SharePoint 2019 Environment Health Check Report

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# Introduction

This report presents the findings of a health check conducted on the Education Standards Board’s SharePoint 2019 environment. The health check aimed to identify the root causes of significant performance issues, including site and library unavailability, high CPU utilization, HTTP 503 errors, Security Token Service application failures, and other critical events.

Reported Outages:

* Monday, 29 July 2024, at 8:53 AM
* Wednesday, 04 September 2024, at 9:20 AM

# Executive Summary

The SharePoint content database has grown to over 656GB, significantly exceeding the recommended maximum size of 200GB for optimal performance. Notably, since our last assessment on July 20, 2023, when the database was 474GB, it has increased by 182GB, representing a 38% growth over the year.

The structure of the SharePoint document library does not follow best practices, further impacting performance. Additionally, RecordPoint has several issues that are affecting overall system performance. Windows event logs indicate critical problems with SharePoint resource throttling misconfigurations, which are adversely affecting performance.

The environment operates as a single server farm, handling all requests from one server that hosts both SharePoint and RecordPoint, overwhelming the server’s capacity. Memory utilization (RAM) remains high during business hours, averaging above 70%, primarily due to application requests from SharePoint Search and RecordPoint. This high usage leaves little room for ad hoc processes, resulting in performance degradation.

Recommendations to Address These Challenges:

1. Reorganize subsites and larger document libraries into separate site collections.
2. Resolve issues in document libraries that exceed resource throttling thresholds, such as unique permissions and list view thresholds.
3. Address resource throttling misconfigurations in SharePoint Central Admin.
4. Shrink the Teams site content database, then reindex it.
5. Remove third-party applications from the server.
6. Increase capacity, potentially by adding a web front-end server.
7. Reconfigure the full crawl schedule to run monthly.

Important: I suggest restructuring the SharePoint sites as soon as possible. Delaying this task will require significantly more time and effort later due to the rapid database growth and its current size.

## 1. CPU and RAM Usage Analysis

The objective is to Identify outliers in CPU utilization for SharePoint 2019 Application server

Outage reported on 29 July 2024:

From approximately 8:25 AM to 8:50 AM on July 29, there was a period of sustained high CPU usage, which may have contributed to the performance issues experienced that day.A graph with a line

Description automatically generated with medium confidence

Outage reported on 04th September 2024:

Starting from around 9:00 AM on September 4, there was sustained high CPU usage, consistently hovering around 80% without significant dips. This indicates a continuous and resource-intensive process running during this period. The drop in usage from 9:25 AM to 9:40 AM indicates that the server was down during that time.

A graph with a line

Description automatically generated with medium confidence

CPU utilization for the past six months:

Over the past six months, there have been numerous instances of high CPU usage spikes, often reaching or nearing 100%. Notably, on September 4th, there was sustained high CPU usage, indicating a significant impact on performance that day. The factors contributing to these high CPU spikes are detailed in the following sections.A graph with orange lines

Description automatically generated

## 2. Windows Event Logs Analysis

The objective is to Identify processes and requests causing high CPU demand on Application server.

Over 1000 SharePoint and RecordPoint failures can be identified each day, primarily due to the following factors.

The ECS Investigations library has exceeded the threshold for unique permissions. The recommended maximum number of unique permissions for a library is 50,000. However, there are two libraries that surpass this limit: ECS Investigations in Compliance and Investigations, and Services Documents in Early Childhood Services.

Below is an event viewer application log entry indicating that the file "Brief Provider Approval Refusal APP" was not added to RecordPoint because the library has exceeded the threshold for unique permissions.A screenshot of a computer

Description automatically generated

Below are some items from the ECS Investigations library that may have unique permissions, as indicated by the library permissions.A screenshot of a computer

Description automatically generated

Below is the file highlighted in the event viewer application log entry above that has unique permissions.A screenshot of a computer

Description automatically generated

Below is the recommended Resource Throttling threshold for List Unique permissions configured in SharePoint Central Administration.A screenshot of a computer

Description automatically generated Below is an event viewer application log entry indicating a failure to execute a search query because the number of records to be returned exceeds the list view threshold limit of 5,000 in the RecordPoint web application.

A screenshot of a computer

Description automatically generated

Below is another example of an event viewer application log entry indicating a failure to execute a RecordPoint internal query because it exceeded the list view threshold.A screenshot of a computer

Description automatically generated

Below is the default resource throttling threshold for List view configured in the RecordPoint web application within SharePoint Central Administration.A screenshot of a computer

Description automatically generated

**Recommendations**

Increasing the list view threshold in the RecordPoint SharePoint site can negatively impact performance. The default recommendation is to return no more than 5,000 items when querying library records.

In SharePoint 2019, while the maximum number of unique permissions allowed for a list or library is 50,000, it's advisable to keep this number below 5,000 to avoid performance issues and administrative challenges.

The main document libraries contributing to these issues are ECS Investigations in Compliance and Investigations, and Services Documents in Early Childhood Services. The best approach is to manage permissions via folders and limit the records returned in library views by adding filters. More recommendations can be found in the section on Resource Throttling Settings and Customizations Review.

## 3. SharePoint Health Analyzer Rules Configuration

The objective is to identify Health Analyzer rule findings and provide recommendations to resolve them.

Below is a Health Analyzer finding indicating that the SharePoint Team site content database size has exceeded 100GB. The maximum recommended size for optimal performance is 200GB, but it is currently at 600GB.A screenshot of a computer

Description automatically generated

The following table shows the sizes of the content databases attached to site collections in SharePoint web applications.

|  |  |  |
| --- | --- | --- |
| **Database Name** | **Site Collection Name** | **Size** |
| SP\_Teams\_WSS\_Content\_4c3f170d5cc94702a5d965f15e3e4a2f | Team Site | 672,136 MB |
| WSS\_RPContent\_20220713114222 | RecordPoint | 22,405 MB |
| WSS\_RPContent\_20220713115409 | RecordPoint | 3,057 MB |
| WSS\_Content\_RecordPoint\_d7bb001cbd4e4bbb805aaa7065dc85a1 | RecordPoint | 264 MB |
| SP\_Portal\_WSS\_Content\_92b6ee2f9925437599738df0597b20e1 | Portal | 3,208 MB |
| SharePoint\_AdminContent\_8adcfe76-0f8f-4be1-8bd1-ce6256de0eea | Central Administration | 328 MB |
| WSS\_Content | Default | 136 MB |

Below is an overview of the subsites nested under the team site collection.A screenshot of a computer

Description automatically generated

Below is an overview of the Team Site Collection Storage Metrics, displaying the storage usage.A screenshot of a computer

Description automatically generated

**Recommendations**

Review and Clean Up: Regularly check for and remove unnecessary or duplicate data.

Restructure SharePoint Sites into Separate Site Collections and Content Databases: The current SharePoint architecture is hierarchical, with one site collection containing most of the data and nested subsites. This structure limits the ability to distribute sites across multiple databases, as site collections can only be split between databases.

To address this, we propose restructuring all subsites into separate site collections. Specifically, the Early Childhood Services document library needs to be moved into multiple site collections. This approach will help limit the size of each database to ideally no more than 100GB per site collection. This project will involve migrating content into several site collections, requiring planning, testing, and outage management. The estimated effort for this project is 15 days.

Shrink Database: The content database for the Teams site has grown to over 600GB, which is more than typically needed for a 500000-document repository. Shrinking the database can help reclaim unused space from deleted records and other operations.

Shrinking a database can be necessary for several reasons:

* Reclaiming Unused Space: Over time, databases can accumulate unused space due to deleted records, dropped tables, or other operations. Shrinking helps reclaim this space, making it available for other uses.
* Improving Performance: In some cases, reducing the size of the database can improve performance, especially if the database has grown significantly larger than needed.
* Maintenance: Regular maintenance, including shrinking, can help keep your database in good health by reducing fragmentation and ensuring efficient use of resources.

However, it’s important to note that shrinking a database can also cause fragmentation, which might negatively impact performance. Therefore, it’s often recommended to rebuild indexes after shrinking.

Here are the steps to do it using SQL Server Management Studio (SSMS):

Open SQL Server Management Studio (SSMS)

Connect to the SQL Server instance SP2019DB

Select the Database: In the Object Explorer, expand the Databases node.

Right-click the content database SP\_Teams\_WSS\_Content\_4c3f170d5cc94702a5d965f15e3e4a2f to shrink.

Shrink the Database: Go to Tasks > Shrink > Database

Note: The database shrink operation may take more than 12 hours as the database exceeds 600GB. After the database shrink operation completes successfully, start rebuilding the indexes.

Open SQL Server Management Studio (SSMS)

Connect to the SQL Server instance SP2019DB

Select the Database: In the Object Explorer, expand the Databases node.

Right-click the content database SP\_Teams\_WSS\_Content\_4c3f170d5cc94702a5d965f15e3e4a2f.

Rebuild Indexes: Go to Tasks > Rebuild Index

## 4. Scheduled Jobs and Run History Analysis

The objective is to identify the schedules and run times of all scheduled jobs to assess their impact on performance.

SharePoint Search jobs

Below is the retained execution history of SharePoint full crawls since August 7, 2024. These crawls are scheduled to run every Sunday and typically take the entire day to complete. Occasionally, the crawl extends into Monday, affecting application performance during business hours.

|  |
| --- |
| **Started Completed Duration Successes Warnings Errors** |
| 11/03/2024 4:55 AM 11/03/2024 6:44 PM 13:48:09 496,289 6,910 42 |
| 10/27/2024 4:56 AM 10/28/2024 2:40 PM 33:43:54 488,376 6,700 4,106 |
| 10/20/2024 4:55 AM 10/20/2024 5:54 PM 12:58:57 213,860 3,103 283,020 |
| 10/13/2024 4:55 AM 10/14/2024 3:36 AM 22:40:19 490,811 6,727 116 |
| 10/06/2024 4:55 AM 10/06/2024 6:43 PM 13:48:16 491,952 6,759 52 |
| 09/29/2024 4:56 AM 9/29/2024 9:43 PM 16:47:41 490,765 6,707 56 |
| 09/22/2024 4:56 AM 9/22/2024 6:58 PM 14:01:59 489,306 6,670 71 |
| 09/15/2024 4:55 AM 9/15/2024 6:52 PM 13:57:26 488,516 6,649 85 |
| 09/08/2024 4:56 AM 9/08/2024 6:20 PM 13:23:49 486,821 6,613 51 |
| 09/01/2024 4:56 AM 9/01/2024 7:24 PM 14:28:36 486,186 6,568 80 |
| 08/25/2024 4:55 AM 8/25/2024 6:56 PM 14:00:54 484,806 6,529 79 |
| 08/18/2024 4:55 AM 8/18/2024 9:51 PM 16:55:22 484,019 6,463 75 |
| 08/11/2024 4:55 AM 8/11/2024 7:47 PM 14:52:03 482,842 6,392 77 |

Below is a summary of SharePoint crawls and their schedules.

Continuous Crawl: Runs every 15 minutes and Crawls between 400 and 1,200 items per day.

Incremental Crawl: Runs every 4 hours starting from 12 AM daily and Processes 50 to 70 items per crawl.

Full Crawl: Runs on every Sunday and Crawls around 500000 items.

Memory Usage: The search process generally requires 8.5GB of memory to run its related processors on the server. The server has a total memory of 32GB, with 70% utilized (22.4GB). Out of the 22.4GB of utilized memory, the search processor uses 8.5GB, which accounts for 37% of the utilized memory.

**Recommendations:**

it’s generally recommended to run full crawls only when necessary. Full crawls are resource-intensive and can significantly impact performance. With enabled continuous crawl that keeps the index up to date with frequent changes. Since the continuous crawl is enabled, it does not need to run every week. Instead, it can be run every month.

Task Scheduler tasks

User Feed Synchronization: There are multiple user feed jobs in Task Scheduler, but nothing is configured in Internet Explorer (IE) feeds, despite automatic feed updates being enabled. A screenshot of a computer

Description automatically generated

Below is an explanation of how feeds are enabled and the related configurations in Internet Explorer

.A screenshot of a computer screen

Description automatically generated

Possible causes and solutions for having many user feed schedules in the Task Scheduler include:

Residual Tasks: Sometimes, tasks remain in Task Scheduler even after feeds are removed from IE. They can be manually deletes these tasks if they are no longer needed.

Corrupted Task Scheduler Entries: Corrupted entries can cause tasks to appear without corresponding configurations in IE. You can try deleting these tasks and re-enabling the feed updates in IE.

Microsoft Edge Update Task Machine Job:

Running MicrosoftEdgeUpdate.exe daily on a SharePoint production server is generally not recommended. Here are a few reasons why:

* Resource Usage: Regular updates can consume CPU, memory, and network bandwidth, potentially impacting the performance of your SharePoint server.
* Stability and Compatibility: Frequent updates might introduce changes that could affect the stability or compatibility of your SharePoint environment, especially if the updates include new features or significant changes.
* Security Concerns: While keeping software up to date is important for security, it’s crucial to balance this with the need for a stable and predictable server environment.

Jobs that triggered but not started:

OneDrive Standalone Update Task, OneDrive Reporting Task jobs are scheduled to run daily but they did not start the action even though the job is triggered on time but launch conditions are not met. As the actions were not executed for these jobs for quite some time I assume these are residual or corrupted jobs that could be disabled/deleted safely.

## 5. Request Distribution Analysis

The objective of this is to determine the distribution of requests across WFEs.

This is a single server farm where all requests are managed by one server. This server hosts both SharePoint and RecordPoint applications and services, which places too much load on a single server to handle effectively

A screenshot of a computer

Description automatically generated

**Recommendations**:

Adding a Web Front End (WFE) server to a single server farm in SharePoint 2019 can bring several benefits:

Improved Performance: A WFE server handles web page requests from users, which can significantly reduce the load on the main server. This leads to faster response times and a better user experience.

Scalability: As your organization grows, adding more WFE servers can help manage increased traffic and workloads. This ensures that the system remains responsive even with a higher number of users.

Load Balancing: With multiple WFE servers, you can implement a Network Load Balancer to distribute requests evenly. This not only improves performance but also enhances reliability by preventing any single server from becoming a bottleneck.

Simplified Maintenance: Maintenance tasks can be performed on one server at a time without affecting the overall availability of the SharePoint farm. This makes it easier to apply updates and perform other administrative tasks.

## 6. Resource Throttling Settings and Customizations Review

The objective is to assess the impact of resource throttling settings on the environment.

**List view threshold** is increased to 150,000 from 5000 which is default and recommended. The primary reason for the SharePoint List View Threshold is to maintain optimal user performance. When large lists are queried, they can consume significant server resources, potentially impacting the performance of the entire SharePoint site.

Below is Resource Throttling configuration in the SharePoint Central AdministrationA screenshot of a computer

Description automatically generated

The following warning in the SharePoint ECS Investigations library indicates that the list view threshold has been exceededA screenshot of a computer

Description automatically generated

**Recommendations**

Limit the list view threshold to 5000 or a slightly higher value, as the current configuration is not recommended. While a SharePoint 2019 document library can hold up to 3 million files, the library structure should ensure that any query returns fewer than 5000 records. The list view threshold should only be reduced after making the necessary changes. Best practices for organizing documents in the library are detailed in the SharePoint Libraries Availability Analysis section.

Below are the steps to configure resource throttling settings for a SharePoint web application:

* Login to the server EECSBWFE02
* Open Central Administration: Go to your SharePoint Central Administration site <http://eecsbwfe02:5000/default.aspx>
* Navigate to Application Management: In the Central Administration home page, click on “Application Management”.
* Manage Web Applications: Under the Application Management section, click on “Manage web applications”.
* Select the Web Application: From the list of web applications, select the one you want to configure.
* Access General Settings: In the ribbon, click on “General Settings” and then select “Resource Throttling”.
* Configure Resource Throttling Settings: You will see various settings related to resource throttling, such as List View Threshold, Object Model Override, and Daily Time Window for Large Queries. Adjust these settings according to your requirements.
* Save Changes: After making the necessary adjustments, click “OK” to save the changes.

## 7. SharePoint Libraries Availability Analysis

The goal is to analyse and recommend best practices to ensure the availability of SharePoint and RecordPoint lists and libraries.

The ECS Investigations library contains approximately 60,000 documents, with many views returning more than 5,000 documents in a single query. Notably, the 'AllDocsNoFolders' view, which returns documents without folders, should not be accessible to non-admin users as it significantly impacts performance.

Below is a list of Libraries with more documents

|  |  |  |  |
| --- | --- | --- | --- |
| **Site Name** | **Library Name** | **Documents** | **Versions** |
| Early Childhood Services  http://eecsrsb2019-teams.sa.gov.au/ecsaar | Services Documents | 237279 | 50 |
| Compliance and Investigations  http://eecsrsb2019-teams.sa.gov.au/complaints | ECS Investigations | 64655 | 200 |
| Schools  http://eecsrsb2019-teams.sa.gov.au/schools | School Documents | 61864 | 5 |

Number of document versions allowed is far exceeded:

Having documents with more than 10 versions in a SharePoint library can impact both SharePoint and RecordPoint in several ways:

SharePoint:

Storage Consumption: Each version of a document consumes additional storage space. With over 200 versions, the storage requirements can increase significantly.

Performance: Managing a large number of versions can affect the performance of the library, especially during operations like saving, retrieving, or searching for documents.

RecordPoint

Comprehensive Syncing: RecordPoint typically syncs all versions of documents, including both major and minor versions. This ensures thorough records management but also means that the storage and performance impacts are mirrored in RecordPoint.

**Recommendations**

Strategies to manage large lists

-Create views: Filter the library views to limit the number of documents returned. Documents can be filtered based on the list fields.

-User folders: Try and organize the documents into folders this will limit the number of documents returned in a query

-Index list columns: e: g the library ECS Investigations has the following automatically created index columns and it would be good to review and index the columns that are most used and use to filter the contents of the list views.

Below is ESC Investigations document library indexed columns

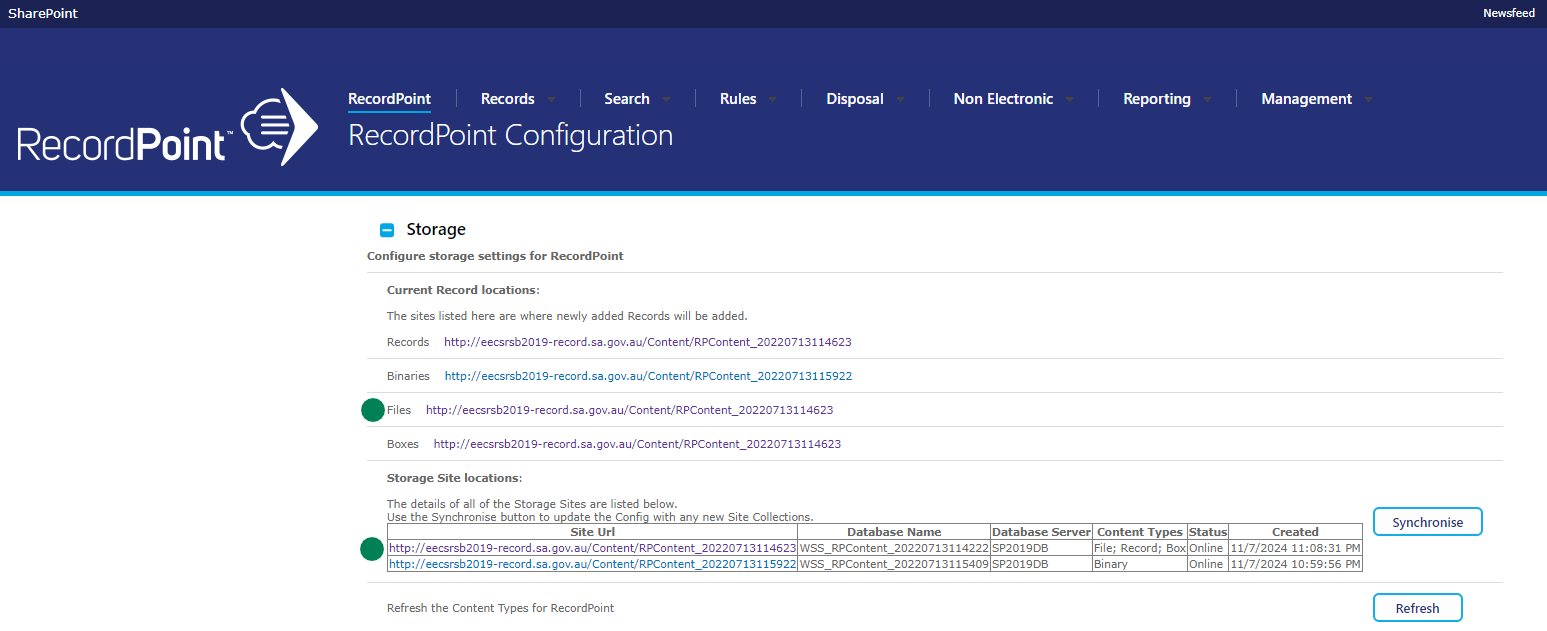
A screenshot of a white box

Description automatically generated

## 8. RecordPoint Integration Impact Analysis

The objective is to identify the impact of RecordPoint integrations on the performance of the SharePoint environment.

Following screenshot shows the where the records are held in RecordPoint and the accompanying database.



The following warning in a RecordPoint library indicates that the list view threshold has exceeded A screenshot of a computer

Description automatically generated

The error shown below in RecordPoint indicates that the record search failed due to exceeding the resource throttling thresholdA screenshot of a computer

Description automatically generated

RecordPoint is hosted in the SharePoint application server. This will hinder not just availability of RecordPoint but also security. As its experienced site unavailability due to high server resource utilizations, this will bring down not just SharePoint but also records point.

The following scenario was identified during the day, showing high CPU utilization caused by the RecordPoint application.

Task Manager screen capture indicates the high memory utilization for the IIS Worker Process.A screenshot of a computer

Description automatically generated

A screenshot of a computer

Description automatically generated

The following screen capture indicates that the RecordPoint application pool name, running under process ID 18784, is responsible for the high memory utilization

A screen shot of a computer

Description automatically generated

The following screen capture indicates the RecordPoint IIS site running under the application pool name ‘SharePoint – record’.A screenshot of a computer

Description automatically generated

More information on how the RecordPoint affecting the server performance is detailed in the ‘Windows Event Logs Analysis’ section.

**Recommendations**

Host RecordPoint on its own server. this will reduce the burden on the sever and enhance the site availability, security and performance.

## 9. SharePoint server security updates

The SharePoint application server and cumulative updates are current

Latest Security updates:29/10/2024

Latest Cumulative updates on 29/10/2024

A screenshot of a computer

Description automatically generated

## 10. SharePoint Server Installed Software

Installing multiple applications like Google Chrome, Internet Explorer, Sharegate Migration Tool, and SharePoint Designer on a single SharePoint 2019 server can impact performance and is generally not considered best practice. Here are some reasons why and recommendations:

Resource Consumption: Each application consumes CPU, memory, and disk resources, which can affect the performance of your SharePoint server, especially under load.

Security Risks: Having multiple applications increases the attack surface, potentially exposing your server to security vulnerabilities.

Minimal Installation: Only install essential applications on your SharePoint server. For instance, use a dedicated machine or VM for running Sharegate Migration Tool during migrations.A screenshot of a computer

Description automatically generated

## 11. IIS Logs Analysis

* Objective: Identify HTTP transactions and areas for optimization.
* Findings: Detail the nature of incoming requests, response times, and potential bottlenecks.
* Recommendations: Offer optimization strategies for IIS configurations.

## 12. ULS Logs Analysis

* Objective: Identify common errors in the SharePoint environment.
* Findings: List recurring issues and error messages affecting performance.
* Recommendations: Provide solutions to address the identified errors.

# Conclusion

The SharePoint content database has grown beyond 600GB, and the application server experiences high memory utilization during the day. Additionally, both SharePoint and RecordPoint documents are failing in search due to violations of resource throttling thresholds.

Follow is a breakdown of tasks by their priority and user impact to address these challenges.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Task** | **Priority** | **User Impact** | **Time** | **Comments** |
| Reorganize subsites and larger document libraries into separate site collections | Urgent and Important | High | 15 days |  |
| Resolve issues in document libraries that exceed resource throttling thresholds, such as unique permissions and list view thresholds. | Urgent and Important | High | Subject to the agreement and availability of business users | Business user engagement is required |
| Address resource throttling misconfigurations in SharePoint Central Admin | Urgent and Important | Moderate | 2 Hours | This must be done after addressing the identified issues in the document libraries that violate the resource throttling thresholds |
| Shrink the Teams site content database, then reindex it | Important but Not Urgent | High | Shrink 18 Hours  Reindex 9 hours |  |
| Remove third party applications from the server | Important but Not Urgent | Moderate | 2 Hours |  |
| Increase capacity, potentially by adding a web frontend server. | Important but Not Urgent | Moderate | 4 Days |  |
| Reconfigure full crawl schedule to run monthly. | Important but Not Urgent | Low | 1Hr |  |

**Priority**

Urgent and Important: Do these tasks immediately.

Important but Not Urgent: Schedule these tasks.

Urgent but Not Important: Delegate these tasks if possible.

# Appendices

Follow is CPU and Memory utilization for the past six months

