SharePoint Governance

by

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Abstract

SharePoint is a web-based business collaboration platform from Microsoft which is very robust and dynamic in nature. The platform has been in the market for more than a decade and has been adapted by large number of organisations in the world. The platform has become larger in scale, richer in features and is improving consistently with every new version. However, SharePoint governance has also gained more importance with these extensions, which always has been a tough challenge with SharePoint-based solutions. This thesis seeks to find a solution for how to govern the SharePoint platform and solutions built on top of it. The state-of-the-art of SharePoint implementation has been studied to identify problem areas and the best practices. The study has identified critical areas which requires governance and the areas has been modelled to get in-depth knowledge as well as identify the core problems. The Governance framework has been developed by taking the identified core problems as a requirement. Moreover, the governance plan has been developed where policies are introduced for each of the critical area by following the governance framework. It is believed that the governance plan will solve the issues and overcome the challenges in an affordable way.

Preface

This thesis was submitted in partial fulfilment of the requirements for the degree Master of Science in Information and Communication technology at the University of Agder. EVRY Consulting AS initiated the project, and the work has been completed under the supervision of Professor Andreas Prinz at the University of Agder, Grimstad, Norway.

First of all, I would like to thank my supervisor, Professor Andreas Prinz for his great assistance, support and patience throughout the project period. His advice regarding the project was invaluable, and the discussion has improved the quality of the thesis. I would also like to thank Morten Rosenberg and Karl-Heinz Fiegl at EVRY Consulting AS for their insightful support, discussions and co-operation. Last but not least, I would like to thank my family for their love, support and believe in me.

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Chapter 1

Introduction

SharePoint governance is the hottest buzzword within SharePoint community and experts today. Much of this is because, the platform has widely emerged during the last decade and is capable of performing some extra ordinary features [1]. Therefore, to gain competitive advantage out of these features as well as keeping the platform managed, the governance has gain more attention.

1.1 Background and motivation

SharePoint governance is a quite a different thing among different experts [2]. Some experts believes that governance is the administration of the platform whereas other believes that it is the guide book that helps end users with using the platform. These are many more ideas circulating in the market as well, which are completely different in nature [3] [4]. The concepts of all these experts are perfectly valid but is not the whole story.

There are many reasons for the ambiguity about SharePoint governance. The first and the most important is that SharePoint is very huge and complex platform.

Many organisations are using it for many different reasons. For example, it is used as a document management system in some organisations, where as other use it as a business intelligence platform. The other reason is that Microsoft has defined it as a very abstract concept and no template is available in the market that can be followed to understand the exact direction for creating the solution [5].

The motivation of this thesis is found from the growing importance of the topic in SharePoint community as well as experts debates and discussions. Microsoft is claiming that it is the fastest growing product in the company history and according to Information and Image Management (AIIM) [6], one in two organisations are using SharePoint server. This concludes that the platform is very stable, however it is noticed that the governance is the challenge that is faced by most of the organisations [7]. Hence, it becomes very important to find a stable solution for this challenge.

1.2 Problem Statement

SharePoint is a web-based business collaboration platform from Microsoft which is highly robust and dynamic in nature. During the last decade, the platform has become larger in scale, richer in features and far broader in relation to the potential scale. As a result, the solutions built on this platform are very easy to use, and often adopted very quickly by the end users in the organization. However, the content starts increasing dramatically and is seldom controlled and governed. This results in an unmanaged, poor performing solution and the platform fails to provide services as expected.

Evry Consulting AS is one of the major providers of solutions based on the SharePoint platform in Scandinavia. As governance is one of the major factors in successful SharePoint deployments, Evry Consulting AS requires a governance plan

that will also be implemented as a part of SharePoint deployment. The purpose of this thesis is to investigate how SharePoint-based solutions should be governed to keep them structured, managed and make use of the platform's large scale and rich features. This thesis will develop an approach to successful SharePoint governance. This entails the following tasks.

- Study the state-of-the-art of SharePoint-based solutions.
- Identify possible problems and best practices for SharePoint deployment.
- Develop a framework for SharePoint governance
- Apply the framework to 1-2 sample cases.
- Provide a governance plan that can be shipped with Evry Consulting AS SharePoint installations.

1.3 Solution Approach

In order to achieve this goal, different approaches will be used to find the solution for the problem at hand.

First, the implemented solutions on SharePoint platform will be studied and the information will be collected about these implementations. The main emphasis will be to find out the best practices as well as the reasons for the success and failure of the implemented solutions. In addition, interviews will be conducted with the companies to find out more in depth information about the daily use of the platform.

Furthermore, an exploratory research approach will be used where existing research, both printed and on-line resources such as Microsoft blogs, will be investigated to get detailed information and to reach the conclusion. So the research made by industry experts and Microsoft blogs will be used as the secondary part of data gathering. With this research as a basis, more in depth information will be gathered for further investigation.

In short, both qualitative and quantitative data analysis approaches will be used to understand the problem and find a solution for it.

1.4 Key Limitations and Assumptions

Limitations

Some restrictions have been made in order to make the project feasible. The following are the key limitations that have been made:

- Even though integration with other systems is an important part to take in consideration, this is out of the scope of this project.
- Although the latest versions such as SharePoint 2013 and SharePoint online are in the market now, large number of solutions are built on SharePoint 2010 platform. So the focus will be to study solutions that are delivered on top of SharePoint 2010 as a platform.
- SharePoint is a very large platform and each section requires in-depth research to completely understand it. However, the focus of this thesis will not be to get in-depth technical knowledge.

When documenting this thesis report, the following are out of the scope:

- Hardware environments.
- Third party software's integration.
- In-depth technical knowledge of every part of the platform.
- Network structure and protocols in the organisations.

Key assumptions

The following key assumptions have been made:

- The implemented solutions are on SharePoint server 2010 which is complete version of the SharePoint platform.
- The third party integrated solutions are performing in an acceptable way.
- Latest updates are installed on all the servers.

1.5 Contribution of knowledge

The key contribution of this thesis is to develop the governance plan that will be used as a best practice in the implementation of solutions based on Microsoft SharePoint platform. The governance plan will describe how SharePoint solutions should be planned, developed, implemented, and utilized. The plan will also include what type of roles, and responsibility should be allocated to a particular person within an organisation. Furthermore, the plan will focus on the areas which are the most critical and important in SharePoint governance.

Finally, this thesis will decrease the ambiguity among people about SharePoint governance and bring them to the single platform about this concept.

1.6 Description of proposed chapters in thesis

Chapter 2 describes the state-of-the-art of the SharePoint platform and the governance associated with it. Both topics are discussed in details to understand the importance of governance in SharePoint platform as well as map them to each other.

Chapter 3 presents the proposed solution. The important governance areas are identified and modelled to draw a clear picture about this concept. Each area is discussed in details and the governance policies are defined for them. Furthermore, different enforcement processes are introduced in this chapter. The automated enforcement process is given a special attention and the framework is introduced for it. Moreover, some automated tasks has been performed by following the automated enforcement framework.

Chapter 4 discusses the outcome of the thesis in details. The steps in the problem statement, objective associated to each step and the achieved goals are discussed in details in this chapter.

Chapter 5 gives a brief conclusion of the work done, and suggestions for the further work.

Chapter 2

Theoretical background

This chapter focuses on the theoretical background of SharePoint governance. As SharePoint is a huge platform and governance is a large topic area in itself, a proper introduction is the key to continue with both concepts simultaneously. The first section in the chapter gives a small introduction to SharePoint whereas remaining sections focus on governance and its importance.

2.1 Introduction to SharePoint

Microsoft SharePoint is a web-based business collaboration platform from Microsoft [8]. This platform helps the business by storing all the content and information on a single place, sharing knowledge across the organisation, automating business processes etc. The platform helps the end users by building different types of sites, uploading and managing documents, search for content and people in a secure way, build and publish reports based on real time data taken from SharePoint itself or other external systems such as structured query language (SQL) Server, Oracle, Enterprise resource planning (ERP) system or Customer relationship management (CRM) system. The platform is fairly complex, but is

divided into six parts commonly stated as the SharePoint Wheel shown in figure 2.1, to make it easy and understandable. These six parts are as follows:

Figure 2.1: SharePoint wheel [9]

1. **Sites**
   The first part of the wheel called “Sites”, means that SharePoint is a huge website creation engine. The end users of the platform can easily create and manage websites without any technical knowledge of web application development. The websites can be for instance internet facing site, team sites and personal blog’s.

2. **Communties**
   The second part of the wheel called “Communities”, means that the platform helps multiple people to work together as a group. The users can together on shared resources at the same time such as documents, task lists, calendars, discussion boards etc.

3. **Content**
   The third part of the wheel called “Content”, means that the SharePoint can

store all content in a single place. Instead of putting content into shared drives or sending emails to each other, it can be stored into SharePoint and can be accessed by authorised persons in organisations. The content can be e.g. documents, presentations, pictures, audio's, videos etc.

4. **Search**
   The fourth part of the wheel called "Search", means that this platform has an excellent, complex and powerful search engine to search content, people within SharePoint as well as outside in the external systems integrated with SharePoint. The platform ensures that users do not get access to confidential content without authorization.

5. **Insight**
   The fifth part of the wheel called "Insight", means that the platform lets the end users to get the business information and give it a meaning with the help of the powerful tools such as the dashboards and the score cards. This platform uses well known applications such as Excel. Anyone can upload and share excel document to SharePoint and then an entire team can access and analyse the same data at the same time.

6. **Composites**
   The sixth part of the wheel called "Composites", means that the platform allows end users to work with data from other systems in the same way as if it is stored in SharePoint. The platform lets users work on-line in the browser or in Microsoft Office. The platform also lets users work off-line in SharePoint workspace where all the data will be synchronised automatically after getting connected.

2.2 What is Governance

According to Wikipedia, the word Governance derives from the Greek verb [kubernáo], which means *to Steer* or guided in a particular direction or manner [10]. Based upon this definition, there are large number of factors involved in steering of any particular object. For example, in steering a boat there are factors such as weather conditions, person experience of steering a boat, the physical condition of the boat itself, the right direction towards destination, etc. It means concentrating on only one factor will not result in successful steering of a boat and it requires that every factor should be given an equal attention.

SharePoint Governance is same as steering the boat and every factor in SharePoint environment requires equal amount of attention.

2.3 What is SharePoint Governance

SharePoint platform provides very efficient results in all six parts of the wheel described in the previous section, but also requires a very good governance. SharePoint Governance is a broad concept and a lot of effort has been done to give it concrete meaning. According to Microsoft, SharePoint Governance is defined as:

"Governance is the set of policies, roles, responsibilities, and processes that guide, direct, and control how an organization's business divisions and IT teams cooperate to achieve business goals" [11].

The main idea that can be derived from the above definition is that governance is the cooperation of business and IT teams, to achieve business goals by following defined policies within an organisation. In a broad way, it defines lines of ownership, who is responsible for what area, best practices to implement and

manage SharePoint environments. In short, governance ensures that the solution built on SharePoint platform is designed, implemented, managed and governed in a correct way. Furthermore, the key components that are defined in the above definition are people, processes, and policies. These key components are explained in detail in the following section.

2.3.1 Key components of SharePoint governance

Governance is the combination of three key components which are people, policies, and processes as discussed earlier. Each of the key component act and perform individually as well as in combination of others. However, change or movement of one component results in the movement of the other components as shown in figure 2.2.

Figure 2.2: Key components of governance

People

The first component of the governance is People. These are the people who are working with or have some kind of interaction with the SharePoint environment in the organisation. For example, content readers, content contributors, and SharePoint administrators. All these different types of people are the capital of the organisation and the governance does not exists without them. The governance plan should cover all these different types of people, their roles and responsibilities, the tasks that they are allowed to or not allowed to do.

Policies

Policies is the second component of the governance. These are the guidelines which should be followed by working within SharePoint environment. The policies must be defined for every type of information in organisation that requires attention in a clear context. Furthermore, it must be ensured that these policies are enforced through either of the enforcement process.

Processes

Processes is the third component of the governance and refers to as different ways to enforce the defined policies. The process that best suits the business should be used for enforcement of the defined policies. Moreover, it is also possible to use the combination of all the processes within the same SharePoint environment.

2.4 Importance of SharePoint Governance

The solutions based on SharePoint platform are very affective, if designed and implemented in a correct way. Therefore, SharePoint is often adopted very quickly

by the end users in an organisation [12]. However, the content inside the SharePoint starts increasing dramatically and it is seldom planned and controlled. The creation of sites start exploding without specific purpose, information starts sharing to the users without proper permissions, content starts storing deep inside folders, documents starts uploading without any Meta-data associated to it, search queries starts failing with providing the un-desired information, information starts appearing on internet facing sites without any approval etc. This ends up with the chaos, and solution fails [13]. Following are the important aspects that describes, why governance of SharePoint based solution are important:

Governance decreases complexity

The governance of SharePoint based solutions is important because it decreases the complexity of the platform. As SharePoint is very dynamic and complex platform and it can provide quite diverse solutions for various types of businesses, must be governed in a proper way. For example, the concrete definition of roles and responsibilities will remove ambiguity among individuals. These individuals will perform their jobs, and the platform will provide services flawlessly.

Governance helps end user adoption

The governance also helps in the end user adoption of the platform. As SharePoint is very rich in features, it is almost impossible for end user to learn it by their own. Governance address this problem by providing clear guidance on how end user should be trained before working with the platform. What type of training is required for different types of roles and what are the responsibilities that should be allocated to each role.

Governance add structure to the content and make it findable

One of the biggest problem of SharePoint is to control the structure of the content. The end users create content such as documents, presentations, multimedia files and upload it to the SharePoint without Meta-data and proper tagging. This made the solution as a black hole, where it is possible to upload every thing but impossible to find it back. SharePoint provides a lot of out-of-the-box features to handle this situation, but only if they are enabled as a part of the governance plan. Thus, the governance also helps in making the content structured and easily findable.

Governance increase quality of the content

One of the other issue that can be solved with governance is the quality of the content. Most often content is created and uploaded it to multiple places. Latter on the content is updated at one place and left un-updated at another place which results in bad quality of content. SharePoint search engine will find the same content at two different places, and end user will be confused which content is up-to-date and which is expired. Governance can solve this issue by enforcing policies for content creation and expiration, in which the expired content will be deleted automatically and up-to-date content will be displayed to the end users.

The governance of SharePoint solutions is also important because it is a complex platform and is very easy to lose control on, if not governed correctly. This can lead not only to the poor performance of the platform but also failure of the complete solution in a certain scenarios. The governance makes it possible to design, implement and run the implemented solution in a smooth and flawless way. Moreover it is also important because the solutions based on SharePoint platform are designed for the end users, who are not information technology experts and it is possible that they are not aware of best practices of working on it. These

were few of the most noticeable aspects among the very long list that says why SharePoint governance is important and has extremely bad consequences in its absence.

Chapter 3

Proposed Solution

This chapter describes the proposed solution for the governance of the SharePoint environment. The first section focuses on the the governance model which has been developed to visualize important areas associated with governance. Followed by governance model is the governance framework, which has been designed to use in the development of the proposed solution.

3.1 The governance model

The SharePoint governance is made up of three equally important areas [14] [15].

1. People
2. Policies
3. Processes

These areas are sub-divided and modelled to get in-depth knowledge of each of the area as shown in figure 3.1. There is no particular order in these areas but all are of equally important to governance. However, these areas are dependent on

each other and lack of time or resources to any of these area can cause damage to the entire governance model.

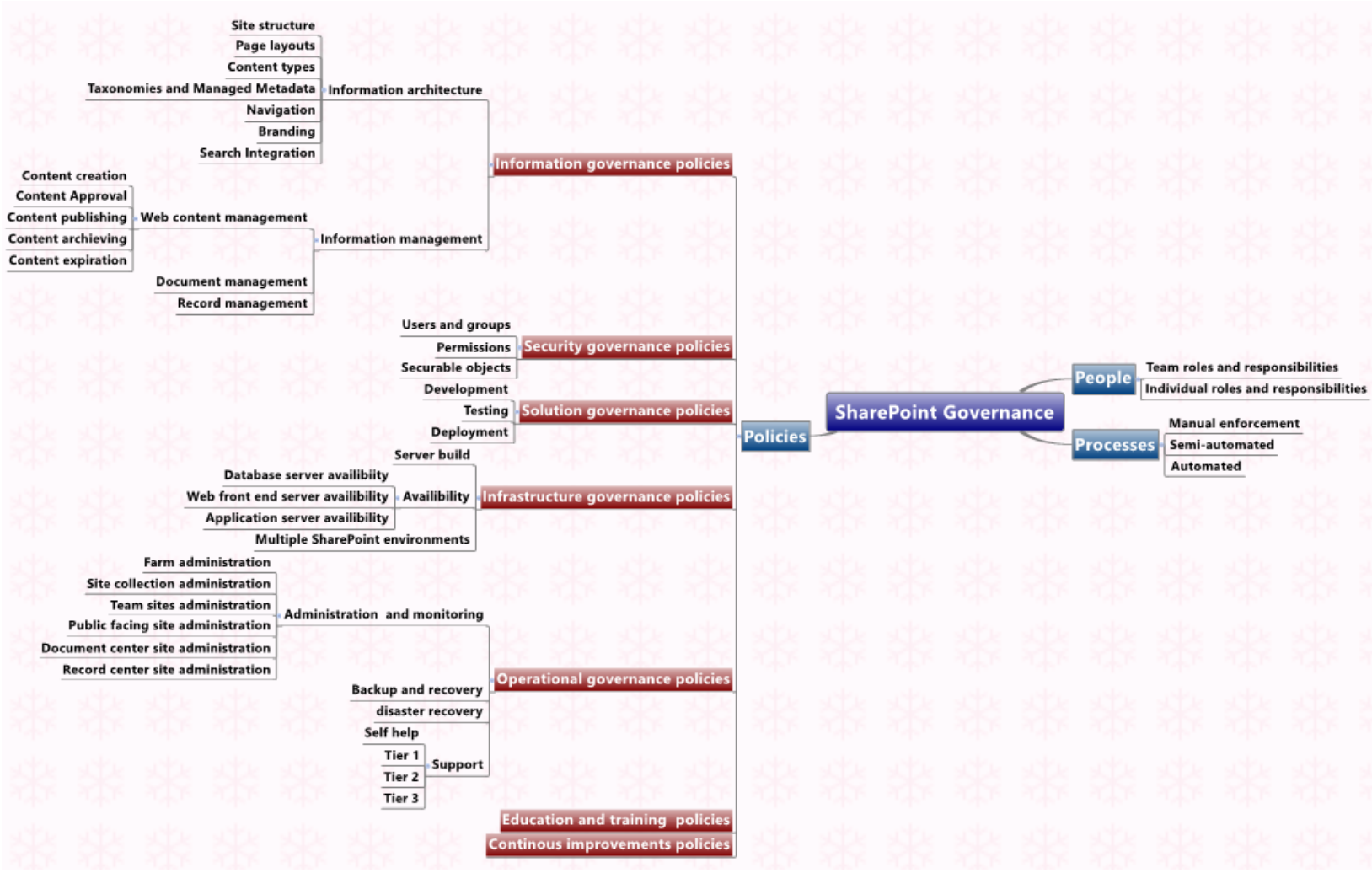


Figure 3.1: The Governance model

3.2 The governance framework

The governance framework consists of the areas that were identified as critical for governance in the governance model. As one of the challenging task with the governance is uncertainty of where to start with the governance. The proposed governance framework shown in figure 3.2, helps in solving this task and make it easier to start work with this complex concept. Furthermore, the framework ties together the important areas into something more useful and understandable both from technical and business perspectives. The following sections describes the proposed solution that has been developed by following the governance framework.

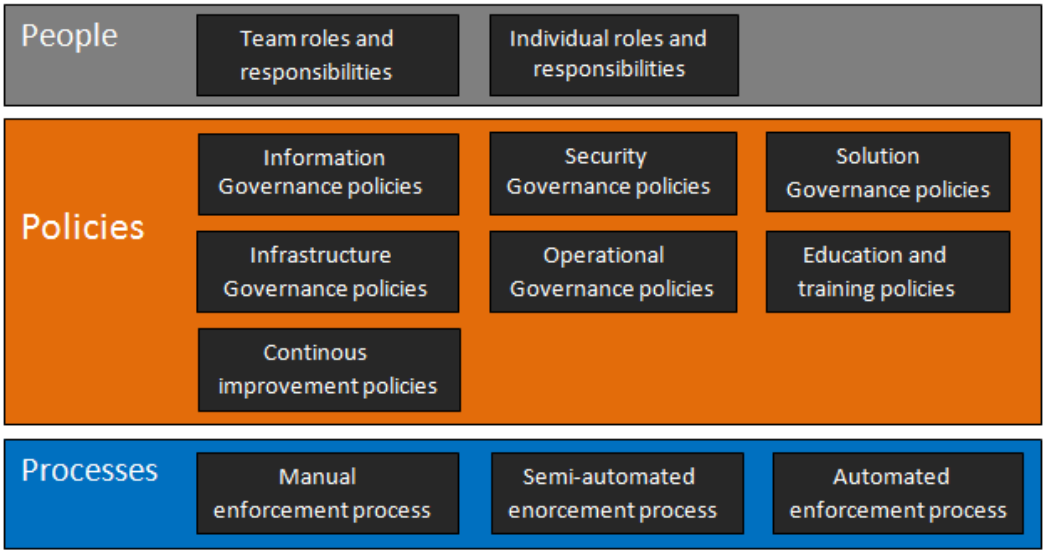


Figure 3.2: The Governance framework

3.3 People

The first element of SharePoint Governance is people as shown in the figure 3.1. This element refers to the people who are working with SharePoint environment in some regard. All of these people should be allocated specific roles and responsibilities to decrease ambiguity about their jobs and increase productivity within SharePoint environment. As every business has a different vision and their SharePoint deployment is built on different requirements, the roles and responsibilities should also be defined differently for each of them. For example, typically a large businesses would have their own development environment where development team would be required, whereas small businesses would outsource the development task where the development team would not be required. However, the following are the typical teams, individuals, the roles and responsibilities that would be defined in a standard SharePoint environment.

3.3.1 Teams roles and responsibilities

Every SharePoint deployment consists of short term (day-to-day) and long term strategies (Long term goal or vision). It must be ensured that both strategies are clearly defined, and there is a separation between strategical and tactical actions to run the environment smoothly. There are two equally important teams that should be defined in every SharePoint environment, a strategy team and a tactical team as shown in figure 3.3 [16].

3.3.1.1 Strategical team

This team consists of business stakeholders, representatives from operations, development, and support. This team will be responsible to align long term strategies of business with SharePoint environment. Furthermore, the team will have the following responsibilities:

Figure 3.3: The governance teams

- Understand how business is growing and what kind of solutions are required to satisfy the improving business requirements.
- How to align our activities with the goal of the business.
- What structure need to be in place to run and support new implemented solutions.

3.3.1.2 Tactical team

This team is further divided into three teams called development team, operation team and support team as shown in figure 3.4 and is responsible to complete the directives initiated by the strategy team. Each of the team will focus on and will be responsible for their own task, directed by the strategy team. Following are the teams and the detailed tasks, that they would perform on daily basis.

Figure 3.4: The tactical teams

Development team

This team depends on the structure of the organisation as discussed earlier in the report. However, whether this team is inside the organisation or the development tasks is outsourced to the third party, the development team will be responsible for custom development in SharePoint environment and will have the following responsibilities:

- Advance custom branding
- Develop custom site definition, features and solutions
- Develop custom page layouts, content types, web parts, and workflows
- Integration of SharePoint with external systems

Operation team

This team will be responsible for the operational support and maintenance of the SharePoint environment by performing nightly backups, monitoring, scheduled

task validation and keeping the system current with system upgrades. In short, the team will have following responsibilities:

- Backup, recovery, and disaster recovery
- Monitoring and maintenance
- Deployment of custom solutions
- Security
- Installations and updates

Support team
The support team will be responsible for handling environment related questions, and other problems that requires resolution. This team will consists of administrators, help desk personnels, and on-line resources that would provide help in the SharePoint environment. Furthermore, the support team will have following responsibilities:

- Troubleshoot SharePoint environment related issues.
- Forward complex and custom development related to the development team.
- End user support via telephone, Email.
- Drive end user adoption.

3.3.2 Individual roles and responsibilities

The tactical teams that were defined previously could be broken down into smaller roles where each role could be directly mapped to a specific person or job role within organisation. The individual roles also depends upon the nature of the business and their SharePoint implementation. For example, in a large organisation an individual role would have less responsibilities as compared to the small

organisation where the same role would have more responsibilities. It is also possible that in some SharePoint environments, responsibilities are merged together and allocate it to a single role.

A standard SharePoint implementation would have roles and responsibilities that can be found in table 1 of appendix E [17].

3.4 Policies

The second element of SharePoint Governance is policies as shown in figure 3.1. This element refers to the policies which should be followed by working in SharePoint environment. Following are the areas that were identified as a critical for SharePoint governance and requires policies.

3.4.1 Information governance policies

Information governance is the governance of organization's entire information such as websites, document libraries, lists, rich media, content, etc. The purpose of information governance is to make this information more usable, accessible, and manageable. The information governance could be further divided into two categories called "Information architecture" and "Information management". Following is the explanation of each category and the governance policies associated with them can be found in appendix E.

3.4.1.1 Information architecture

Information architecture determines how the information is organized and presented to the end users. The information architecture must be designed, implemented and governed in such a way that the information can be easily consumed

by the end users [18]. The information architecture is made up of small elements as shown in figure 3.1, and following is the explanation of each of the element. The governance policies should be introduced for each element to improve the information access to the end users as well as improve the ability of content creators to develop and maintain the information over time.

Site structure

A site structure means the structure of entire site collections, sites and sub-sites of the solution built on SharePoint platform. A SharePoint based solution consists of a single or multiple web applications. A web application further consists of a site collection with built-in top level site. Sites and sub-sites can be created in a top level site in a hierarchical manner, if required. The site structure should be planned according to the structure of the organisation and all relevant information should be stored and displayed on the same site. Furthermore, the site structure should be governed to ensure the best end user experience on any particular site in the entire solution. [19].

Page layouts

A page layout is the frame which holds structure of the entire page inside the master page. The web parts and the field controls are added to the page layouts to display the content on a certain page [20]. SharePoint provides numbers of out-of-the-box page layouts and also provides flexibility to develop custom page layouts according the given requirements. The page layouts should be designed in such a away that the user interface of the page which is using the page layout friendly and performance of the page is good. Furthermore, the page layouts should be governed to ensure that flow of information on the pages is consistent and the features that are added to it are performing as desired.

Content types

A content type is the centralized, reusable package of settings that can be applied

to content in SharePoint. Content types have a hierarchical relationship referred to as "Parent-child relationship" in which setting from one content type is inherited by the other content type [21] [22]. SharePoint provides large number of out-of-box content types for different types of information as well as provides possibility to develop custom content types. The content types should be strictly governed to ensure that only required and related content types are published to a particular site collection and correct content type is being used to generate the content.

Taxonomies and Managed Meta-data

Managed metadata is the hierarchal collection of centrally managed terms that can be defined and used for differnt types of items in SharePoint based solutions [23]. A *term* could be defined and associated with any item in sharepoint and *term set* is the collection of all the related terms. Taxonomy is the framework embedded in SharePoint platform to ensure that the content uploaded is classified correctly and is easily findable. Taxonomy organizes related objects in a hierarichal structure in SharePoint implementation and establishes categories of them. Furthermore, it creates a naming standards for terms to provide consistency in a Sharepoint deployment and supports managed metadata. The taxonomies and managed metadata should be governed to ensure that the business related tags are defined and applied to the content.

Navigation

SharePoint navigation provides primary interface for users to move across site collections, sites, sub-sites, and pages. Additionally, links to external websites can also be created through this navigation. SharePoint provides three types of navigations out-of-the-box which can be used directly without any modification [24]. However, these navigations are also highly customizable. All types of navigations used in SharePoint environment should be governed to ensure consistent movement of the end user across multiple sites. Following are the three types of navigations that are typically used in SharePoint environment.

- **Global Navigation**
  This is the most commonly used navigation in SharePoint environment which appears at the top link bar in the SharePoint sites. Most often, this navigation is used to move across different site collections or top level sites.
- **Current Navigation**
  The second type of navigation is called a quick launch or Current navigation and appears at left side of the site. This navigation is used to move across different lists or document libraries in any particular sites.
- **Bread crumb**
  The third type of navigation is called a bread crumb which are dynamically generated and appears at the top of the web pages. This navigation is used to move across page in a particular SharePoint site.

Branding

Branding is the customization of look and feel such as colors, fonts, logos, and graphics of the site. SharePoint is highly customizable and multiple level of branding can be applied to it. From changing a theme to advance customization in the master page, SharePoint is highly flexible in branding [25][26]. SharePoint provides large number of out-of-the-box themes which can be directly applied to brand any particular site in SharePoint and it is also possible to design a custom theme in Microsoft PowerPoint and then import it to the SharePoint environment. Advance customization can be done through modification in the master page of any particular site. As SharePoint provides multiple number of sites, the branding of these sits should also be targeted in a different way. For example, the internet facing site should be highly branded and must match with the company brand and line of business as it is exposed on the web to the whole world where as a personal site in the Intranet environment should be lightly branded. However, the branding of every type of site in SharePoint environment should be governed to ensure that the look and the feel of the site matches with the business brand and is consistent across the entire solution.

Search integration

SharePoint has a very powerful search engine in its core and is very critical because it is used most often to find content, hidden under several levels. There is a standard search in SharePoint which works against all crawled attributes that are defined for the content [27]. But it can also be customized to offer more advanced filtering. Search in SharePoint environment should be governed to ensure that the end users are easily accessing what they are looking for and the content that requires special authentication is available to the authorised users. It is also important because there is a tight integration between SharePoint search engine and permissions in the SharePoint environment. SharePoint search engine respects permissions, however it must be configured to display related and authorised content the end user.

3.4.1.2 Information management

Information management refers to the strategy of management of unstructured information within enterprise. This unstructured information can be web content, documents, images, multimedia, emails etc. Information management enables us to control who can access this information, what can they do with it, and how long it should be kept within organisation. Furthermore, it makes the information more manageable, usable and findable [28]. Information management can be divided into sub-categories to make it more understandable. Following are the sub-categories of information management and detailed explanation of each of them.

Web content management

Web content management (WCM) refers to the management of content which is displayed on the site such as plain text, graphics, images, videos, and audio. This content has a life cycle from its creation to expiration as shown in figure 3.5 and it

should be governed to ensure that correct and up-to-date information is displayed on the pages. Furthermore, the governance policies should be defined for each step of the life cycle in WCM to ensure that only relevant information is created and displayed on any particular site in SharePoint environment. Following is the explanation of each step of WCM in SharePoint environment [29].

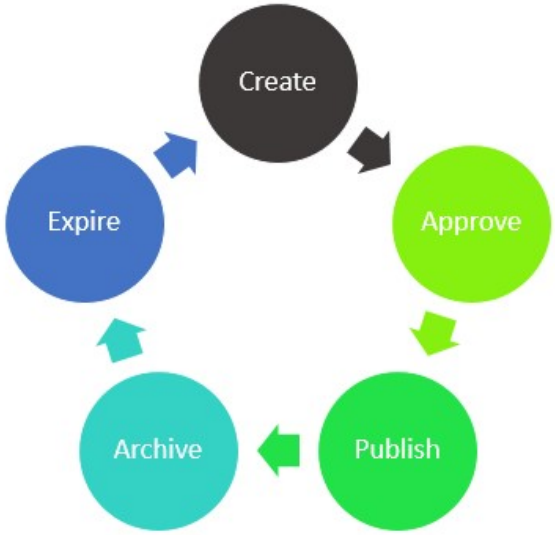


Figure 3.5: Content life cycle [30]

1. **Content creation**
   This is the first step in life cycle of WCM where content is created. The creation of content varies from one site to another in SharePoint environment. For example, the content creating for the internet facing sites should be strictly controlled as compared to content that is creating for the Intranet. The number of content creators should also vary from one type of site to another.

2. **Content approval**
   This step of WCM refers to approval of the content that has been created in

the previous step. This also varies from one site to another in SharePoint environment and the criteria should be different for each of them. For example, the content that has been created for internet facing sites should be approved from multiple approvers where as the content posting to the personal site may not require approval.

3. **Content publishing**
   This part of the life cycle deals with the publishing of the content that has been created and approved in the previous steps. The publishing of the content also varies from one site to another in the SharePoint environment. For example the content publishing to internet facing site should be strictly controlled and very few number of people should be allowed to publish the content as compared to the content publishing to the Extranet or Intranet where large number of people could publish the content.

4. **Content archiving**
   Content archiving is an option that can be used to increase the visibility and usefulness of up-to-date content and increase the long term sustainability. However, it must be planned and decided what should be done with the content, after it is archived.

5. **Content expiration**
   Content expiration is the ability to remove the content from storage system upon expiration. This helps in recovering the storage acquired by the expired content as well as ensures that expired content is removed completely. However, it must be decided which content should be removed and which content should be kept forever as an organization record.

3.4.1.3 Document management

Document management refers to the storage, management, accessing, and tracking of electronic documents in the SharePoint environment. These documents could be Microsoft Word documents, excel sheets, PDF's, PowerPoint presentation etc. [31]. All of these documents would have a life cycle as a web content discussed in the previous section, but most often they have longer life time than them. Sometimes, these documents are kept forever and declared as a record of the organisation as shown in figure 3.6. The document management should be governed to ensure that the documents are created with the organisation standard, stored at the correct place, accessed by the people who has authorization, policies such as version control and retention time are activated on them, and findable by the SharePoint search engine etc.

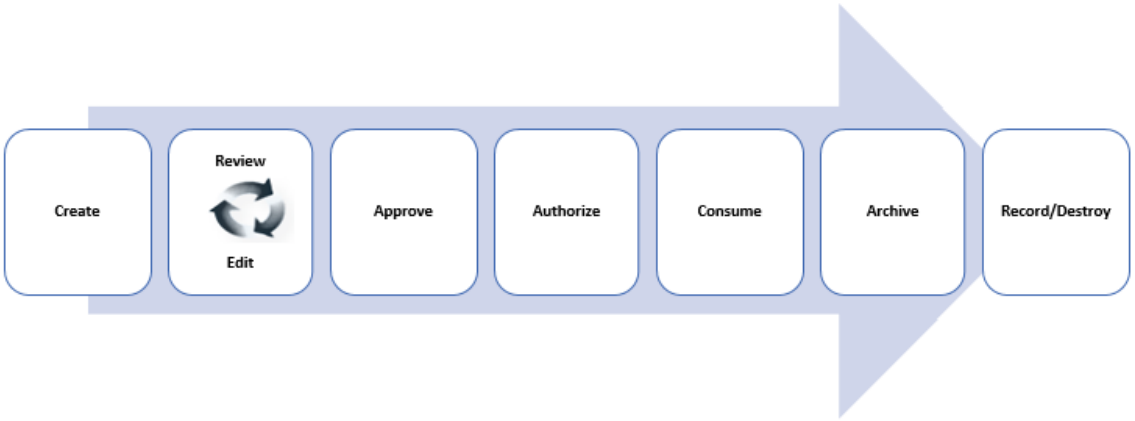


Figure 3.6: Document life cycle

3.4.1.4 Record management

Record management enable us to manage documents that are necessary for the life line of the business such as legal documents, contracts [32]. Furthermore,

it ensures that the content which is declared as a record is secure in SharePoint environment and is available for authorized users only. SharePoint provides some of the excellent and unique features for record management out-of-the-box such as in-place record management, eDiscovery, and email and messaging records. The record management should be governed to ensure that the all the content that is declared as a record in secure, accessible, audited and monitored regularly, and limited numbers of users have access to it.

3.4.2 Security governance policies

Security is the granting of permissions to individuals or groups for accessing securable objects in SharePoint environment. According to this definition, there are three important elements in SharePoint security model which are individuals or groups, permissions, and securable objects as shown in figure 3.7 [33]. However,

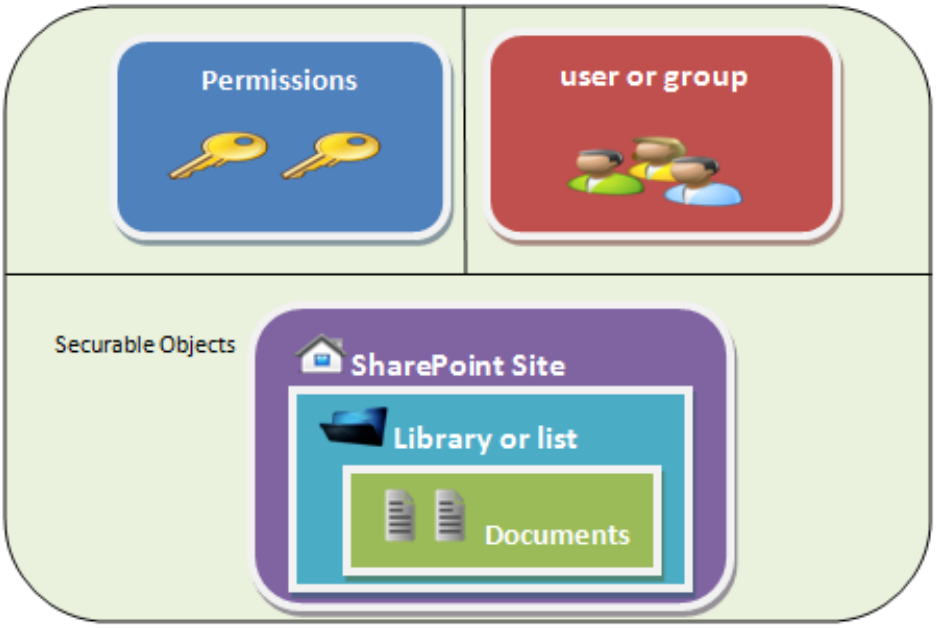


Figure 3.7: Elements of SharePoint Security Governance

it is required to understand the following concepts before applying the security policies in SharePoint environment.

- ⋆ Different levels of permissions.
- ⋆ Fined grained permissions.
- ⋆ Inheritance in SharePoint security model.
- ⋆ SharePoint groups vs. active directory (AD) groups.
- ⋆ Service account passwords

All the security elements shown in the figure 3.7, should be governed to ensure that the SharePoint environment is secured. Following is the explanation of these elements and the governance policies related to them can be found in appendix E.

3.4.2.1 Users and groups

The first element in SharePoint security model is user or groups who needs access to any particular site or content in the SharePoint environment. These users or groups can be given access either through internal SharePoint groups or domain groups such as AD group. However, the users and groups should be strictly governed to ensure that authenticated people have access to the information. It is also a good practice to give access to the group rather then individual user because the administration of the group is easy as compared to the administration of large number of individual users.

3.4.2.2 Permissions

Permissions is the second important element in SharePoint security model which means to grant a user the ability to perform specific actions in any particular site. For example, the read permission allows users to view items and pages, opens

items and document. There are multiple levels of permissions that can be allocated to the particular user or a group. It is also possible to allocate multiple permissions to a single user of group. For example, a user can have both read and contribute permission and in this case the higher level will be win and should be allocated to the user. Permissions should be strictly governed to ensure that correct level of permission is allocated to the user or group in SharePoint environment.

3.4.2.3 Securable objects

The third important element in SharePoint security model is securable objects which refers to a specific entity such as a site, list, document library, folders, or any specific item for which permission levels can be assigned to users or groups in the SharePoint environment. Furthermore, it must be noticed that all the items, lists and libraries inherits permissions from the parent site by default. So it should be customized if different permission levels are required on any particular securable object. All the securable objects should be governed individually to ensure the access as well as the permission level that has been allocated to the user of group.

3.4.3 Solution Governance policies

SharePoint is a highly customizable platform and supports customization on multiple levels. From a simple site branding to highly customized server side code, different type of customization is feasible in SharePoint environment [34]. However, custom SharePoint solutions should be developed under particular standards. Furthermore, different environments should be used to develop custom solutions in SharePoint environment. The custom developed solution should also pass through certain phases before it is deployed to the production environment as shown in figure 3.8. Following are the different phases of custom solution development in SharePoint environment and the governance policies related to them can be found in appendix E.

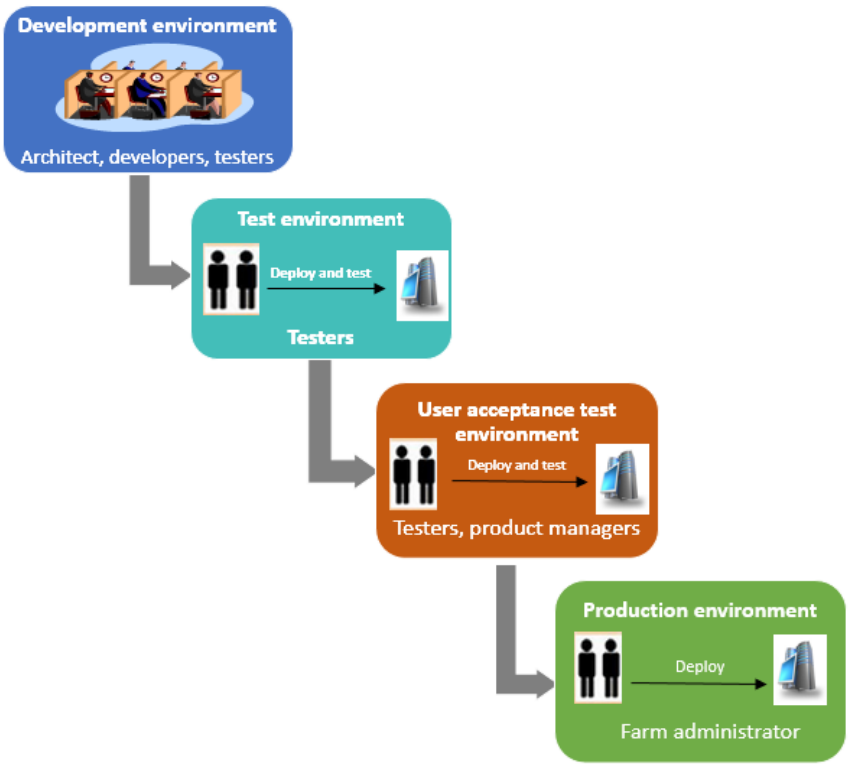


Figure 3.8: Multiple SharePoint environments

3.4.3.1 Development

This is the first phase in custom solution development in SharePoint environment. SharePoint should be installed on a development machine to take full advantage of its development capabilities and features. The development environment should be designed depending on the size of development team. SharePoint provides multiple options to create development environment and it should only be used to create custom SharePoint solutions.

3.4.3.2 Testing

The second phase in custom solution development is testing in SharePoint environment. A separate environment should be built for testing and custom developed solution should be tested multiple times in a this environment. This will help in identifying the critical issues and errors in the early stage and improve the quality of code for the production environment.

3.4.3.3 Deployment

The final step is the deployment of custom developed solution to the the production environment. SharePoint provides multiple ways for deployment of the custom developed solution to SharePoint environment. The first and the most common way is to upload windows solution package (WSP) file to the solution gallery in SharePoint environment and activate it. The second way is the deploy custom solution directly from Visual Studio (VS). VS will automatically upload, configure and activate the solution in the SharePoint environment. The third way is to use Windows PowerShell to deploy solution to SharePoint environment. The fourth and rarely used way is to manually move dynamic link library (DLL) files to SharePoint environment. The way that suits best regarding the technical resources and the environment should be used to deploy the custom developed solution.

3.4.4 Infrastructure Governance policies

Proper planning and governance of the infrastructure is vitally important in SharePoint environment. The number of servers, processors, and the amount of random access memory (RAM), physical or virtual servers are the key requirements that should be governed to achieve maximum reliability in SharePoint environment [35]. Following are the different elements in SharePoint infrastructure and the governance policies associated with them can be found in appendix E.

3.4.4.1 Server Build

SharePoint server can be built and installed by number of ways depending on the requirements of the business. These installations includes a single server with built-in database installations, single server, and multiple-server farm installations [36]. A server should be built according to the requirements of the business as well as governed to keep it up and running to provide goals.

3.4.4.2 Availability

Availability means that SharePoint environment is up and running under full potential. As SharePoint is a web based system, and all of the content is stored in SQL Server databases, the availability of SharePoint means availability of multiple servers such as SQL Server, Front-end web servers, and the application servers as shown in figure 3.9. To ensure availability of SharePoint, it must be ensured that all other servers are up and running at the same time [37]. The following is the explanation of each server performing to ensure the high availability of the SharePoint environment.

- **Web Front End (WFE) server availability**
  SharePoint is a web based application and WFE servers handles web page requests from the end users. The WFE server handles hyper text transfer protocol secured (HTTPS) requests and relies on Internet Information Server (IIS). Multipe WFE should be used in SharePoint environment to ensure high availability of WFE as well as SharePoint environment. Furthermore, Network Load Balancer(NLB) should be used to distribute requests among WFE servers.
- **Application server availability**
  Application server provides key infrastructure and services for applications that are hosted in the SharePoint environment. It is the server that runs all

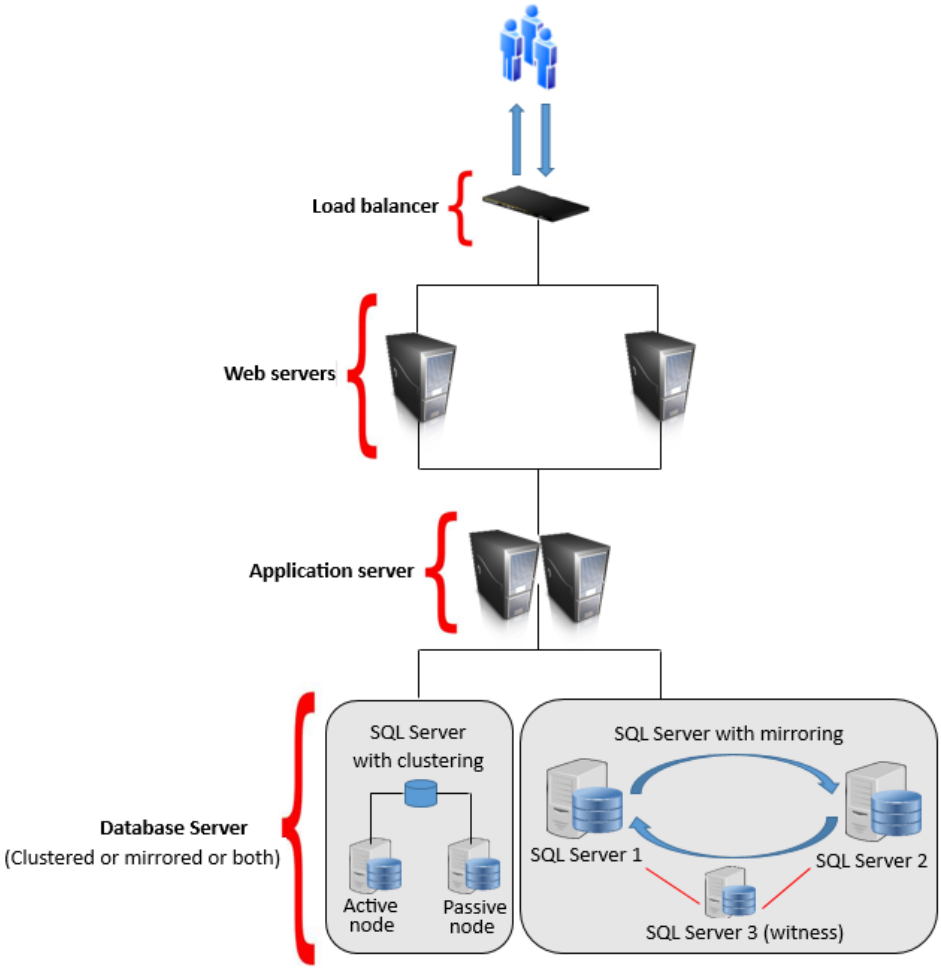


Figure 3.9: High available farm architecture [37]

the heavy services such as Microsoft Visio, Excel, Access, index/search services etc. These services can be activated and de-activated according to the business requirements and it is also possible to divide and run these services on multiple application servers in the same environment. Furthermore, the application server does not serve content to the end users because they do not have web application role. Multiple application servers should be added to SharePoint environment to ensure high performance and availability.

- **Database server availability**
  SharePoint stores all its data in content databases on the database server. The database server can be installed individually on a separate server as well as on the server where every thing is installed on the single server such as stand-alone environment. However, the best practice is to install database server on a separate server. Furthermore, the database server should be configured for performance and availability to ensure high availability.

3.4.4.3 Multiple SharePoint environments

A custom SharePoint solution should pass through certain phases before deployment to the production environment as described in the previous section. Furthermore, each phase should be allocated a separate environment. For example, there should be at least four different environment such as Development, Testing, User acceptance testing, and production, to ensure the reliability of the solution as shown in figure 3.8. All of these environment should be same in infrastructure as well as latest updates should be installed in each of the environment.

3.4.5 Operational Governance policies

There are certain tasks that should be performed on a regular basis to keep every system operational. SharePoint is not an exception and there are tasks that should be performed on a regular basis [38]. Following are the tasks and the governance policies associated with them can be found in appendix E.

3.4.5.1 Administration and monitoring

SharePoint administration and monitoring is the key requirement to ensure that SharePoint environment is healthy and running under full potential [39]. SharePoint provides large number of out-of-the-box functionalities to monitor itself and

ensure its performance level. The following are the key areas that requires administration and monitoring in the SharePoint environment:

Farm administration

A SharePoint farm is the logical collection of different servers that provide services. A typical SharePoint farm operates stand-alone, however it could also work by cooperating with other farms. The administration of SharePoint farm is required to ensure the health and sustainability of the environment. SharePoint provides large number of out-of-the-box features that can be used for monitoring and administration of SharePoint environment [40]. However, it is also possible to develop custom solutions for farm administration and a lot of third party tools are available for administration of SharePoint farm .

Site collection administration

A site collection is a group of sites with built-in top level site and has its own content database, and owner [41]. The sub-sites can be created in the top level site and they inherits most of the properties from site collection such as permissions, navigation, by default. It is a best practice to create multiple site collections in the SharePoint environment and all the related sites and content is stored within a single single collection. However, it is required to actively monitor all site collections to provide a good performing SharePoint environment. SharePoint provides a lot of out-of-the-box features for site collection administration such as monitoring of allocated permissions, health and performance monitoring, space used by the content in the content databases, etc.

Team sites administration

A team site is a SharePoint site which is used for a particular project or a team. These sites have often very short life time and are archived or deleted upon expiration [42]. However, the monitoring and administration of team site is also required to ensure that correct functionality and features are activated on the site

and they are performing as required.

Publishing sites administration

These are the internet facing sites which represents brand of the company or organisation. In SharePoint, these sites have a separate site collection template and differs in a lot of features from other SharePoint sites. For example, these sites have enabled publishing features out-of-the-box, while in other SharePoint sites it should be enabled manually [43]. These sites should be monitored more strictly as compared to other sites because of its exposure to outside world.

Document center administration

These sites are centralized location for storing large amount of documents. The documents stored in these sites are not related to particular project or team and can be allowed to access by large number of audience [44]. However, these sites should also be governed to ensure that people have only read permission on this site and they are not allowed to make changes in site or the content. Furthermore, it should also be governed to ensure that this site does not contain duplicate documents from other sites.

Record center administration

The record center site is a SharePoint site dedicated to centrally storing and managing records. These sites are meant for storing company records and make them immutable so that it cannot be modified or overwritten. These records can be for instance contracts, employees personal information, and company legal documents [45]. The record center sites should be strictly governed to ensure that all the documents are secured and few people have access to it. Furthermore, it must be ensured that the auditing feature is activated on this site to keep the record of every activity performing on the documents.

3.4.5.2 Backup and recovery

Backup is important in SharePoint because it ensures that the data is safe and recoverable in un-pleasant situations such as disaster. There are numbers of processes through which backup could be taken in SharePoint environment, and the process most suitable for the business should be used [46]. Following are the backup processes available in the SharePoint environment.

- ⋆ Backup entire farm.
- ⋆ Backup a farm configuration.
- ⋆ Backup a web application.
- ⋆ Backup a service application.
- ⋆ Backup a site collection.
- ⋆ Backup customization.
- ⋆ Backup content databases.
- ⋆ Backup snapshot databases.

3.4.5.3 Disaster recovery

Disaster recovery refers to restoration of services after hardware failure, loss of power, natural disaster, etc [47]. To restore a server farm, the following SharePoint components must be backed up:

- ⋆ Configuration database and central administration content database.
- ⋆ All other content databases.
- ⋆ SharePoint 14 Hive folder.
- ⋆ *Inetpub* folder with complete customization such as *web.config* file.
- ⋆ IIS for all front end servers used in the farm.

3.4.5.4 Support

Support means providing help to the end users of the system, whenever required. It can be delivered by many technologies depending on the situation and the environment of the business. For example, questions can be answered directly through telephone, Online chat, and Emails. On-line forum is also kind of a support, where question are answered through forum. As SharePoint is a complex platform, therefore a multi-tiered support should be provided to the end users as shown in figure 3.10. A dedicated SharePoint site should be created and every person in the organisation should have access to it. The end users should check for the solution on this site first. There should also be a discussion forum where end users will be allowed to post their problems. If the end user does not find the solution for the problem on the site, they will contact Tier 1 for support. Tier 1 will be responsible for solving small issues such as features and functionalities, uploading of documents to SharePoint, integration of Microsoft Office with SharePoint etc. If Tier 1 could not solve the problem, it should be forwarded to Tier 2. Tier 2 will be responsible for solving more complicated problems such as allocation of storage space, permission management, features activation and deactivation etc. Lastly, if the problem is so complex that Tier 2 cannot solve it, should be forwarded to Tier 3. Tier 3 will be responsible for the most complex problems such as support related to custom code, installation and updates issues, performance related problems etc.

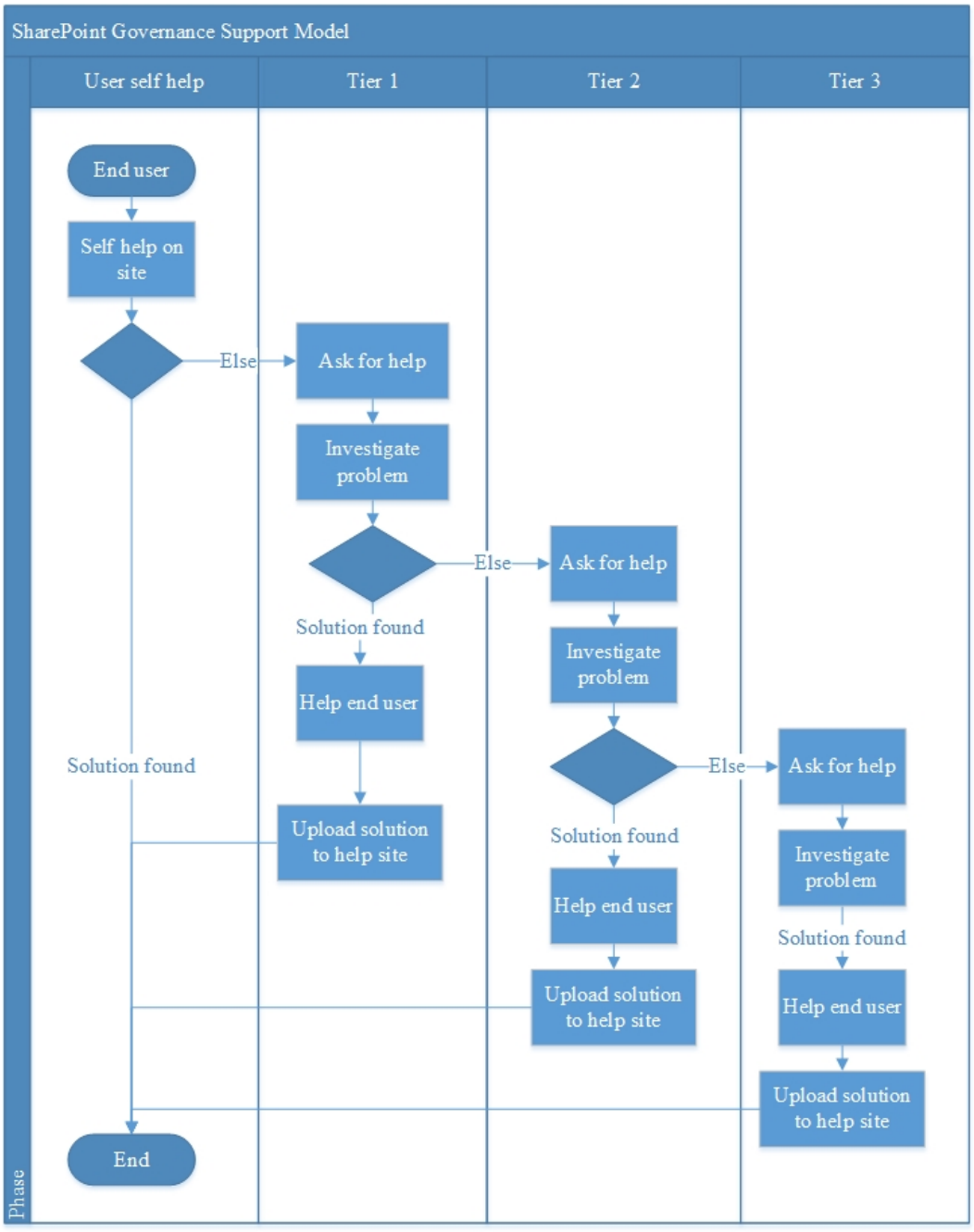


Figure 3.10: SharePoint Governance support model

3.4.6 Education and training policies

This is the most critical stage in SharePoint deployment and is often under estimated. Most organisations spend a lot of time and resources in the deployment of SharePoint, but they do not give enough training to the end users. As a result of this the end users does not have a knowledge of using the platform in the correct way.

SharePoint platform is very rich in feature and it is almost impossible for end user to learn it by their own. They need a proper education and training to consume rich features of SharePoint platform in a correct and effective way [48]. Furthermore, the end users should be trained how they can perform their day-to-day tasks affectively with SharePoint rather then learning entire SharePoint platform. They should also be taught why a particular feature that they are learning is important in their daily life.

One of the most common mistake in training the end users is that trainers gives training specific to SharePoint platform. The trainer wants to teach the entire platform to the end user in a very short time. This ends up with too much burden on the end user and they does not learn, what they should learn to perform their job affectively. The governance policies related to the education and training can be found in Appendix E.

3.4.7 Continuous Improvement policies

Continuous improvement is an ongoing effort to improve a product or a service. As business requirements changes, the solution needs to be improved to fulfil new requirements. However, the case is different in SharePoint environment because the other elements such as infrastructure , security, operation, education and training also needs to be improved to support the improved solution as shown in figure

3.11 [49]. In most of cases it is not practical to take all the elements and start

Figure 3.11: Continuous improvement in SharePoint environment

improving it on the same time. Instead, an iterative and incremental approach and First In First Out (FIFO) approach should be used to improve the solution. Furthermore, the most important and independent topics should be targeted first. The depth of the topic should also be notices and divided into sub-topics, if the problem is complex. After improving the specific topic area, the other elements such as infrastructure , security, operation, education and training should be improved accordingly. This process should continue in the same manner till the life time of the SharePoint environment. The governance policies related to continuous improvement can be found in Appendix E.

3.5 Processes

As discussed previously, the governance plan should be a living document, and updated as the solution extends. However, in many organisations the scenario is opposite to it. They have a well documented governance plan, but they lack in the enforcement of the policies documented in the governance plan. So in addition to have a good governance plan in place, it must be ensured that policies are also enforced accordingly [50]. There are three processes to enforce the policies, which are as follows:

1. Manual enforcement process
2. Semi-automated enforcement process
3. Automated enforcement process.

3.5.1 Manual enforcement process

Manual enforcement is a process in which a person checks manually whether the policies defined are enforced or not. This process requires a lot of time and resources from an organisation. In a small organisation where there is a small SharePoint implementation, this process may be feasible. However, in a large organisations with large SharePoint implementation, this process is impractical.

3.5.2 Semi-automated enforcement process

Semi automated is the process in which a tool such as Windows PowerShell or other third party tools are used to ensure that the governance policies are enforced in the SharePoint environment. This process requires less time and resources as compared to manual enforcement, but still requires human intervention most of the time. The proper example of the semi-automated enforcement will be the

generation of reports about the health of SharePoint envirnment with the help of built-in SharePoint features.

3.5.3 Automated enforcement process

Automated enforcement is the process in which all the policies are enforced automatically and there is no human intervention. Unfortunately, there is no out-of-the-box solution for this process in SharePoint environment, but it can be developed with custom code for some policies. There are also third party tools available to perform automatic enforcement, but they are expensive and non realistic in some of the implementations. Fortunately, there are technologies which can be used to develop custom automated solutions free of cost. The following section describes the framework which can be used to develop the custom automated solutions.

3.5.3.1 Automated enforcement framework

The automated enforcement process is the best alternative among the three choices discussed earlier because it is less time consuming and error free. As discussed earlier, SharePoint platform does not provide this solution out-of-the-box but it can be developed by combining by some core technologies of SharePoint platform [51]. Furthermore, it should be noticed that it is not possible to enforce all the policies with this framework. This automated enforcement framework consists of four steps as shown in figure 3.12.

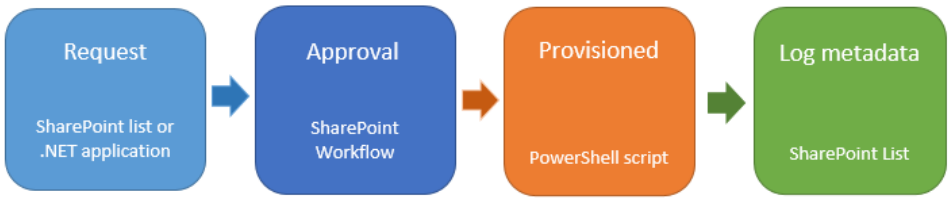


Figure 3.12: Automated enforcement framework

Step 1: Request

The end user sends request through a SharePoint list or .NET application within SharePoint environment.

Step 2 : Approval

The request is received by approvers through the SharePoint Workflow. The approvers approves the request and update the SharePoint list item.

Step 3 : Provisioned

The powershell script reads the SharePoint list and check the updated list. If the list has approved items, the powershell script creates the desired functionality and update the SharePoint list items to completed.

Step 4 : Log metadata

The metadata is added back to the SharePoint list.

All the technlogies used in the automation framework are the core technologies used by SharePoint itself, free of cost, and are higly supported by Microsoft. The automation framework can be used to create tasks automatically, ensuring that the governance policies are also enforced. Following is the scenario taken from the SharePoint environment to ensure that the automation framework provides results as expected.

3.5.3.2 A sample scenario showing enforcement of policies through automated enforcement framework

Suppose there is a frequent request for the creation of the team site in an organization. The organization has a governance plan which says that the following policies should be enforced while creating team site in SharePoint environment.

1. Name of the site should be provided by site requester.
2. The purpose of the site should be provided by site requester.
3. The name of the site administrator should be provided.
4. Versioning feature should be enabled.
5. Check-out and Check-In features should be enabled on all document libraries.

In the manual enforcement process, the end user will send request to the the help-desk for the creation of new team site. The help-desk will then send the request to the number of approvers for the approval of the new site. After getting approval, the help-desk will send the request to the site collection administrator to create a new team site and ensures that governance policies are enforced. The site collection administrator will create a site and enforce governance policies on it. The end user will get a site with enforced governance policies.

The problem with this approach is that there are large number of actors involved in the process and probability of making a mistake is too high. There is also a lot of time consumption and must be double checked to ensure that the governance policies are enforced. Following is the same scenario where a team site should be created by using automated enforcement framework.

Step 1: Request
The end user requests for a new team site by filling the form as shown in the

3.13. The data stores in a SharePoint list and request is sended automatically to approvers.

Figure 3.13: SharePoint list for site request

Step 2: Approval

The request is sended to approvers via a SharePoint Workflow which is implemented by using Microsoft SharePoint Designer 2013 3.14. Steps in the SharePoint worflow are as follows:

1. The Workflow sends the recieved email confirmation to the site requester.
2. The Workflow sends an email to the approvers for approval of the request.
3. The Workflow waits, untill all approvers approves the request.
4. After approval, the Workflow changes the value of the column called "Status" from "Request" to "Approved" as shown in figure 3.14.
5. The Workflow stops after doing all of this work automatically.

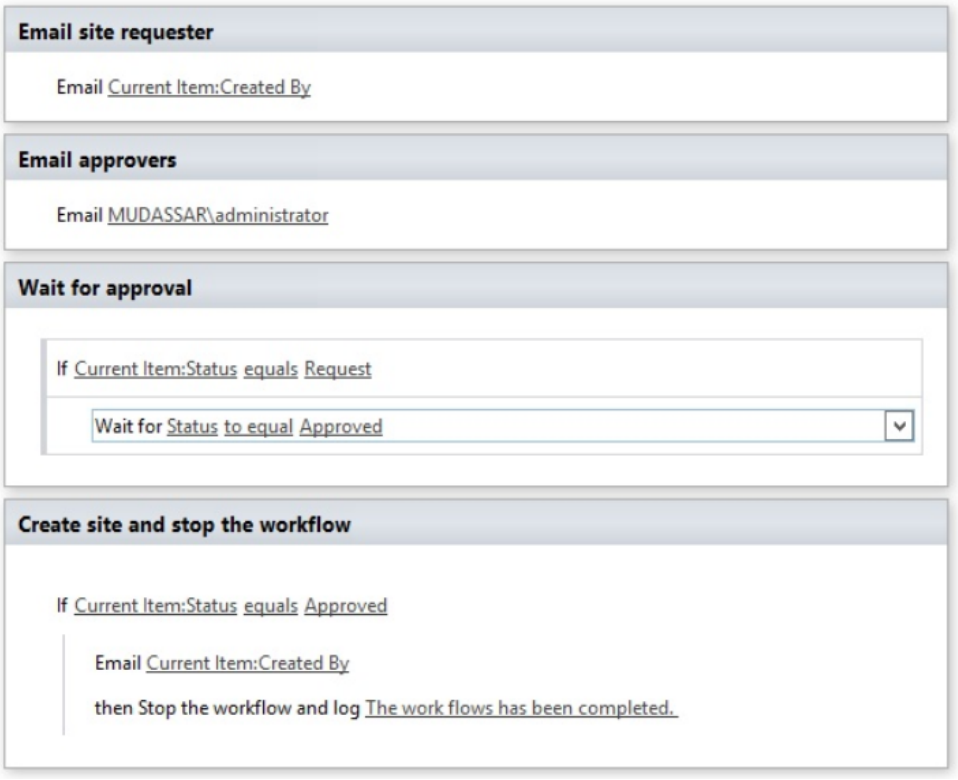
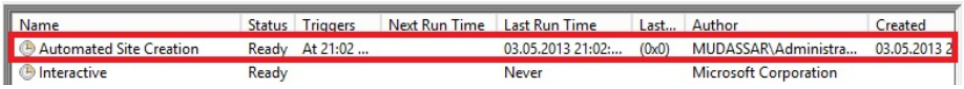


Figure 3.14: Workflow in SharePoint designer

Step 3: Provisioned

After completion of the Workflow, the PowerShell script runs and create the team site. There are three ways to run the PowerShell script and the one most suitable to the business should be used. The first way is to run the PowerShell script directly from the Workflow. However, SharePoint does not provide out-of-the-box features to do it and a third part developed features should be used to perform this activity. The second way is to develop a windows service that will read a SharePoint list, but this is also an expensive method as a custom windows service should be developed to perform it. The third way which is easy, affordable and SharePoint provide it out-of-the-box is to create a scheduled task that reads the SharePoint list.

The third way has been used in this scenario and a scheduled task has been created that will read SharePoint list as shown in figure 3.15. The scheduled task runs the



Name	Status	Triggers	Next Run Time	Last Run Time	Last...	Author	Created
Automated Site Creation	Ready	At 21:02 ...		03.05.2013 21:02:...	(0x0)	MUDASSAR\Administra...	03.05.2013 2
Interactive	Ready			Never		Microsoft Corporation	

Figure 3.15: Scheduled task

PowerShell script shown in figure 3.16 , and the script reads the entire SharePoint list. If the script founds any item with the status "Approved". The script will take all the data provided by the end user and create the team site automatically. In addition, the script also ensures that all the governance policies which are defined in the script are enforced automatically.

```
try {
     Add-PSSnapIn "Microsoft.SharePoint.PowerShell" -ErrorAction SilentlyContinue
     }
catch { }
$weburl="http://mudassar/sites/IT"
$listname="Site request"
$web = get-spweb $weburl
$list = $web.Lists[$listname]

$items = $list.items

$items | foreach{
$item = $_
$name = $item["Site name"]
$admin = $item["Site administrator"]
$admin = "MUDASSAR\administrator"
$status= $item["Status"]

if($status -eq "Approved")
{
  Write-Host "Script is creating site collection"
  $url = "http://mudassar/sites/$name"
  $sitename =$name
  get-spwebtemplate
  $template=get-spwebtemplate "STS#0"
  new-spsite -url $url -name $name -OwnerAlias $admin -Template $template

  $weburl="http://mudassar/sites/$name"
  $listname="Shared Documents"
  $web = get-spweb $weburl
  $list = $web.Lists[$listname]
  $list.ForceCheckOut = $true
  $list.EnableVersioning = $true
  $list.Update()
  $web.Dispose()

Write-Host "Finished"
$item["Status"]="Completed"
$item.update()
}
}
```

Figure 3.16: PowerShell script for creating team site

Step 4: Log Meta-data

The Meta-data is added back to the SharePoint list to keep track of the activity. In this case, the creation date of the team site has been added to the SharePoint list as shown in figure 3.17.

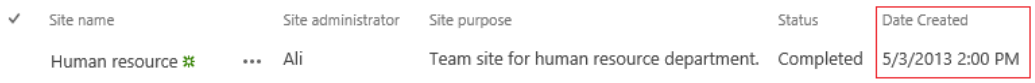


Figure 3.17: Addition of meta-data to SharePoint list

Chapter 4

Discussion

The purpose of this thesis was to investigate how SharePoint based solutions should be governed to keep them structured, managed, and use the platform large scale and rich features. The problem statement defined in chapter 1.2 was divided into certain steps and goal were specified with each step. Following is the discussion about each step and goals achieved as a result of the work done.

Study state-of-the-art of SharePoint-based solutions
The first step was to study the state-of-the-art of existing SharePoint deployments with the objective of gaining enough knowledge. The study has been done by combining the qualitative and quantitative research.

The qualitative research was done by literature study, surveys and by studying two existing SharePoint deployments. The literature study included reading books, white papers issued by Microsoft and their partners and on-line resources such as Microsoft blogs. Two of the existing SharePoint deployments were also studied in depth to understand the core reasons of the problem. The complete documentation, from requirement gathering to the solution implementations were gathered and studied. The purpose of this study was to understand and map the require-

ments with the delivered solution and identify possible problems. Furthermore, interviews were conducted with both the end users and administrators of the solutions shown in appendix C, to understand the expectations they have had and the solution they had been delivered. Also, a survey shown in appendix B, was done among end users to target large number of people and to collect information as much as possible. This helped us in sketching a very clear picture of both the solutions, its strengths and weaknesses which leads us to the quantitative research.

The quantitative research was done to ensure, whether other deployments encounter the same problems as the two solutions that had been used in qualitative research. Again, on-line resources and already existing surveys were used to collect the data. This was very surprising that a very large number of organisations encounters the governance issue and was a very hot buzz word in the SharePoint community.

Identify possible problems and best practices for SharePoint deployment
The second step was to identify possible problems as well as best practices of the SharePoint deployments. For the most part, this was achieved during the first step and with some extra work of further cross matching the gathered information.

The first problem area that was identified was ambiguity of roles and responsibilities among individuals. For instance, the end users had no idea who to contact or even where to start, if they had a problem. The farm administrator and database administrator were confused about taking backups. This issue was taken into account and was resolved by introducing specific roles and responsibilities in the proposed solution.

The second identified problem area was information architecture and management. There was a duplicate content every where, and search engine was not providing results as expected. End users were very frustrated with finding similar

information on two places and were unable to choose which information is up-to-date. Internal and External links among sites were broken and end users were redirected to error pages, where they had not idea, what went wrong. Page layouts were un-ordered and required information was very difficult to find. These issues were resolved by introducing the information architecture and management policies in the proposed solution.

The third problem area that was identified as critical was security. People had an access to the information that they should not have, while others had no access to the information that they should have. Important elements and objects were identified that were causing these problems and policies were defined for them during proposed solution.

The fourth identified area was the custom solution development. The solutions were directly deployed to the production environment without enough testing, and that caused troubles. Different environments were proposed during solution and policies were made for each of the them.

The fifth critical area which leads to many problems was infrastructure. For instance, web servers fails to support a lot of user simultaneously or sometimes database server were too slow to respond. The issues was resolved by creating policies for infrastructure.

The sixth identified area where the problems were noticed was operational. There were problems with the monitoring and different level of administration of the system. Furthermore, problems were also identified with taking the backup, recovery and the support model.

The seventh and the very under estimated area was the education and training of the end users. They were left on their own to learn the system and no proper

training was given to understand how to use the system.

The last identified problem area was related to the improvement in the SharePoint environment. A very wrong concept was developed about SharePoint that it is a platform that fits for all the problems at once and solve it out-of-the-box. Business requirements were changing and no improvement had been done in the environment to support these changes.

The main problem areas and the best practices were identified during this step and were studied further for the development of the governance framework.

Develop a framework for SharePoint governance
The third step was to develop a governance framework that could be used to develop a governance plan. During the last two steps, the problem areas, the best practices and in-depth knowledge was gathered that could be used to develop a governance framework. As identifying a correct problem within a very big area is also a challenging task and it is very easy to make a mistake. Therefore, this process was also divided into stages. An abstract model was created first, where all identified areas were included. Each area was further divided into sub-area to get the clear overview and its complexity level. The problems within sub-area were identified individually and mapped back to the sub-area and area in the bottom up approach. This process was repeated until all individual problems were identified. All of these problems were taken as a requirement and the governance framework was developed by mapping the problems to specific areas.

Apply the framework to 1-2 sample cases
The fourth step was to apply the developed governance framework to a sample case. The idea was to ensure that governance framework provides results as expected, if used with a different SharePoint implementation. The framework was applied to one of the solution that had been studied during the state-of-the-art.

Although, the solution was not very complicated and was under further development. But the governance framework performed as expected and most of the issues were solved.

Provide a governance plan that can be shipped with Evry Consulting AS SharePoint installations

The last and the final step was to develop a governance plan that could be shipped with EVRY Consulting AS installations. As each business requirements and their SharePoint implementations are different and a single governance plan does not fit for all at once. Therefore, an abstract governance plan has been created by following the governance framework, which could be modified to satisfy a particular business requirements. Furthermore, a check list has been created which could be used to identify areas and sub-areas that should be targeted with the governance plan.

Chapter 5

Conclusion and further work

The Chapter 1 presented how solutions built on SharePoint platform does not provide services as expected due to lack of governance. To solve this problem and avoid the complete failure of the platform, a governance solution was required such that the platform rich features and capabilities could used while keeping the platform controlled and managed. Hence, the ultimate goal of this master thesis was to provide a governance solution for the SharePoint platform.

To achieve this goal, the thesis was divided into five steps and objectives were set for each of the step. The first step was to study the state-of-the-art of SharePoint based solutions. The objective of this step was to gather in-depth knowledge about SharePoint platform, how solutions are built on top of the platform, and how and where the governance problem arise. As SharePoint is extremely large platform and detailed explanation of each and every part of the platform was out of the scope of the thesis. Therefore, a very short introduction to the SharePoint platform, governance and its importance is included in Chapter 2, to get a general overview about both topics. The second step was quite related to the first step where some extra knowledge filtering and cross matching was required. The main objective with this was to identify the problem areas and best practices associ-

ated with the SharePoint implementations, which will clear on-going confusion. Again, the objective was achieved by identifying the problem areas and best practices, which were modelled later in Chapter 3.

The third step and its objective was to develop a governance framework, that could be used to develop a governance plan for any particular SharePoint implementation. The objective was achieved and presented in Chapter 3. The fourth step was to apply the governance framework to a sample case. The objective with this step was to check whether the governance framework provides results as expected by applying it to the real implementation. The governance framework has been applied to a sample case and the framework performed as expected.

The fifth and the final step was to develop a governance plan that could be shipped with EVRY Consulting AS SharePoint implementations. The objective has been achieved and the governance plan has been developed which could be modified as per requirements of the customers.

Future work

SharePoint governance is a broad topic and an extensive research has been done to achieve the main goal of the thesis. Two SharePoint implementations were studied extensively and interviews were conducted with both end users and administrators to understand the core of the problem. However, the area is far from completely covered and need further study and research.

The topic could be further studied with respect to the large implementations which are shared across multiple regions and countries in the world. The latest version of SharePoint (SharePoint online), where farm administrators also have limited authorization could be studied from governance perspective. Furthermore, the areas that could be further studied in on-premise implementations are as follows:

- Governance of SharePoint environment for business intelligence solutions.

- ⋆ Governance of SharePoint platform with respect to the business connectivity services.
- ⋆ Governance of SharePoint platform for project management solutions.

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Appendix A

Abbreviations

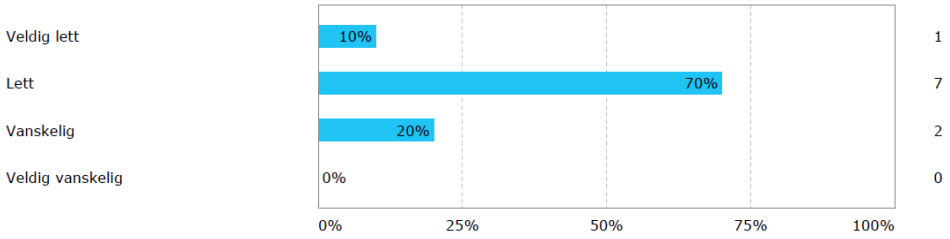
Word	Description
RAM	Random Access Memory
ERP	Enterprise Resource Planning
CRM	Customer Relationship Management
SQL	Structured Query Language
AD	Active Directory
WSP	Windows Solution Package
GB	GigaByte
IIS	Internet Information Server
FAQ	Frequently Asked Questions
HTTPS	Hyper Text Transfer Protocol Secured
FIFO	First In First Out
WCM	Web Content Management
VS	Visual Studio
DLL	Dynamic Link Library
WFE	Web Front End
NLB	Network Load Balancer
CSS	Cascading Style Sheet

Appendix B

End user : Interview questions and answers

As a part of gathering information and identifying possible problems, interviews were conducted and survey has been done to target large number of end users. The following is the survey that was conducted at the University of Agder, Kristiansand campus. The survey was sent to 30 people and most of the them have participated. Although some of the participants did not took part in all the questions, but they answered some of the questions randomly.

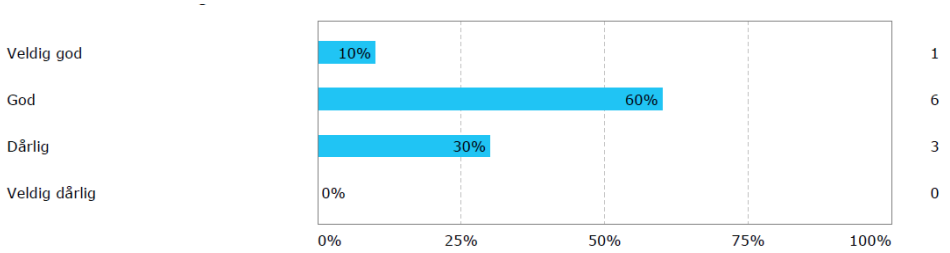
1. **Hvordan er den daglig bruk av intranett?**



2. **Hva er din favoritt funksjonen og hvorfor?**

   - Lagring av dokumenter. Har bruk for det
   - Søk. Nyttig og nødvendig
   - Kunngjøringer.Fordi det er enkelt og greit å legge inn hurtimeldinger og fint å få meldinger som berører de fleste
   - Lagring dokumenter. Fint å kunne samarbeide på dokumenter-lett å finne tilbake de via søk og bla i dokumentbiblioteket-kan også finne de hjemmefra, eller på reise, kan koble dokumentliste til min Outlook og SharePoint Workspace, og kan også lese/redigere via ipad.

3. **Hva er din erfaring med bruk av intranett?**



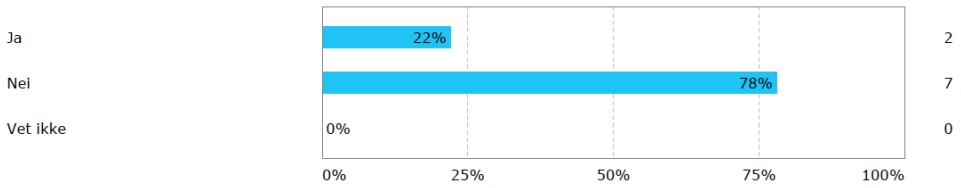
4. **Hva er mest irriterende funksjonen og hvorfor?**

    - Bruker lang tid på å laste inn. Dårlig søkefunksjonalitet. Alt ligger i Worddokumenter.
    - Dokumenthåndtering
    - Jeg synes søkefunksjon ikke er like enkel. Sliter ofte med å gjenfinne dokumenter
    - Tungvint å komme tilbake til bibliteket, hovedside.Må først tilbake til førstesiden på innaskjærs

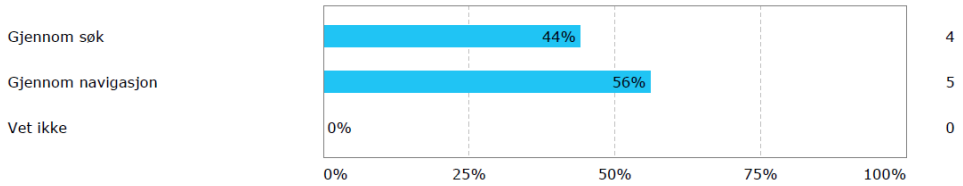
5. **Hvilken ny funksjon ønsker du å ha og hvorfor?**

    - "Liker" funskjon som er på facebook.
    - Mer "social media"-aktig. Mer dialog. Mer faglig innhold. Integrasjon eller høsting til/fra Twitter/Facebook/Instagram.
    - Jeg vil ha en bedre søkefunksjon som gjør det lettere å finne riktig dokument

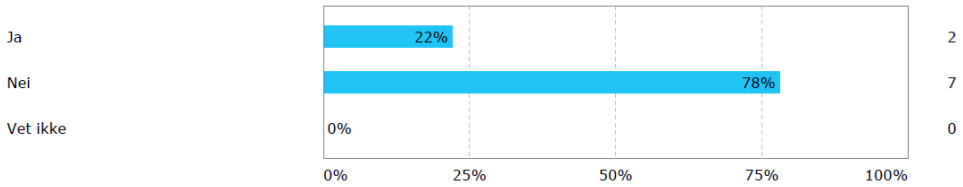
6. **Er det lett å finne inhold på intranett?**



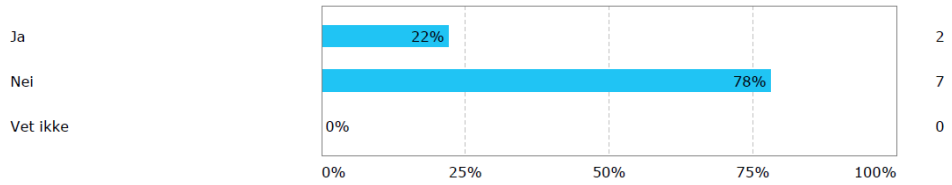
7. **Hvordan foretrekker du å finne inhold på intranett?**



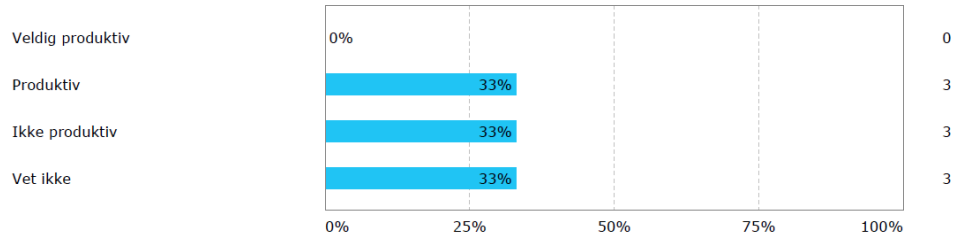
8. **Bruker du tag funskjonen "Jeg liker/merker" på intranett?**



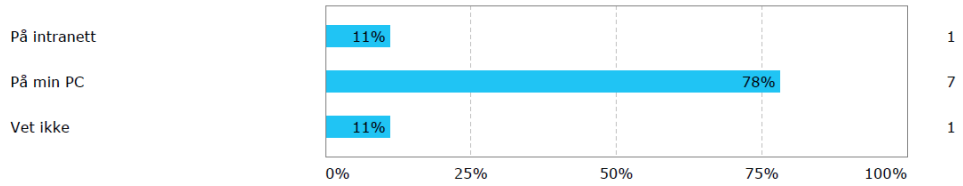
9. **Har du personlig blogg på intanett"?**



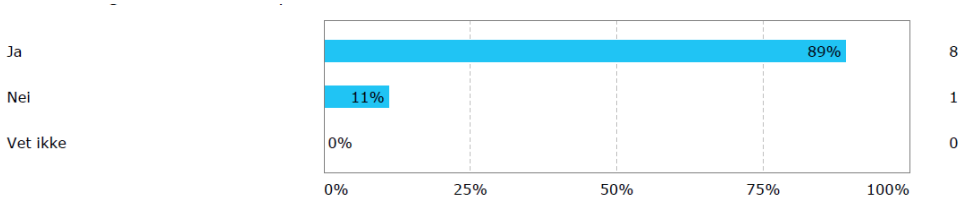
10. **Hva synes du om din produktivitet på jobb med bruk av intranett?**



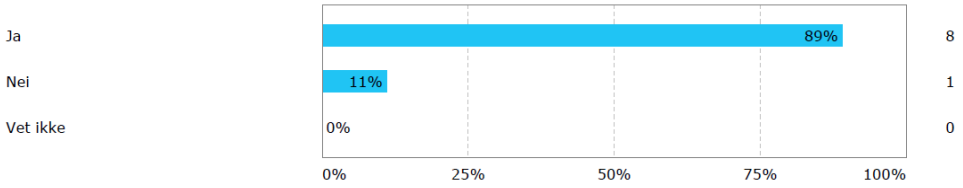
11. **Hvor lagrer du dine dokumenter oftest?**



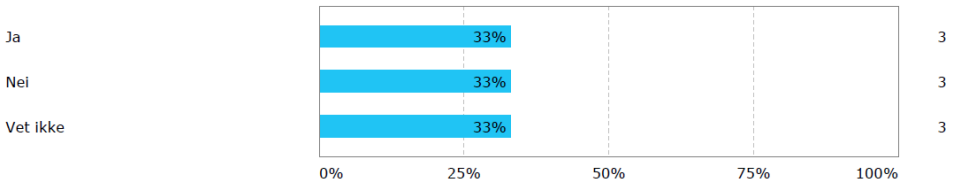
12. **Har du lagret dokument på intranett?**



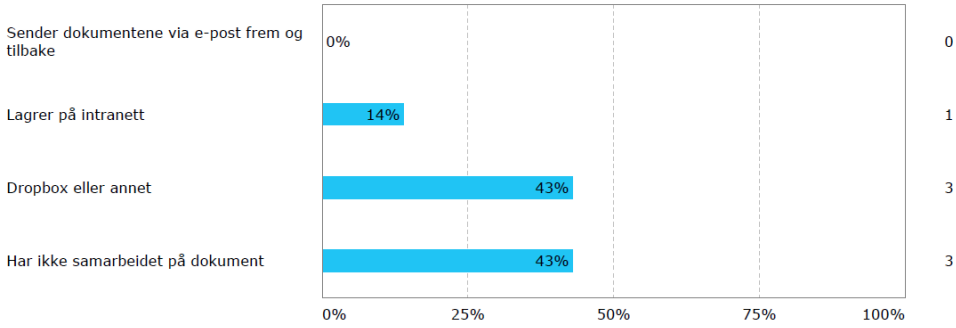
13. **Vet du forskjellen mellom lagring av dokument på intranett og din lokale PC?**



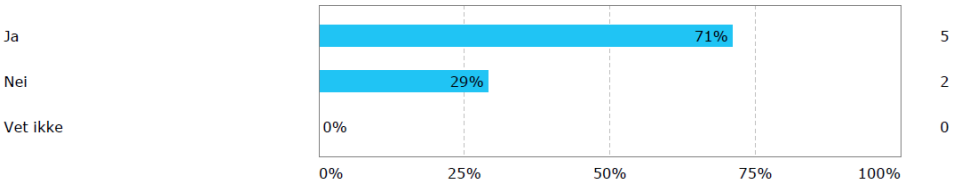
14. **Bruker du versjonskontroll funskjonen på dokumentene?**



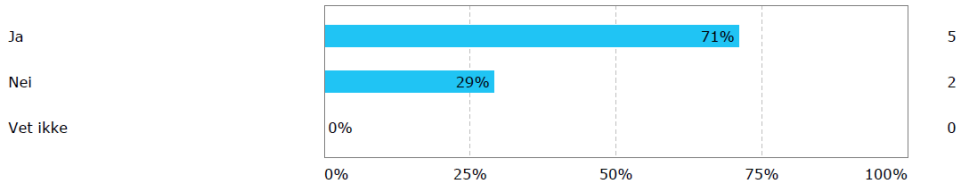
15. **Dersom du samarbeider på et dokument, hva gjør du?**



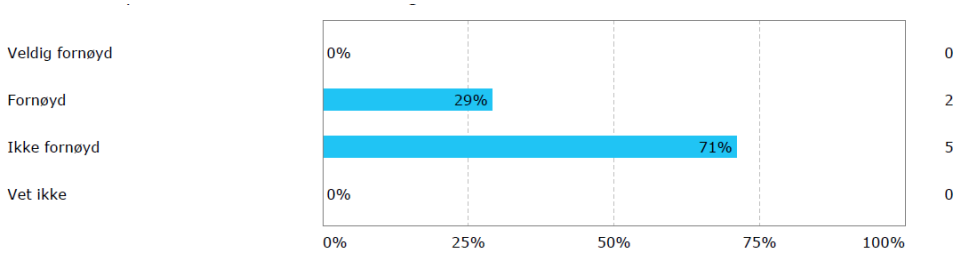
16. **Har du bidratt med innlegg eller svar på diskusjoner på intranett?**



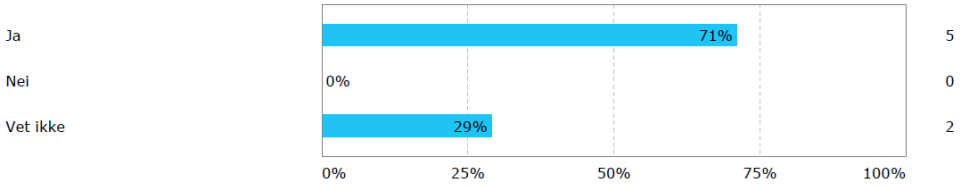
17. **Har du skrevet nyhet på forside av intranett?**



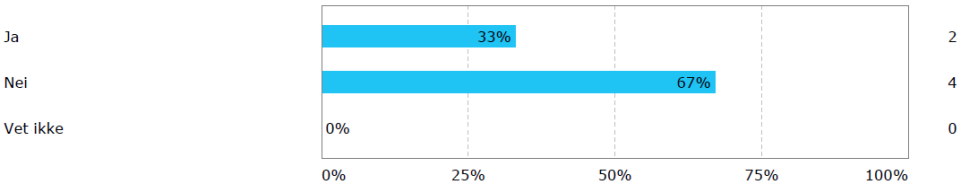
18. **Hvor fornøyd er du med utseendet og følelsen av intranett?**



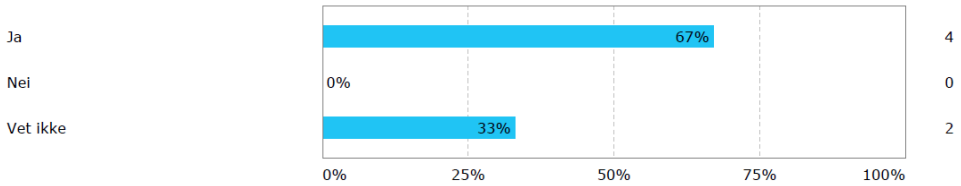
19. **Er du førnoyd med fargevalget som brukes i intranett?**



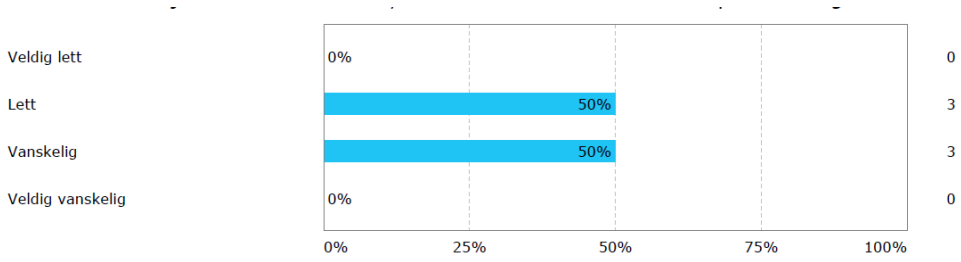
20. **Er oppsett av sidene enkle og lett å bruke?**



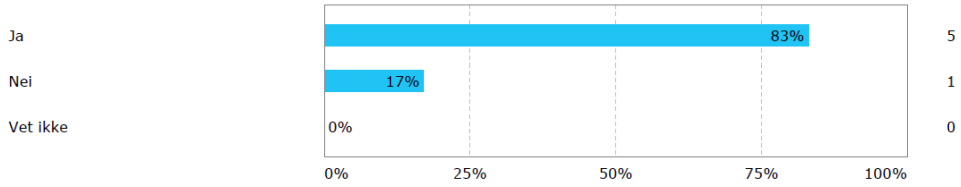
21. **Er den først side av avdelingen din ryddig og godt organisert?**



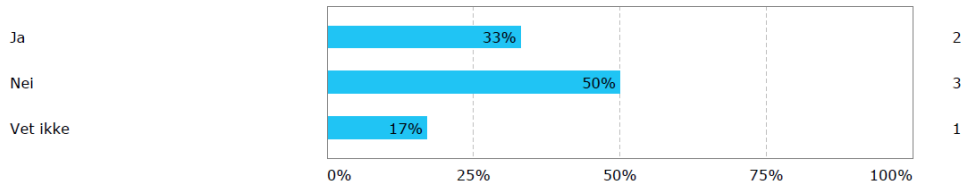
22. **Hvordan var å jobbe med intranett, når det først ble introdusert på avdelingen din?**



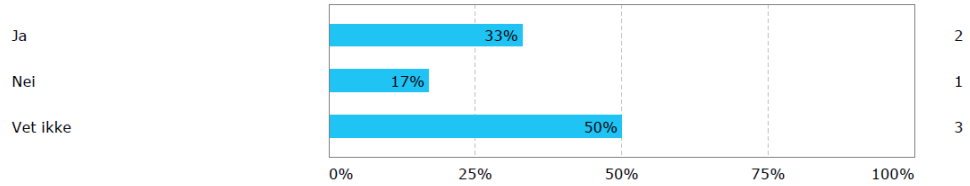
23. **Synes du det er lettere å bruke funksjoner på intranettet nå enn i starten?**



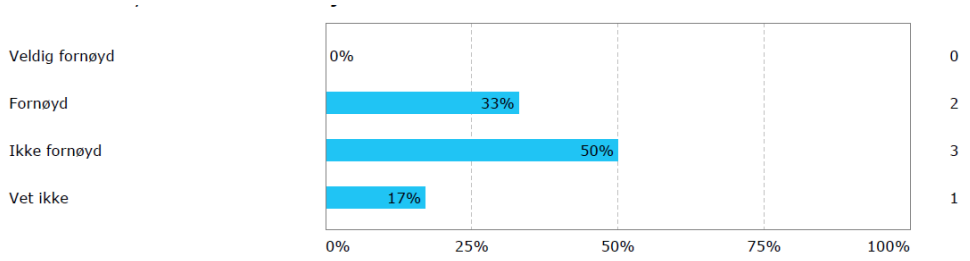
24. **Synes du at sider lastes inn raskt på intranett?**



25. **Fungerer funskjonene som forventet?**



26. **Er du fornøyd med søkefunskjonen?**



Appendix C

Administrator : Interview questions and answers

As a part of information gathering, interviews were also conducted with administrators of the SharePoint environment at University of Agder and Kristiansand Kommune. Both administrators were asked the same questions and the answers provided by them are merged together to understand the core problems. Following are the interview questions and answers provided by SharePoint administrators.

1. **Hvilken SharePoint lisens brukes i din organisasjon?**
   SharePoint Server 2010 Enterprise.

2. **Hva er din erfaring med å bruke SharePoint som administrator??**
   Liker SharePoint, men brukere kan har vanskelig med å forstå systemet . Spesielt dette med at vi ikke lenger lagrer via "gule mapper".

3. **Hva er ansvaret til SharePoint-administrator?**
   Jeg er administrator med fokus på sluttbrukerene, har ikke ansvar for server, backup etc – svarer derfor med Se svar fra Central admin på de spørsmål jeg ikke kan besvare. Eksmpler på administratoroppgaver jeg har: Opprette

dokumentbibliotek, lister etc, endre rettigheter. Endre tilganger. Out of the box muligheter og ellers bidra med brukerstøtte.

4. **Hva er kriteriene for tildeling av tillatelser?**
   Vårt intranett er delt i to site collections – intra.uia.no og mitt.uia.no - der intra.uia.no har en toppsite kalt for Forside – som er delt områdene i Nyheter, InfoService og Organisasjon – med forskjellige rettigheter satt opp.

   Full kontroll gis til minst en bruker på hver site/område under organisasjon (avdelingenes interne samhandlingsområder) etter noe opplæring.
   Alle brukere har lese- og skriverett (Bidra) på alle områdene for samhandling, under organisasjon – bruker med full kontroll på eget området kan eventuelt endre rettigheter.
   Under Nyheter, har alle brukere lese- og skriverett i side biblioteket for nyheter, mens områdene aktuelle og leder har begrensede skrivetilganger, en redaksjonsgruppe, mens andre brukere har leserett.
   På infoservice – fellesinformasjon – er det gitt skriverett til fåtall, leserett til alle og dokumentbiblioteket er satt opp med kladdeversjonering.

5. **Er det noen plan for utvidelse av løsningen?**
   Planlegger mulighet for områder der eksterne kan gis tilgang, en ny site collection. Pt er løsningen bare åpne for uia ansatte. Vi må også vurdere om området Organisasjon, skal være i en egen site collection. Nå er alle områdene i samme site collection – under Forside. Og en ev. oppgradering til Sharepiont 2013.

6. **Hva er planen for katastrofegjenoppretting?**
   Vi tar backups veldige ofte.

7. **Noen katastrofe har skjedd så langt?**
   Nei.

8. **Hvor ofte tar du backup?**
   Veldig ofte.

9. **Har du tilgang til powershell?**
   Ja – men pt liten kunnskap om dette i organisasjonen.

10. **Hvilket nivå av tilpasning er lov?**
    Jeg bruker User Interface veldig ofte. Men vi har lov til å bruke andre verktøy som SharePoint Designer.

11. **Hvilke verktøy er tillatt for administrator å bruke for tilpasning?**
    Microsoft SharePoint Designer, Visio, Powershell. Bare Visual studio er ikke tillatt.

12. **Hvilke egendefinert løsning har lov til å gjøre på serveren, Farm eller sand box løsninger?**
    Vi har lov til å kjøre begge typer løsninger på serveren.

13. **Hvor mange "Farms" er i hele løsning??**
    Det er 1 Farn i løsning.

14. **Hvor ofte lagrer du en ny Site collection?**
    Vi har to site collection; intra.uia.no og mitt.uia.no Site collection er delt i 3 underområder, nyheter (felles løpende nyheter), infoservice (informasjon – fra få til alle – mer statisk), organsasjon (samhandlingsområder for enhetene). Vi har ikke laget noe site collection enn dette to.

15. **Hvor ofte lager du nettsteder i en Site collection?**
    Det er ikke ofte vi oppretter nye områder (sites) under site collections. Enkelte brukere med fulle rettigheter kan gjøre det selv under siten som er opprettet for samhandlingsområder. Kanskje 1 ny site i måneden?

16. **Hva er "Solution templates" som er tilgjengelige**
    Alle løsning finnes tilgjengelig for administrator, men den mest brukte er Team sites.

17. **Hva er de strategier for arbeidsflyt?**
    Vi bruker ikke arbeidsflyt som det er en kompleks funksjon. Men planen er å introdusere til sluttbrukere snart.

18. **Hvordan er Branding på tvers av flere nettsteder??**
    Samme toppen – med megameny følger alle sidene – enkelte samhandlingsområder har bare logo Innaskjærs

19. **Hva er retningslinjene for store lister?**
    Vi er klar over at det eksisterer en grense for antall elementer I en liste, men har ikke laget en plan for hvordan hanskes med dette. Se ellers svar fra Cental admin.

20. **Hvordan er Microsoft Office integrasjon med SharePoint?**
    Det fungerer helt normalt og det er mange som er velige glad med dette funksjonen.

21. **Er SharePoint koblet til ekstern datakilde?**
    Nei

22. **Hva er retningslinjene for håndtering av metadata?**
    Vi har opprettet to termsett for metadata. Disse brukes for alle dokumenter i dokumentsenteret, og kan brukes for de orgeneheter der dette passer. De er satt opp for alle samhandlingsområder under fakultet, og brukes der. Så har bruker med fulle rettigheter for egne områder, også mulighet for å opprette egne administrerte metadata termsett.

23. **Hva er retningslinjene for "Record management"?**
    Vi har et “Document center” – vi lagrer fellesdokumenter som er I daglig bruk. Disse er ikke ment å være arkivverdige og vil ikke bli flyttet til et record center. Arkivverdige dokumenter lagres i et arkivsystem ephorte. Dokumentene i document center for en utløpsdato et år frem i tid, men ingen policy er satt opp for disse pt.

24. **Hvem har tilgang til Record center?**
    Vi har et “Document center” - der alle har lesetilgang, og en mindre del har skriverett. Ikke skriverett til nødvendigvis alle dokumenter, men skriverett for dokumenter opprettet i mappen for orgenhet som bruker tilhører

25. **Får du lov til å gjøre en oppgradering, hvis tilgjengelig?**
    Ja, men har ikke gjørt enda.

Appendix D

Governance check list

The following is the check list guide that provides abstract view of the important areas that requires governance in SharePoint environment. The area can be selected in the check list and details related to the area can be found in the governance plan shown in appendix E.

SharePoint Governance Check List

☐Roles and responsibilities

- ☐Team role and responsibilities
- ☐Individual roles and responsibilities

☐Information Governance policies

- ☐Information architecture
  - ☐Site structure
  - ☐Page layouts
  - ☐Content types
  - ☐Taxonomies and managed Meta-data
  - ☐Navigation
  - ☐Branding
  - ☐Search integration

- ☐Information management
  - ☐Web content management
  - ☐Document management
  - ☐Record management

☐Security Governance policies

- ☐ Users and groups
- ☐ Permissions
- ☐ Securable objects

☐Solution Governance policies

- ☐Development
- ☐Testing
- ☐Deployment

SharePoint Governance Check List

☐Infrastructure Governance policies

- ☐Server build
- ☐Availability
  - ☐ Web Front End server availability
  - ☐ Application server availability
  - ☐ Database server availability
- ☐Multiple environments

☐Operational Governance policies

- ☐Administration and Monitoring
  - ☐Farm administration
  - ☐Site collection administration
  - ☐Team sites administration
  - ☐Publishing sites administration
  - ☐Document center administration
  - ☐Record center administration
- ☐Backup and Recovery
- ☐Disaster recovery
- ☐Support
  - ☐End user self help
  - ☐Tier 1
  - ☐Tier 2
  - ☐Tier 3

☐Education and training policies

☐Continuous Improvement policies

Appendix E

Governance plan

SHAREPOINT GOVERNANCE PLAN

EVRY CONSULTING AS

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1 Executive summary

The SharePoint governance plan is the guidebook outlining the usage, administration, maintenance, development, and further improvement of the SharePoint Environment. The governance plan defines strategic and tactical teams and identifies their roles and responsibilities in different parts of the system. Furthermore, it defines rules for appropriate usage of SharePoint environment.

The Governance plan also identifies the most critical areas in SharePoint environment and introduces usage policies for them. All of these areas should be used by following the defined policies to keep the system up and running under full potential. At last, the Governance plan introduces different type's processes which can be used to enforce the defined policies in an effective way.

The primary goals of this governance plan are as follows:

- Create teams and allocate responsibilities to each of the team.
- Allocate individual responsibilities to each role within defined teams.
- Identify critical parts of the system and introduce policies on them.
- Apply the introduced policies to keep the system managed as well as take the most out of the platform rich features and functionality.

2 The governance model

The SharePoint governance is made of three equally important areas which are as follows:

1. People
2. Policies
3. Processes

These areas are sub-divided and modeled to get in-depth knowledge of each of area as shown in figure 2. There is no particular order in these areas but all are of equally important to governance. However, these areas are dependent on each other and lack or resources to any of these area can cause severe damage to the entire governance mode.

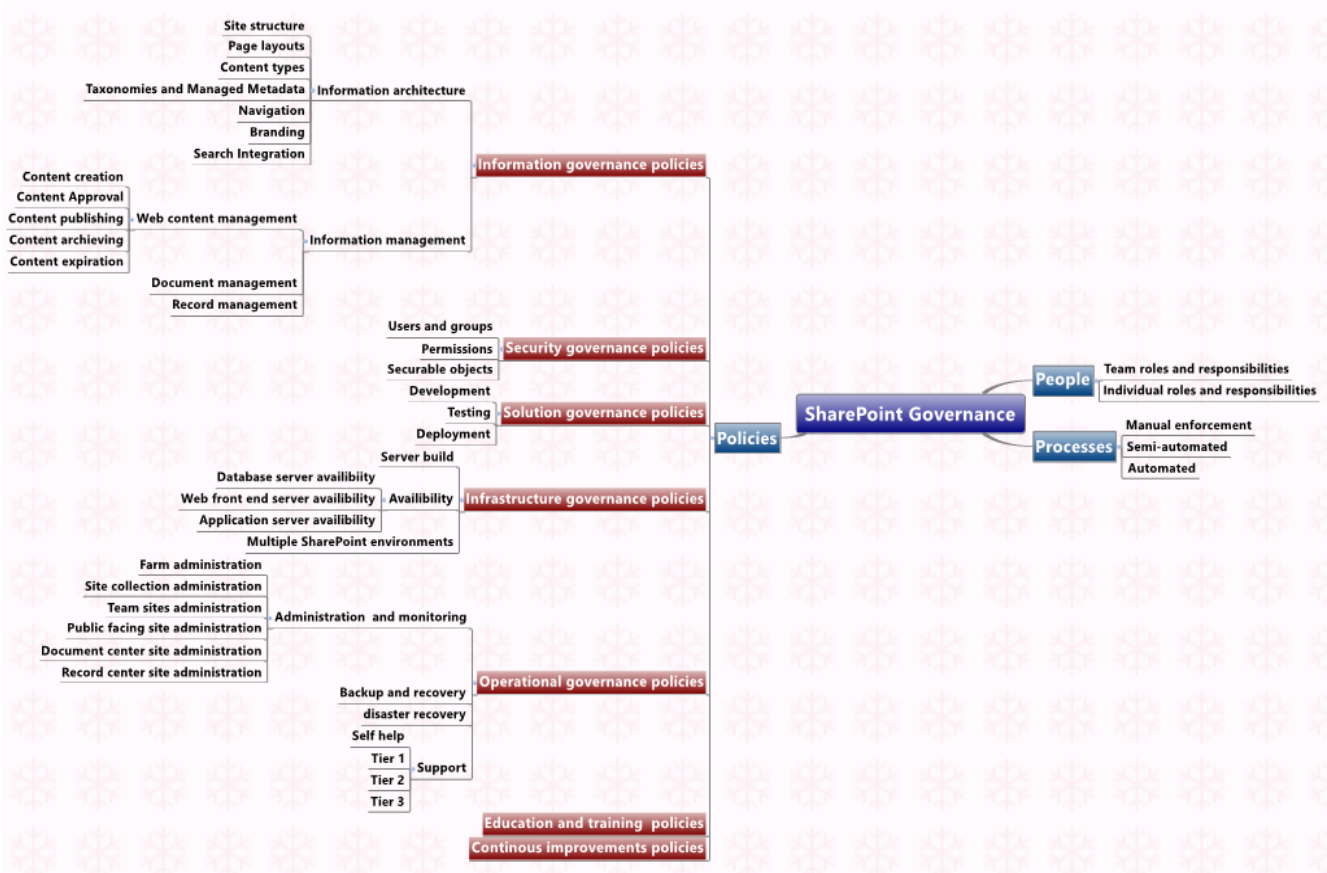

Figure 1: The SharePoint Governance model

3 People

The first element of SharePoint Governance is People as shown in figure 1. This element refers to people who are working with SharePoint in some regards within organization. All of these people should be divided into teams and responsibilities should be allocated to them to decrease ambiguity about their jobs and increase productivity in organization.

3.1 Team roles and responsibilities

The SharePoint environment will consists of two teams, a strategy team and a tactical team as shown in figure 2.

Figure 2: The SharePoint Governance teams

3.1.1 Strategy team

This team consists of business stakeholders, representatives from operation, development, support teams and will be responsible for governance of SharePoint environment. Furthermore, the strategy team will have following responsibilities:

- Understand how business is growing and what kind of solutions is required to satisfy the improving business requirements.
- How to align our activities with the goal of the business.
- What structure needs to be in-place to run and support new implemented solutions?

3.1.2 Tactical team

The tactical team is responsible to complete the directives initiated by strategy team. This team is sub divided into three teams called development team, operation team and support team, each allocated with specific responsibilities.

Development team

The development team will have following responsibilities:

- Advance custom branding
- Develop custom site definition, features and solutions.
- Develop custom page layouts, content types, web parts, and workflows.
- Integration of SharePoint with external systems.

Operation team

The operation team will have following responsibilities:

- Backup, recovery, and disaster recovery.
- Monitoring and maintenance.
- Deployment of custom solutions.
- Security
- Installations and updates

Support team

The support team will have following responsibilities:

- Troubleshoot SharePoint environment related issues.
- Forward complex and custom development issues to the development team
- End user support via telephone, Email.
- Drive end user adoption.

3.2 Individual role and responsibilities

The individual roles and their responsibilities are shown in table 1.

Table 1: Individual roles and responsibilities

Role	Responsibilities	Permissions
System administrator	• Installation and maintenance of the infrastructure such as Windows Server, SharePoint Server and SQL Server. • Daily operation of the infrastructure. • Installation of additional software's for flawless operation of the current environment. • Installation of updates, service packs and upgrades the system if available and required. • Monitoring the performance of the entire system.	• Have administrative rights. • Access to site collections and configuration settings.
SharePoint farm administrator	• System settings such as management of servers in the farm, particular farm management and services on the farm. • Application management such as web applications, site collections, service applications and content databases. • Monitoring of the SharePoint farm through analytics reports, status checking, and reviewing problems and their solutions. • Manage security settings of the farm and service accounts. • Upgrade and migration of SharePoint farm. • General application settings such as external service connection, info path form services, site directory, SharePoint designer, search, reporting services, content deployment.	• Access to SharePoint farm. • Access to central administration and site collections. • Access to site configuration settings.

SQL Server administrator	• SQL Server maintenance and performance tuning. • Manage SQL Server security. • Manage SQL Server cluster and mirroring services.	• Access to SQL Server. • No access to SharePoint farm.
Backup administrator	• SQL Server backup. • Internet information services (IIS) backup. • Backup and restore of entire farm or particular site collection.	• Access to SQL Server. • Access to Internet information services (IIS). • Access to SharePoint farm with limited rights.
User accounts administrator	• Creation and manage user and service accounts. • Setting up SharePoint portal to use Active directory for authentication. • Synchronization of SharePoint with Active directory.	• Access to Active directory. • Limited access to SharePoint farm.
Project manager	• Manage the project. • Deliver solution with in project constraints. • Identify and manage project risks.	• Access to project specific site.
SharePoint architect	• Gather business requirements. • Translate business requirements into portal solution. • Design the architecture based on these requirements. • Guide the development team for successful implementation of the designed architecture.	• Access to the development and testing environments. • No access to the production environment.
SharePoint developer	• Develop custom solutions and features. • Develop custom web parts, apps, workflows etc.	• Access to the development and testing environments. • No access to the production environment.

Designer	• Design user interfaces and maximize usability of the solution. • Change the look and feel of the solution. • Change Master Page, page layouts, cascading style sheet (CSS) and images.	• Limited access to the development and testing environments. • No access to the production environment.
Tester	• Perform different type's o testing such as load testing, usability testing etc. • Ensure reliability of the solution in different circumstances. • Identify issues and errors in the solution. • Test the solution on different browsers and devices.	• Limited access to the development and testing environments. • No access to the production environment.
Support manager	• Manage the entire support team. • Member of the strategical team. • Provide guidance to strategical team related to support issues.	• Limited access to the SharePoint environment and site collections. • Limited access to active directory.
SharePoint trainer	• Train site collection administrators, site administrators and end users. • Create training videos. • Answer questions on self help site.	• Administrative access to self help site.
Help desk	• Help end users in day to day problems. • Troubleshoot issues. • Provide help on the telephone line. • Answer questions on the self help site. • Update self help site.	• Administrative access to self help site.
Site owner	• Provision site. • Modify permissions to the site. • Add, delete, and modify functionality and features to the site.	• Administrative access to the site. • Grant access to the site. • No sub-site creation rights.

4 Policies

The second element of SharePoint governance is policies. The policies are set of rules that should be followed by working with SharePoint environment. The critical areas that require policies in SharePoint environment can be seen in figure 1. Following is the explanation of each area and policies associated to them.

4.1 Information Governance policies

Information governance is the governance of organization's entire information such as websites, document libraries, lists, rich media, content, etc. The purpose of information governance policies is to make this information more usable, accessible, and manageable. To introduce information governance policies in a clear and understandable manner, it has been divided into two sub parts called "Information architecture" and "Information management".

4.1.1 Information architecture

Information architecture determines how the information is organized and presented to the end users. The information architecture must be designed, implemented and governed in such a way that the information can be easily consumed by the end users. The information architecture is made up of further elements and governance policies should be introduced to each of these elements achieves the end result in affective way. The following are these elements and governance policies associated to them.

4.1.1.1 Site structure

A site structure is the entire layout of the site which includes the header, navigation, body, and the footer. In SharePoint, these elements are included in the master page and considered as the most critical elements. The governance policies for the site structure are as follows:

- The structure should be designed in a way that the end user can move freely and confidently across the entire site.
- A roll-up site should be designed which contains general cross organization content and aggregated view of all related sites.
- The site structure should be as simple and user friendly as possible.
- The site structure should be dynamic and compatible with different devices and browsers.
- Multiple site collections should be defined and similar sites should be created within a same site collection.

4.1.1.2 Page layouts

A page layout is the frame which holds structure of the entire page inside the master page. The page layouts should be designed and governed in such a way that its usability is easy for the end users. The governance policies for page layouts are as follows:

- Multiple page layouts should be designed, and the most user friendly layouts should be used to display information.
- Page layouts should not have a huge difference such that the flow of information remains constant.
- Page layouts should be designed in an ideal height such that the end user does not need to scroll down to find important information.
- The most information should be displayed on top left of the page layout.
- Page layouts should always be designed in SharePoint designer but never upload to SharePoint site directly from SharePoint designer, to increase performance.
- A standard designed page layouts should be used for all pages in the site.

4.1.1.3 Content types

A content type is the centralized, reusable package of settings that can be applied to the content in SharePoint. Content types have a hierarchical relationship referred to as "Parent-child relationship" in which setting from one content type is inherited by other content type. SharePoint provides large number of out-of-box content types for different types of information. The governance policies for content types are as follows:

- The content types should be defined at higher possible level in site hierarchy.
- The standard SharePoint content types and columns should never be modified and should always be read only.
- The standard base content types should be centrally controlled.
- The company specific content types should be derived from standard out-of-the-box SharePoint content types.
- A naming convention and grouping should be defined to ensure consistency.
- All content types should be allocated a unique name and description to make it understandable to the end users.

- The content type should be defined as specific as possible to the business requirements, so that other important features such as work flows, information management policies can be easily availed.

4.1.1.4 Taxonomies and managed Meta-data

Managed metadata is the hierarchal collection of centrally managed terms that can be defined and then used as attribute for an item in SharePoint. Similar terms can be collected into a group called term set. Taxonomy means to apply the terms to documents or lists as a tag. The governance policies for managed meta-data and taxonomies are as follows:

- Terms should be pre-defined and only authorized person should have permission to add terms.
- The defined terms should be maintained on a regular basis.
- The terms should be consistent and the naming convention should be as clear as possible.
- The relationship between parent and child term entries should also be consistent and understandable by the end users.
- The initial taxonomies should be developed in excel and then imported to term store because it is easy to share excel files as compared to term store.
- The developed taxonomies should be discussed with stakeholders to ensure their relation to the business and then imported to term store because it cannot be modified, once imported.
- The taxonomy template developed by Microsoft should be used to develop taxonomies and the column names should not be modified because they are closely mapped with the term store.
- Term sets should be created for major categories and should not be allowed to use by other categories.
- It should be required to tag a document before adding to document library.
- The high level categories should not be allowed to use as a tag.

4.1.1.5 Navigation

SharePoint navigation provides primary interface for users to move across site collections, sites, sub-sites, and pages. Additionally, links to external websites can also be created. SharePoint provides three types of navigations out-of-the-box which can be used directly without any modification. However, these navigations are also highly customizable and extensible. Following are the three types of navigations and governance policies be associated to them.

Global navigation

The first type of navigation is called a global navigation which appears at the top link bar in SharePoint sites. The governance policies for this type of navigation are as follows:

- The global navigation should always be displayed on the top of the site.
- The global navigation control should always be added to the master page.
- The global navigation bar should only contain links to top level sites.
- The global navigation bar should not contain more the 7 links, and if the number of top level sites increases in the solution, a drop down menu should be used.
- SharePoint add a link to global navigation by default when a new site is created. This functionality should be customized and addition of link to global navigation should not be allowed by default.

Current navigation

The second type of navigation is called a quick launch or Current navigation and appears at left side of the site. The governance policies for current navigation are as follows:

- The quick launch should always be displayed on the left side of the page.
- Links to the most important and often visited pages should be displayed on quick launch.
- The length of the quick launch should be limited such that the end user does not need to scroll down to find any particular link on the page.
- The displayed links should be organized under a particular heading.
- SharePoint add a link to quick launch by default when a particular item such as list is added to the site. This functionality should be customized and addition of link to quick launch should not be allowed by default.

Bread crumbs

The third type of navigation is called a bread crumb which is dynamically generated and appears at the top of the web pages. The governance policies for bread crumb are as follows:

- Bread crumbs should always be used on the site pages.
- The bread crumb control should always be added to page layout.
- As bread crumbs are dynamically generated links, so they must be controlled in order to become it too large on any particular page.

4.1.1.6 Branding

Branding is the customization of look and feel such as colors, fonts, logos, and graphics of the site. SharePoint is highly customizable and multiple level of branding can be applied to it. From changing a theme to advance customization to the master page, SharePoint is highly flexible in branding. The governance policies for branding a SharePoint site are as follows:

- Solution branding should match the business brand.
- Multiple wire frames should be developed before choosing the final branding of the solution.
- Branding should be consistent throughout the solution.
- Core CSS files should not be changed.
- Customized styles should be stored in a single file.
- If possible, out of the box themes should be used for branding.
- Color combination should be decided with extra care by keeping in mind about people such as color blind etc.
- Designer should only be allowed to use SharePoint designer to brand master pages, page layouts etc.
- Any look and feel changes away from the approved themes must be approved again before implementation.

4.1.1.7 Search integration

SharePoint has a very powerful search engine in its core and is very critical because it is used most often to find content, hidden under several levels. There is a standard search in SharePoint which works against all crawled attributes that are defined for the content. But it can also be customized to offer more advanced filtering. The governance policies for SharePoint search are as follows:

- Information should be found easily via search.
- Two or more query components and crawl components should be deployed to increase availability and redundancy.
- Best bet feature should be activated to provide related results.
- Managed properties should be used to enhance the end user search experience.
- The search database should be defragmented periodically to improve performance of queries.

- SQL Server latency should be monitored, as SharePoint search is I/O intensive for SQL Server.
- The crawling and querying must be tested multiple times after updating or any changes in the configuration.
- Certain folders should be excluded from antivirus scanning, if file-level antivirus software is used in SharePoint provide fluent end user experience.

4.1.2 Information management

Information management refers to the strategy for the management of unstructured information within an enterprise. This unstructured information can be web content, documents, images, multimedia, emails etc. Certain policies can be defined to make this information more manageable, usable and findable. Information management can be divided into sub-categories to make it more understandable. The sub-categories and the governance policies related to them are as follows:

4.1.2.1 Web content management

Web content includes plain text, graphics, images, videos, and audio that are published to the web pages. This type of content has a life cycle from its creation to expiration as shown in figure 3. Certain policies should be defined for each step of life cycle to ensure that un-required and expired content does not remain displayed on the web pages.

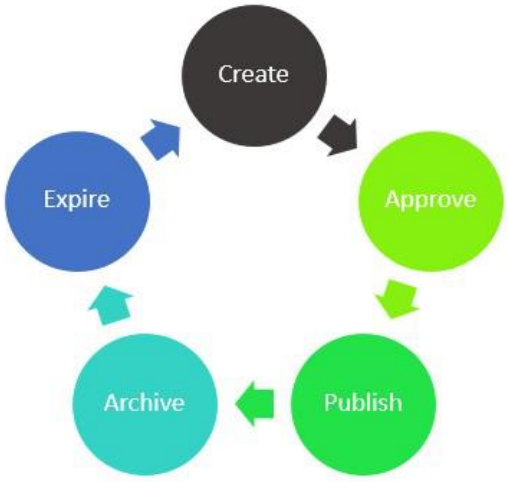

Figure 3: Content life cycle

Content creation

The creation and posting of the content varies from one page to another. For example the content posting to home page should be strictly controlled as compared to content posting to sub-pages in any particular site or site collection. The governance policies for the content creation are as follows:

- Content should be given a very clear heading that would help the readers to understand what whole text is about.
- The concept called "No one read they scan" should be kept in mind, and important message should be written as early as possible and with bold font in the text.
- Content created should be checked many times to remove spellings and grammar mistakes.
- Content should be written in a way that will provide its message in a very good flow.

Content approval

Certain content should be approved before posting it to the site. This criteria should be different for different types of content. For example, the content posting to the publishing site should be strictly approved where as content posting to the personal site does not require approval. The governance policies for content approval are as follows:

- Content creator should be responsible for approval of the content.
- Content to be published must go through a multi-step approval process to ensure professionalism, accuracy, privacy, and legal compliance.
- Content creator should use a built-in approval work flow for approval of the content.
- The content approver should be responsible for reviewing and approving content.

Content publishing

The publishing of the content also varies from one page to another. For example the content publishing to home page should be strictly controlled as compared to content posting to sub-pages in any particular site. The governance policies for content publishing to sites and pages are as follows:

- Content should not be posted directly to the starting page of the site.
- Content should be highly controlled on the starting page of the site.
- There should be very few contributors on the landing page of the site.

- The content creator should be responsible for the life cycle of the content.
- It must be ensured that the content is available after publishing.
- It must be ensured that the content is not redundant.

Content archiving

Content archiving is an option that can be used to increase the visibility and usefulness of up-to-date content and increase the long term sustainability. However, it must be planned that what should be done with the content, after it is archived. The governance policies for content archiving are as follows:

- The space from where the content is archived must be replaced or filled up to keep the look and feel of the site.
- The links to the archived content should be removed.
- The metadata created by the archived content should be removed.
- The storage system where content should be archived should be monitored on a regular basis.
- Access to the archived content should be monitored and kept limited.

Content expiration

Content expiration is the ability to remove the content from storage system upon expiration. This helps in recovering the storage acquired by the expired content as well as ensures that expired content is removed completely. However, it must be decided which content should be removed and which content should be kept forever as an organization record. The governance policies for content expiration are as follows:

- An email should be sent to eligible person upon content expiration to ensure that content is expired and should be removed.
- The storage system should be monitored regularly to ensure that the space is recovered after content removal.

4.1.2.2 Document management

Document management is the storage, management, and tracking of electronic documents such as Microsoft Word documents, PDF's, Power point presentation and so on. These documents also have a life cycle as web content, but most often they are not destroyed at their expiration. Most often these documents are sent to record center to keep them as a record with in enterprise. The policies that should be implemented on document management are as follow:

- Retention time should be decided and applied to all the information before uploading to the SharePoint.
- A work flow should be kicked off, after the retention time of the information is completed and should be confirmed from its creator before taking further step on it.
- Auditing feature should be activated to keep track of operations such as viewing, editing, deleting etc. of documents or lists.
- System assigned identifiers should be activated at site collection level to provide unique identity to each document.
- Document set feature should be activated at a site collection level that would allow the arrangement of multiple documents at a single place as folder and features such as meta-data, versioning, workflows, etc. can be applied on it
- Managed meta-data service should be used to tag all the documents such that these documents can be indexed easily by SharePoint search engine.
- The document library should always be created with a specific goal and a clear title should be allocated to it.
- The document libraries should have multiple document templates available that will give a starting point to a specific kind of document with specified meta-data that must be provided to upload a document.
- Alert feature should be activated on a document library if documents in the library require special attention.
- A work flow should be activated at document library level if all document in a document library needs approval.
- Check-in and check-out features should always be activated in a document library.
- Versioning should always be activated on the documents and maximum 10 versions of a document should be kept.
- Draft versions of the documents should only be visible to authorized users.
- If a document needs approval, a SharePoint built-in workflow should be used for the approval of a document.

- The hierarchy of sub folders should be avoided as far as possible.

4.1.2.3 Record management

Record management enables us to manage documents that are necessary for the life line of the business such as legal documents, contracts, etc. Record management ensures that necessary content is maintained and managed at a specific place within SharePoint and is available for authorized users only. The governance policies for record management are as follows:

- A feature called “In place record management” should be activated at site collection level that will help to declare a record in place. This feature should be used for the records that are short term and should be shifted to record center latter on.
- Content organizer feature should be activated to allow SharePoint automatically process documents based on rules defined such as sending of documents automatically to specific locations.
- A feature called “Email integration with content organizer” should be activated at a site collection level which enables sites content organizer to accept and organize email messages.
- Authorization should be allocated to very limited users to record management sites and the content that is declared as the record.
- Records should be audited at least one time per month.
- The sub folders inherit all the properties from its parent, so policies for sub folders must be changed separately, if required.
- Records should be archived under the company policy to the declared storage system.
- The document or the content that is declared as a record should be strictly secured.

4.2 Security Governance policies

Security is the granting of permissions to individuals or groups for accessing securable objects in SharePoint environment. According to this definition, there are three important elements in SharePoint security model which are individuals or groups, permissions, and securable objects as shown in figure 4.

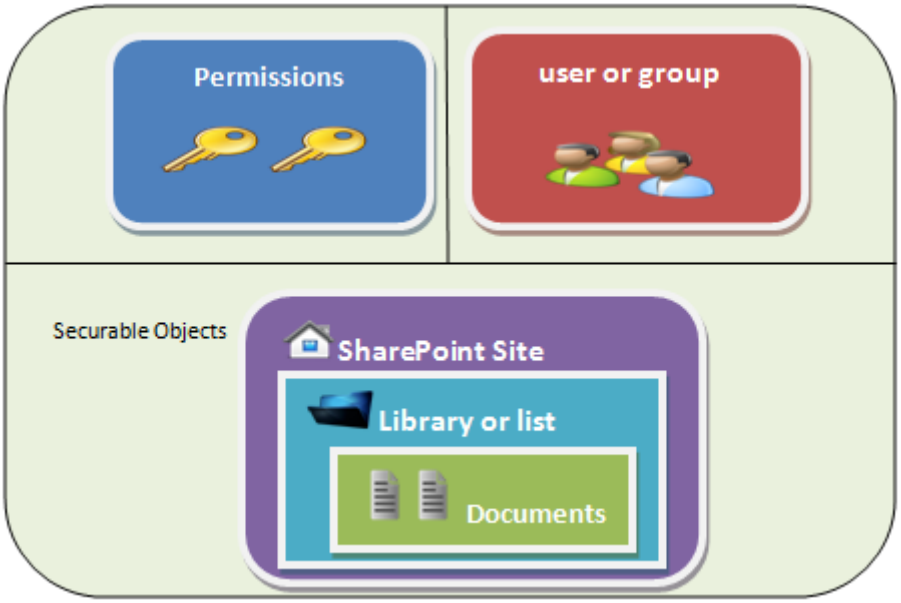

Figure 4: Elements of SharePoint Security Governance

However, it is required to understand the following concepts before applying the security policies in SharePoint environment.

- Permissions and its different levels.
- Fined grained permissions.
- Inheritance in SharePoint security model.
- SharePoint groups vs. Active directory groups.
- Service account passwords

Following are the three elements and the governance policies related to each element of the security model.

4.2.1 Users and groups

Users are individuals who need access to SharePoint site or its content. These users can be given access individually or in a group. Following are the governance policies for user or group in the SharePoint environment:

- All custom created groups whether they are active directory groups or SharePoint groups should be well documented.
- Active directory groups should be created and used whenever there are large numbers of users and the criteria for membership can be managed from other sources such as Human resource system.
- SharePoint groups should be created and used, whenever there are small numbers of users.
- Custom SharePoint security group should be created for users whenever there is confusion between different levels of permissions.
- The name of the custom group should match with a business oriented name such as marketing group rather than permission level name such as Member or Visitor.
- If the default security groups that are created automatically by SharePoint are not in use, they should be deleted.
- There is limit of 2000 users/group in SharePoint, which should never be exceeded.
- There is also a limit of 5K users/Active directory group, which should be never be exceeded.
- SharePoint security model is built on inheritance concept and requires special attention is custom groups.

4.2.2 Permissions

Permissions grant a user the ability to perform specific actions. For example, the view item permission allows users to view item in list but they cannot add item in the same list. Permissions can be allocated to users from site collection level to item level. Following are the governance policies for permissions in the SharePoint environment.

- All custom permission that are assigned should be well documented.
- Permissions should be allocated to groups whenever possible rather than the individual user.
- Permission should be allocated on the concept called “Least privilege” which means that only allocate permissions to users which they requires to perform their jobs.
- The default permission levels should never be modified.

- If a custom permission level is required for site collection, existing permission levels should be checked first and then either add or delete from permission levels to create custom permission levels.
- The custom permission level should have clear and meaningful name.
- The custom permission level should be defined and assigned to users or groups, whenever there is a confusion on which level of permission should be assigned.
- The allocated permissions to users and groups should be monitored, and updated on a regular basis.
- The concept of permission inheritance should be given special attention.
- Permissions also affect navigation strategy. In navigating from site A to site B, a user must have at least read permissions on all nodes in this path, otherwise navigation will throw an error message.

4.2.3 Securable objects

A securable object is a specific entity in SharePoint such as a site, list, document library, folders, or any specific item for which permission levels can be assigned to users or groups. By default, all lists and libraries inherits permissions from the site, but can be easily customized to assign different permissions on any list or library. Following are the governance policies for securable objects in SharePoint:

- The default permissions settings should be applied whenever possible on secured objects because management of permissions becomes much easier when there is a clear hierarchy of permissions and inherited permissions.
- Secured objects should be arranged in such a manner that they can share most of the permissions.
- Security of each object is inherited from its parent unless it is broken, so special attention should be given to objects that require unique permissions.
- Sensitive data should be placed in their own list, libraries or if possible in a separate site and permissions should be allocated separately.
- If the security is required at the item level, a separate list or document library should be created for this type of items and assign security to them rather than allocate security to individual items.

4.3 Solution Governance policies

SharePoint is a highly customizable platform and supports customization on different levels. From a simple site branding to highly customized server side code, every type of customization is feasible in SharePoint environment. However, custom SharePoint solutions should be developed under particular standards and different environments should be used to develop these solutions. The solution should pass through certain phases before it is deployed to the production environment. Following are the different phases of solution development in SharePoint environment and the governance policies related to them.

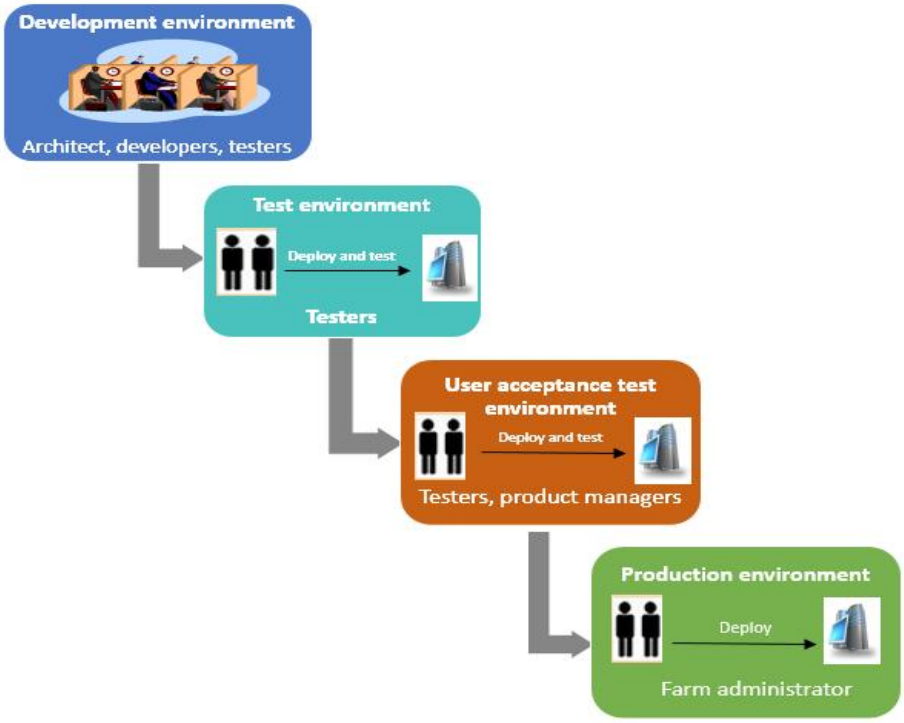

Figure 5: Environments for custom solution development

4.3.1 Development

The governance policies for development of custom SharePoint solution are as follows:

- SharePoint provides excellent components such as Content types, page layouts, web parts, document libraries, lists etc. that may complete business requirements. So the existing out-of-the-box functionalities should always be prioritized on custom development to meet business requirements.
- Custom solution should only be developed if there is no way to solve it with the out-of-the-box features.

- If possible, a custom solution should be created as a sandbox solution rather than farm solution.
- Custom solutions should be developed by using recommended tools such as Microsoft Visual Studio, SharePoint Designer, etc.
- A proper logging and exception handling should be used in custom solutions which will help in trouble shooting and finding errors on production server.
- A single WSP file should be created for a customized solution.
- The existing files in hive 14 should never be customized.
- Custom solutions should be developed by developers and then approved by administrator before adding it to the pre-production server.
- Administrator should only be allowed to do customization via User interface of SharePoint.
- Source code must be under proper source control and all the builds must have proper labels.
- WSP builder should be used to create WSP files.

4.3.2 Testing

The governance policies for testing of custom SharePoint solution are as follows:

- Solution should be tested on testing and pre-production machine before installing it on production server.
- All sort of testing should be performed on the solution such as unit testing, integration testing, web testing, stress testing, load or scale testing, and user acceptance testing to make sure about reliability of the solution.
- Solution should be tested on all major operating system, mobile devices and tables.
- Solution should be tested on all major browsers.

4.3.3 Deployment

The governance policies for deployment of custom SharePoint solution are as follows:

- A quality assurance environment should be created which would be exactly as a production environment.

- Files should be deployed to right directory.
- All the features and assets used in the solution should be deployed by WSP solution package.
- All WSP files should be well documented about what solution contains and what it is about.
- Dependencies between WSP files should be well documented.
- Batch files scripts should be used to deploy packages to make deployments consistent across different environments such as development, testing, pre-production and production environments.
- WSP should have un-installation module at place.
- Must be ensured that «Upgrade solution» is used, for easy deployment of next version.
- Must be ensured that that the solution has a unique GUID in the farm.

4.4 Infrastructure Governance policies

Proper planning and governance of the SharePoint infrastructure is vitally important to achieve the business goals. The numbers of servers, processors, and the amount of random access memory (RAM), physical or virtual servers are the key requirements that should be governed to achieve maximum reliability in SharePoint environment. Following are the different categories and the governance policies associated with them.

4.4.1 Server Build

Following are the policies for server build in SharePoint environment.

- Access to servers and central administration should be strictly limited to SharePoint administrators.
- SharePoint uses the concept called “Managed accounts” to run the services on the server.
- Different service accounts should be created to run SharePoint services, and it should be strictly prohibited to use individual account for these services.
- SharePoint can be configured to automatically manage password policies for managed accounts. However, it should not be applied on farm administrator accounts.
- Permissions should be granted to the service accounts only, if needed.
- SharePoint Server should be monitored strictly either via SharePoint own health monitoring services or third party tools.

- Different service accounts should be created for each farm in case of multiple farm architecture.
- Service packs and updates should not be applied directly on production environment.
- Dedicated servers should be allocated to SharePoint server and SQL Server.
- Most used services should be identified and scaled accordingly.

4.4.2 Availability

Availability means that SharePoint environment is up and running under full potential. But as SharePoint is a web based system, and all of the content is stored in SQL Server databases, the availability of SharePoint means availability of multiple servers such as SQL Server, web servers, and application servers. To ensure availability of SharePoint, it must be ensured that all other systems are up and running at the same time. The following are the policies for each role which ensures the availability of SharePoint availability.

4.4.2.1 Web Front End server availability

The policies for Web Font End server availability are as follows:

- Multiple web servers should be used for high availability.
- Load balancer should be used to send the traffic to multiple web servers.
- Site affinity also known as "Stickiness" should be enabled, which forces user to use single server for the whole session, unless the server is down.
- Web server's capacity should be tested and sufficient servers should be provided depending on the number of users.

4.4.2.2 Application server availability

The policies for application server availability are as follows:

- Only required services should be activated and run in the SharePoint environment.
- The performance of all services should be monitored regularly.
- If large amount of services are required, an extra application server should be installed and services should be divided among them.
- Search service should be given a special attention and it's a good practice to run it on a dedicated server.

4.4.2.3 Database server availability

The policies for database server availability are as follows:

- Cluster service fail over cluster should be used for the availability of database server role where if the cluster node fails, second node would take database role seamlessly.
- A SQL Server alias should be used to connect, which gives flexibility of moving SharePoint databases to other SQL Server instance.
- The database server should be configured for high availability and databases such as *TempDB*, secure store, search crawl, search property, and usage should be kept separate from other databases.
- The databases should be kept clean and healthy state by auditing.
- The server should be kept updated with latest service packs.
- Distance between web server or application server and database server should be kept as small as possible and latency should not be more than one millisecond.
- Database server must be in same time zone with web and application servers.

4.4.3 Multiple environments

A custom SharePoint solution should pass through certain phases before deployed to the production environment as described in the previous section. Furthermore, each phase should be allocated a separate environment (Development, Test, User acceptance test, and deployment) to ensure the reliability of the solution as shown in figure 5. The governance policies for multiple environments are as follows:

- Multiple service account should be leveraged for each farm.
- All environments should be same in term of platform updates, service packs and features.
- SharePoint farm administrators should have access to production environment.

4.5 Operational Governance policies

There are certain tasks that should be performed on a regular basis to keep every system operational. SharePoint is not an exception and there are tasks that should be performed on a regular basis. Following are the tasks and the governance policies associated with them.

4.5.1 Administration and monitoring

SharePoint administration and monitoring is the key requirement to ensure that SharePoint environment is healthy and running under full potential. SharePoint provides large number of out-of-the-box functionalities to monitor itself and ensure its performance level. However, the following are administration and monitoring policies for governing SharePoint environment:

4.5.1.1 Farm administration

The governance policies for the farm administration in SharePoint environment are as follows.

- The physical environment should be checked for physical security measures, temperature and humidity, and physical devices such as routers, switches, hubs, cables, etc.
- SharePoint stores its SQL Server databases, transaction logs, search indexes, etc. on disk space and it should be monitored to check whether enough space is available to store all the data generated by SharePoint.
- The event viewer should be checked on a daily basis which gives information about hardware, software and system problems that must be resolved.
- The windows timer service should be activated which will result in running timer jobs in SharePoint for creating performance results.
- Search service should be monitored to ensure that search service is running.
- Content databases should be monitored and must not be allowed to exceed 200GB. Alert should be set on content databases for sending automatic email to administrator when stored data reaches to 180 GB.
- The diagnostic logging should be checked actively to find the errors before it affects the entire SharePoint environment.
- The usage data and health data collection reports generated by SharePoint should be checked very often to find about the health of SharePoint environment.
- The diagnostic logging and health data collection files are stored in logging database. It must be ensured that logging database has enough space to store more files that would be generated in the future.

- The reports generated by web analytics feature provide information about traffic served by the farm, best bets, searched keywords in search, inventory information such as number of sites created, consumed disk space, etc. These reports must be checked on regular basis to understand how SharePoint farm is performing and whether current implementation is enough or upgrade is required.
- The SharePoint health analyzer which aggregates data logged by other features must be used to identify problems. This analyzer also offers solutions to the problems detected, which should be used to solve the identified problems. If the analyzer is not able to solve the problem, help from third level support must be asked.
- Network performance should also be monitored because it can affect SharePoint performance.

4.5.1.2 Site collection administration

The governance policies for site collection administration are as follows:

- Site collection should be created by farm administrators.
- Site collection template should be unavailable through self-service site creation wizard.
- Each site collection must have more than one administrator.
- Each site collection should be associated with single content database when the site collection is expected to start and grow beyond 10 gigabytes (GB). Otherwise all site collections should be host in a single content database.
- A quota template should be used for site collection.
- Site collections should be monitored and should be moved to new content databases if content database is reaching approximately 200 GB.
- Different site collections should be available for different sites such as publishing sites, team sites, Record center, etc.

4.5.1.3 Team sites administration

The governance policies for team sites administration are as follows:

- Team sites will only be created by site collection administrator.
- To create a team site, it must be ensured that the following information is provided:

    - What is the purpose of the site?
    - How will this site benefit employees or business?
    - Who will have access to the site and what kind of authorization should be allocated to them?

- Who will be the site owner and administrator?
- What are the most important features that should be available on the site?

- The team site should target specific audience.
- One or two dedicated web applications should be used to host team sites to optimize performance, manageability and permissions.
- Sites will be created by the templates that are centrally designed and appropriate for the purpose.
- The team site which is inactive for more than 90 days must be deleted and it must be confirmed from site owner.

4.5.1.4 Publishing sites administration

The governance policies for publishing sites administration are as follows:

- Publishing site should always be created in a separate site collection.
- Top level pages should always be less editable and should only be used for rolling up content.
- Sub-pages should be used for addition of content.
- Use model dialog framework to increase usability and performance.
- The query driven web parts should always be made efficient.
- Content should be organized to optimize the performance of the query by using content organizer feature.
- Author-in-place model should be used to author and publish content.
- Different type of cashing such as output cache, object cache, and blob cache should be used to improve throughput and user response time.

4.5.1.5 Document center administration

The governance policies for document center site administration are as follows:

- Document center site should always be created as a top level site in a site collection.
- Content organizer feature should always be enabled on document center sites.
- Rules should be defined about routing of the documents to particular folders.
- Taxonomies and metadata management should be planned on document repository.

4.5.1.6 Record center administration

The governance policies for record center site administration are as follows:

- These sites should have a very restricted access.
- There should be a separate library for each established record type.
- Each record should have a retention time after that it should be destroyed.
- Each record in the library should have same retention time.
- The record should be automatically destroyed after its defined retention period.

4.5.2 Backup and recovery

Backup is important in SharePoint because it ensures that the data is safe and recoverable in un-pleasant situations such as disaster. There are numbers of processes through which backup could be taken in SharePoint environment and the process most suitable for the business should be used. Following are the backup processes available in the SharePoint environment.

- Backup entire farm.
- Backup a farm configuration.
- Backup a web application.
- Backup a service application.
- Backup a site collection.
- Backup customization.
- Backup content databases.
- Backup snapshot databases.

The governance policies for backup and recovery in SharePoint environment are as follows:

- Backup should be performed on daily basis and must be ensured that it was successfully.
- As SharePoint Farm back up does not restore everything, so internet information services (IIS) and hive library should be backup separately.
- A backup should always be performed before and after SharePoint farm upgrade.
- Trails backup should be performed on regular basis to ensure that backup is working properly.
- The backup data is stored in content databases, so it must be ensure that there is enough space for future backup of data.
- Only fresh backup data should be kept and old backup data should be deleted.
- Backup should be performed at a time when the system has fewer end users.

- Enough resources should be made available to perform successful backup.
- Backup should be performed completely with history.
- All the logged events and performance data should also be back-up.
- SharePoint provides different recovery models such as recovery of complete farm, web application, site collection, particular site, etc. and backup should be done as per requirement.
- Configuration database and central administration content database should be back-up separately.

4.5.3 Disaster recovery

Disaster recovery refers to restoration of services after hardware failure, loss of power, natural disaster, etc. To restore a server farm, the following SharePoint components must be backup:

- Configuration database and central administration content database.
- All other content databases.
- SharePoint 14 Hive folder.
- *Inetpub* folder with complete customization such as *web.config* file.
- IIS for all front end servers used in the SharePoint farm.

Furthermore, the governance policies related to disaster recovery are as follows:

- Must be ensured that the data is not lost after the disaster recovery.
- The system should be completely recovered after the disaster.
- The system should be made available, up and running as soon as possible after the disaster recovery.

4.5.4 Support

Support means providing help to the end users, whenever required. In SharePoint, a multi tiered support model should be provided to the end users as shown in table 2.

Table 2: Multi-tier support in SharePoint environment

Support group	Functions	Availability
User self help	• Online information on the help site. • Frequently asked questions (FAQ)	7 days, 24 hours
Tier 1	• Solve basic problems not available on self-help site. • Escalate problem to Tier 2, which they cannot solve.	Normal business hours
Tier 2	• Advance problems such as creating new site collection, storage quota, permissions, etc.	Normal business hours
Tier 3	• More advance problems such as issues with customized solutions.	Normal business hours

Following is the explanation of each tier in details.

User self help

This is a dedicated site where help material will be available and can be used as a self-service to acquire help regarding certain issue. Support team would upload articles and videos related to most often occurring issues. FAQ section would be created on this site where solution for most often occurring issues could be found. Furthermore, users would be able to ask question from the community on this site.

Tier 1

Site owners, site collection administrators, corporate help desk are the first line of contact for users with questions and problems concerning the SharePoint environment. Tier 1 support staff will help users by resolving simple known issues, understanding features and functionality, and escalates issues that require additional expertise to Tier 2.

Tier 2

SharePoint farm administrators and corporate help desk technical support staff provides help in tier 2. They solve the issues which require in-depth expertise in SharePoint environment and escalate issues which are beyond their expertise to Tier 3. Tier 2 has an administrative access to SharePoint environment and normally solves issues such as allocation of storage quota which requires high level of permissions.

Tier 3

The development team who has designed and implemented the solution provides tier 3 support. They solve the issues which require extensive knowledge of SharePoint such as issues with custom development. Tier 3 is expected to have minimum number of support calls.

The governance policies for multi-tiered support model are as follows:

- A specific support site should be created where training resources, tips and tricks should be made available.
- FAQ section should also be created on support site where most often asked question and their answers should be available.
- End users should be allowed to ask questions and should be encouraged to help each other.
- End users should be motivated to get help on support site before contacting other support persons.
- Site owner should be contacted as a first level support, if they cannot find help on support site.
- Enough people should be available in a support team with good skills of both technical and communication.
- Other infrastructure support teams such as AD, Microsoft Exchange should be introduced together as some problems can be solved with co-operation.

4.6 Education and training policies

Proper education and training is required to consume the rich features of SharePoint platform in an effective way. Following are the governance policies for education and training in SharePoint environment.

- Training should be given according to the day-to-day job of the end users.
- Training should be given according to the roles defined in table 1.
- Training should start with introducing simple features and functionality and how it can be helpful in their daily job and then move towards complex features.
- Training should be given in the form of class room lectures and practical demos should also be included in it.

- Special courses should be arranged in organization by concentrating on a special topic.
- Online lab hosted on the sandbox solution where users would perform practice on what they have learned so far.
- Online references such as Microsoft blogs and white papers should be given to all types of users related to their role.
- Training approach should begin with very basic tasks and move on to more advance and complicated tasks.
- Social events should be organized within organization where users would be more open to ask questions and discuss their day-to-day problems.
- A dedicated training site should be created where collection of self-help training resources should be made available. Articles and videos should be created about how specific features of the platform works and should be added to this training collection.

4.7 Continuous Improvement policies

Continuous improvement is an ongoing effort to improve a product or a service. As business requirements changes, the solution needs to be improved to fulfill new requirements. However, in SharePoint, not only solution but all other elements such as infrastructure, security, operations, education and training, etc. also need to be improved to support new implemented solution as shown in figure 6.

Figure 6: Continuous improvement in SharePoint environment

Furthermore, the governance policies for continuous improvement in SharePoint environment are as follows:

- The complete picture should always be kept in mind as businesses evolve and requirements changes all the time.
- A single element in a circle which is most critical to the organization should be targeted first for further improvement but it should not be improved completely by ignoring other elements of the circle.
- Persons from every level with in organization should be included in making a decision about the improvement that is required.
- Within selected element, problems should be divided into small parts and the most important topic should be selected and solved first.
- The most critical, independent, and small problems should be solved or improved first.
- The FIFO (First in first out) principle should be used in all of the improvement processes.
- The solved problems should be documented and the process should continue in the same sequence.

5 Processes

In addition to have a good governance plan in place, it must be ensured that policies that are defined in the previous section are also enforced accordingly. There are three processes that can be used to enforce these policies, which are as follows:

1. Manual enforcement process
2. Semi-automated enforcement process
3. Automated enforcement process

5.1 Manual enforcement process

Manual enforcement is a process in which a person checks manually whether the policies defined are enforced or not. This process requires a lot of time and resources from an organization. In a small organization where there is a small SharePoint implementation, this process may be

feasible. However, in large organizations with large SharePoint implementation, this process is impractical.

5.2 Semi-automated enforcement process

Semi automated is the process in which a tool such as Windows PowerShell or other third party tools are used to ensure that the governance policies are enforced in the SharePoint environment. This process requires less time and resources as compared to manual enforcement, but still requires human intervention most of the time. The proper example of the semi-automated enforcement will be the generation of reports about the health of SharePoint environment with the help of built-in SharePoint features.

5.3 Automated enforcement process

Automated enforcement is the process in which all the policies are enforced automatically and there is no human intervention. Unfortunately, there is no out-of-the-box solution for this process in SharePoint environment, but it can be developed with custom code for some policies. There are also third party tools available to perform automatic enforcement, but they are expensive and non realistic in some of the implementations.