**Planning Documentation**

**Kubernetes Cluster – Pod5**

**INFT3000**

**NSCC Institute of Technology**

**03/25/2025**

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# Introduction

Faculty at NSCC’s Institute of Technology have voiced an interest in having an on-premises Kubernetes cluster installed in their data center to host various services and processes. Our project aims to plan, create and install this cluster for use in the data center with scalability and versatility in mind.

Our installation plan will be complete with testing VMs running the cluster in a virtual environment, possible vectors for V2P migration if necessary, recommendations on physical hardware as well as testing methods for various pods once initial framework is ready for on-premises testing.

# Project Management Approach

Overall, the organization of the project will typically follow a 3-step process of Planning, Virtualization and Implementation. Once the scope of the project can be calculated in our planning documentation, it should be tested in a virtual environment. Once tests succeed in the virtual environment, implementation and installation on the physical hardware can begin.

Planning and virtual testing should be done with the possibility of migration in mind, while physical implementation must carefully consider hardware and resource requirements as well as procurement methods through NSCC’s faculty.

Any additional hardware procurement (servers, workstations, etc.) must be formally requested via documentation to academic faculty leaders (currently Marie Dutka or Shawn O’Brien). This includes required specs for the system as well as a network plan for setup such as IP addressing scheme, network location, physical location etc.

# Project Scope

The scope of our Kubernetes project is to plan, test and install the functioning framework of a Kubernetes cluster on-premises at NSCC with the capability to host various pods, VMs and other microservices. This project aims to improve processing capabilities and reduce resource costs by opening up the possibility of self-hosted systems and/or moving existing Cloud-based services to self-hosted alternatives on campus.

The Kubernetes project is designed to be versatile and scalable. System requirements and resources are designed and planned around the minimum requirement for basic systems (ie: Web server, email server, etc.) as well as higher requirements for multiple pods and VMs depending on campus needs in the future.

# Milestone List

The chart below outlines a general idea of the timeline and deliverables of the project. These dates are subject to change as issues arise or progress exceeds expectations. For any large shifts in scope or timeline, be sure to update the team via scrum meeting/email. Results of each milestone should be updated in the Milestone Report.

|  |  |  |
| --- | --- | --- |
| Milestone | Description | Date |
| Research Kubernetes Server Requirements | Determine hosting platform. AWS, Azure, or Local. Determine free options if available for Cloud | 1/14/25 |
| Setup Development Environment | Install necessary tools like Linux VM and Minikube/ microk8s | 1/21/25 |
| Install Kubernetes on VM | Install and configure Kubernetes on the VM | 2/4/25 |
| Configure Kubernetes network | Research and determine network configuration settings for Kubernetes cluster | 2/11/25 |
| Migrate Kubernetes VM to physical hardware | Determine physical hardware specifications, tools for migration, permissions from faculty for install | 2/25/25 |
| Troubleshooting/Bug fixes | Expect issues with migration, hardware and network integration. See Risk Assessment Evaluation for more details. | 3/10/25 |
| Final Implementation | Aim for completion and integration of project | 3/24/25 |

# Change Management Plan

The following steps comprise our team’s change control process for all projects and will be utilized on the Kubernetes project:

Step #1: Identify the need for a change (Any Team Member)

Voice any concerns, improvements or setbacks in weekly scrum meeting *OR*  message Kubernetes group on Teams depending on severity of change request.

Step #2: Determine shift in scope (Project Manager)

Evaluate how this change may affect projected timelines and milestones.

Step #3: Gather consensus approval from team member (Team)

If the change is determined to be beneficial for the project, a team consensus will determine if change is implemented by majority vote.

Step #4: Implement change (Project Manager)

If a change is approved by the CCB, the project manager will update and re- baseline project documentation as necessary as well as ensure any changes are communicated to the team and stakeholders.

Any team member or stakeholder may submit a change request for the Kubernetes Project. The Kubernetes Project Sponsor will consult with NSCC faculty and any changes to project scope, cost, or schedule must meet this approval.

# Work Breakdown Structure (WBS)

**Project Manager:** Kyle Walker – Organization of scrum meetings, communication with advisors and sponsors, change management requests. Migration specialist after initial virtual environment is confirmed functional.  
**Technician:**  Franklin Fiske – Development of virtual machine for testing and configuration. Responsible for construction of Kubernetes cluster.

**Cloud Specialist:** Evan Longley – Construction of Azure environment for monitoring and interfacing with Kubernetes cluster. Management of Azure permissions and user accounts for team members

**Lead Researcher:** Jack Gordon – Integration and compatibility research. Determine any possible errors that may arise outside of each team member’s role. Help recognize issues between systems.

# Communications Management Plan

This Communications Management Plan sets the communications framework for this project. It will serve as a guide for communications throughout the life of the project and will be updated as communication requirements change. This plan identifies and defines the roles of Kubernetes project team members as they pertain to communications. It also includes a communications matrix which maps the communication requirements of this project, and communication conduct for meetings and other forms of communication. A project team directory is also included to provide contact information for all stakeholders directly involved in the project.

The Project Manager will take the lead role in ensuring effective communications on this project. The communications requirements are documented in the Communications Matrix below. The Communications Matrix will be used as the guide for what information to communicate, who is to do the communicating, when to communicate it, and to whom to communicate.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Communication Type** | **Description** | **Frequency** | **Format** | **Participants/ Distribution** | **Deliverable** | **Owner** |
| Weekly Status Report | Microsoft Teams summary of project status | Weekly/As Needed | Teams | Project Team | Status Report | Project Manager |
| Weekly Project Team Meeting | Meeting to review action register and status | Weekly | In Person | Project Team | Weekly Minutes Report | Project Manager |
| Change Request | Significant change to project scope | As Needed | Email | Project Sponsor, Team, and Faculty | Formal Request | Project Manager |
| Milestone Report | Living document for milestone progress | As Needed | Teams | Project Team | Updated report to be submitted via Brightspace | Project Manager, Technician |
| Technical Design Review | Review of any technical designs or work associated with the project | As Needed | In Person | Project Team | Technical Design Package | Project Manager, Technician |

Project team directory for all communications is:

|  |  |  |
| --- | --- | --- |
| **Name** | **Title** | **E mail** |
| Marie Dutka | Project Sponsor/Academic Advisor | marie.dutka@nscc.ca |
| Russell Munday | Technical Advisor | russell.munday@nscc.ca |
| Shawn O’Brien | Academic Advisor | shawn.o’brien@nscc.ca |
| Kyle Walker | Project Manager | W0263439@nscc.ca |
| Franklin Fiske | Technician | W0453627@nscc.ca |
| Evan Longley | Cloud Specialist | W0473011@nscc.ca |
| Jack Gordon | Lead Researcher | W0486401@nscc.ca |

Communications Conduct:

Meetings:

Weekly meetings will consist mostly of stand-up “scrum” meetings in room D316 to touch base with team members and ensure the project is following all expected timelines and milestones. These meetings will also be the expected time to consult the Project Sponsor for any change requests.

Email:

All email pertaining to the Kubernetes Project should be professional, free of errors, and provide brief communication. Email should be distributed to the correct project participants in accordance with the communication matrix above based on its content. If the email is to bring an issue forward then it should discuss what the issue is, provide a brief background on the issue, and provide a recommendation to correct the issue. The Project Manager should be included on any email pertaining to the Kubernetes Project.

Informal Communications:

While informal communication is a part of every project and is necessary for successful project completion, any issues, concerns, or updates that arise from informal discussion between team members must be communicated to the Project Manager so the appropriate action may be taken.

# Procurement Management Plan

The Project Manager will provide oversight and management for all procurement activities under this project. Any procurement actions must be approved by the Project Sponsor.

Due to the nature of the project and its location on campus, a Cost Assessment has been purposely left out of this documentation. All hardware and software needed for the project should be procured on campus via formal request through both Academic Advisors.

In the event an external procurement becomes necessary, the Project Manager will be responsible for management of any selected vendor or external resource. The Project Manager will also measure performance as it relates to the vendor providing necessary goods and/or services and communicate this to the Project Sponsor for final approval.

# Project Scope Management Plan

Scope management for the Kubernetes Project will be the sole responsibility of the Project Manager. The scope for this project is defined by the Scope Statement, Work Breakdown Structure (WBS) and WBS Dictionary. The Project Manager, Sponsor, and Team will establish and approve documentation for measuring project scope which includes deliverable quality checklists and work performance measurements.

Proposed scope changes may be initiated by the Project Manager or any member of the project team. All change requests will be submitted to the Project Manager who will then evaluate the requested scope change. Upon acceptance of the scope change request the Project Manager will submit the scope change request to the Project Sponsor for acceptance. Upon approval of scope changes by the Change Control Board and Project Sponsor the Project Manager will update all project documents and communicate the scope change to all team members. Based on feedback and input from the Project Manager and team members, the Project Sponsor is responsible for the acceptance of the final project deliverables and project scope.

The Project Sponsor is responsible for formally accepting the project’s final deliverable. This acceptance will be based on a review of all project documentation, testing results, beta trial results, and completion of all tasks/work packages and product functionality.

# Risk Management Plan

This section provides a general description for the approach taken to identify and manage the risks associated with the project. It should be a short paragraph or two summarizing the approach to risk management on this project.

Since risk management is a science in itself, we have many risk management templates available on our website. Look for the detailed Risk Management Plan, Risk Register along with templates for performing a risk assessment meeting.

The approach for managing risks for the SmartVoice Project includes a methodical process by which the project team identifies, scores, and ranks the various risks. Every effort will be made to proactively identify risks ahead of time in order to implement a mitigation strategy from the project’s onset. The most likely and highest impact risks were added to the project schedule to ensure that the assigned risk managers take the necessary steps to implement the mitigation response at the appropriate time during the schedule. Risk managers will provide status updates on their assigned risks in the bi-weekly project team meetings, but only when the meetings include their risk’s planned timeframe.

Upon the completion of the project, during the closing process, the project manager will analyze each risk as well as the risk management process. Based on this analysis, the project manager will identify any improvements that can be made to the risk management process for future projects. These improvements will be captured as part of the lessons learned knowledge base.

# Risk Register

The Risk Register for this project is provided in Appendix C, Risk Register.

# Staffing Management Plan

Discuss how you plan to staff the project. This section should include discussion on matrixed or projectized organizational structure depending on which is being used for this project. This section should also include how resources will be procured and managed as well as the key resources needed for the project.

The SmartVoice Project will consist of a matrix structure with support from various internal organizations. All work will be performed internally. Staffing requirements for the SmartVoice Project include the following:

Project Manager (1 position) – responsible for all management for the SmartVoice Project. The Project Manager is responsible for planning, creating, and/or managing all work activities, variances, tracking, reporting, communication, performance evaluations, staffing, and internal coordination with functional managers.

Senior Programmer (1 position) – responsible for oversight of all coding and programming tasks for the SmartVoice Project as well as ensuring functionality is compliant with quality standards. Responsible for working with the Project Manager to create work packages, manage risk, manage schedule, identify requirements, and create reports. The Senior Programmer will be managed by the Project Manager who will provide performance feedback to the functional manager.

Programmer (1 position) – responsible for coding and programming for the SmartVoice Project. All coding and programming tasks will be reviewed by the Senior Programmer prior to implementation. Responsibilities also include assisting with risk identification, determining impacts of change requests, and status reporting. The Programmer will be managed by the Project Manager and feedback will be provided to the functional manager for performance evaluations by the Project Manager and Senior Programmer.

Senior Quality Specialist (1 position) – responsible for assisting the Project Manager in creating quality control and assurance standards. The Senior Quality Specialist is also responsible for maintaining quality control and assurance logs throughout the project. The Senior Quality Specialist will be managed by the Project Manager who will also provide feedback to the functional manager for performance evaluations.

Quality Specialist (1 position) – responsible for assisting the Project Manager and Senior Quality Specialist in creating and tracking quality control and assurance standards. The Quality Specialist will have primary responsibility for compiling quality reporting and metrics for the Project Manager to communicate. The Quality Specialist will be managed by the Project Manager who will provide feedback, along with the Senior Quality Specialist to the functional manager for performance evaluations.

Technical Writer (1 position) – responsible for compiling all project documentation and reporting into organizational formats. Responsible for assisting the Project Manager in Configuration Management and revision control for all project documentation. Responsible for scribing duties during all project meetings and maintaining all project communication distribution lists. The Technical Writer will be managed by the Project Manager who will also provide feedback to the functional manager for performance evaluations.

Testing Specialist (1 position) – responsible for helping establish testing specifications for the SmartVoice Project with the assistance of the Project Manager and Programmers. Responsible for ensuring all testing is complete and documented in accordance with TSI standards. Responsible for ensuring all testing resources are coordinated. The Testing Specialist will be managed by the Project Manager who will also provide feedback to the functional manager for performance evaluations.

The Project Manager will negotiate with all necessary TSI functional managers in order to identify and assign resources for the SmartVoice Project. All resources must be approved by the appropriate functional manager before the resource may begin any project work. The project team will not be co-located for this project and all resources will remain in their current workspace.

# Resource Calendar

Include a Resource Calendar as part of your project plan. The resource calendar identifies key resources needed for the project and the times/durations they'll be needed. Some resources may be needed for the entire length of the project while others may only be required for a portion of the project. This information must be agreed to by the Project Sponsor and Functional Managers prior to beginning the project.

The SmartVoice Project will require all project team members for the entire duration of the project although levels of effort will vary as the project progresses. The Project is scheduled to last one year with standard 40 hour work weeks. If a project team member is not required for a full 40 hour work week at any point during the project, their efforts outside of the SmartVoice Project will be at the discretion of their Functional Manager.



# Cost Baseline

This section contains the cost baseline for the project upon which cost management will be based. The project will use earned value metrics to track and manage costs and the cost baseline provides the basis for the tracking, reporting, and management of costs.

The cost baseline for the SmartVoice project includes all budgeted costs for the successful completion of the project.

|  |  |  |
| --- | --- | --- |
| **Project Phase** | **Budgeted Total** | **Comments** |
| Planning | $350,000 | Includes work hours for all project team members for gathering requirements and planning project |
| Design | $250,000 | Includes work hours for all project team members for work on SmartVoice conceptual design |
| Coding | $200,000 | Includes all work hours for coding of SmartVoice |
| Testing | $175,000 | Includes all work hours for testing (including beta testing) of SmartVoice software |
| Transition and Closeout | $150,000 | Includes all work hours for transition to operations and project closeout |

# Quality Baseline

This section should include the quality baseline for the project. The purpose of this baseline is to provide a basis for ensuring that quality can be measured to determine if acceptable quality levels have been achieved. It is important for all projects to clearly define and communicate quality standards and the quality baseline serves this purpose.

The SmartVoice Project must meet the quality standards established in the quality baseline. The quality baseline is the baseline which provides the acceptable quality levels of the SmartVoice Project. The software must meet or exceed the quality baseline values in order to achieve success.

|  |  |  |
| --- | --- | --- |
| **Item** | **Acceptable Level** | **Comments** |
| Voice Recognition | At least 98% recognition level with 2% or less errors in text | Using standard TSI English language databases |
| Compatibility | No errors associated with running software with compatible applications | Using the \_\_\_\_\_\_\_ suite of applications |
| Supporting Documentation | Less than 1% failure rate in beta testing new users to run setup and execute software functionality |  |

# Sponsor Acceptance

Approved by the Project Sponsor:

Date:

<Project Sponsor>

<Project Sponsor Title>

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