

NASA USRP – Internship Final Report

## **SMC Message Browser Projects**

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# SMC Message Browser Projects

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## i. Nomenclature

<i>CCC</i>	=	<i>Command Control and Communications</i>
<i>COTS</i>	=	<i>Commercial-Off-The-Shelf</i>
<i>CSCI</i>	=	<i>Computer Software Configuration Item</i>
<i>EMS</i>	=	<i>Enterprise Management Systems</i>
<i>KSC</i>	=	<i>Kennedy Space Center</i>
<i>LCS</i>	=	<i>Launch Control System</i>
<i>LCSDEV</i>	=	<i>LCS Development Set</i>
<i>MCO</i>	=	<i>Master Console Operators</i>
<i>OMU</i>	=	<i>HP Operations Manager for Unix</i>
<i>SATERN</i>	=	<i>System for Administration, Training, and Educational Resources for NASA</i>
<i>SCCS</i>	=	<i>Spaceport Command and Control System</i>
<i>SMC</i>	=	<i>System Monitoring and Control</i>
<i>XML</i>	=	<i>eXtensible Markup Language</i>

## I. Abstract

I work directly with the System Monitoring and Control (*SMC*) software engineers who develop, test and release custom and commercial software in support of the Kennedy Space Center Spaceport Command and Control System. (*SCCS*). *SMC* uses Commercial Off-The-Shelf (*COTS*) Enterprise Management Systems (*EMS*) software which provides a centralized subsystem for configuring, monitoring, and controlling *SCCS* hardware and software used in the Control Rooms. There are multiple projects being worked on using the *COTS EMS* software. I am currently working with the HP Operations Manager for UNIX (*OMU*) software which allows Master Console Operators (*MCO*) to access, view and interpret messages regarding the status of the *SCCS* hardware and software. The *OMU* message browser gets cluttered with messages which can make it difficult for the *MCO* to manage. My main project involves determining ways to reduce the number of messages being displayed in the *OMU* message browser. I plan to accomplish this task in two different ways: (1) by correlating multiple messages into one single message being displayed and (2) to create policies that will determine the significance of each message and whether or not it needs to be displayed to the *MCO*. The core idea is to lessen the number of messages being sent to the *OMU* message browser so the *MCO* can more effectively use it.

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## II. Introduction

This report shows the goals, accomplishments and processes underwent to achieve my tasks for the fall 2013 System Monitoring and Control software engineer internship. These processes involved training, obtaining permissions and determining ways to accomplish the tasks given to me to their fullest potential.

The Spaceport Command and Control System (*SCCS*) provides the command and control infrastructure for the Ground System Design and Operations (GSDO) program of the Kennedy Space Center. *SCCS* is composed of two subsystems; the Launch Control System (*LCS*) and the Kennedy Ground Control Subsystem (KGCS). I am working within the *LCS* with the System Monitoring and Control (*SMC*) group developing, testing and releasing custom and commercial software in support of *KSC SCCS*.

The objective of *SMC* is to provide a centralized subsystem for configuring, monitoring and controlling *SCCS* hardware and software in the control rooms. *SMC* uses the HP Operations Manager for UNIX (*OMU*) Commercial-Off-The-Shelf (*COTS*) Enterprise Management Systems (*EMS*) software to assist in achieving their objective. The *OMU* allows Master Console Operators (*MCO*) to access, view and interpret messages concerning the status of the *SCCS* hardware and software.

My main project involves determining ways to reduce the number of messages being displayed in the *OMU* message browser. I plan to accomplish this task in two different ways: (1) correlating multiple messages into one single messages being display and (2) by creating policies that will determine the significance of each message and whether or not it needs to be displayed to the *MCO*. The core idea is to lessen the number of messages being sent to the *OMU* message browser so the *MCO* can more effectively use it.

## III. Prerequisites

Prior to beginning my tasks for the project, many steps needed to be taken to prepare myself regarding using the software. (E.g. security training, obtaining permissions, setting up accounts, reading users guides, etc.) Most of the software and programs I access require special permissions, including the *OMU*, so completing these prerequisites played an important factor in achieving my tasks.

### A. Security Training:

Completing the basic security training granted me access to my NASA Domain Controller account and allowed me to log onto NASA's SATERN training website to complete other necessary training required for my group. Completion of this training allowed me to request accounts to be setup for me. Some of these training courses include:

- IT Security for Systems Administrators Beginning/Intermediate
- KSC Clearquest User Training
- Elevated Privileges On NASA Information Systems
- FY 2013 Annual Information Security Training
- KSC Protecting Sensitive Unclassified and Privacy Information 2013
- NASA NE Information Policies

### B. Account Setup:

Working with two different machines and being required to access particular documents, files and software throughout my project, certain accounts were required for me to have. The following accounts were created for me:

- Root Access
- KSC - Rational ClearQuest
- KSC AccuRev

- *KSC RequisitePro*
- *CCC LCSDEV*
- *KSC Elevated Privileges for NON-ODIN/ACES computers - System Administrators*
- *KDDMS - Windchill*
- *CCC SCCS*

### **C. Tools Access/ Training:**

The following document assisted me when comprehending the responsibilities of the *SMC CSCI*. The *SMC CSCI* is responsible for configuring, controlling and monitoring the LCS hardware and software. This document provides a detailed design and structure of the *SMC CSCI*.

- *LCS SMC Software Design Document*

Understanding of the structure and setup of the *OMU* was a very important part of my project. The *OMU* is a very powerful tool and contains many useful functions. The following documents aided me while understanding the *OMU* and its functions:

- *HP Operations Manager Java GUI Operator's Guide*
- *HP Operations Manager for UNIX 9.10: Administration UI*

One of the functionalities the *OMU* has is Message Storm Detection. When messages arrive to the management server at a rate that exceeds the allotted message rate, a Message Storm is detected. The following document assisted me with understanding and determining message storms:

- *HP Operations Manager for UNIX 9.10: MessageStorm Detection*

## **IV. Procedure**

To accomplish my projects main objective, I broke down the procedure into separate parts. (1) Determine a way to accumulate messages to be analyzed. (2) Analyze messages and determine a solution. (3) Execute solution through by developing policies.

### **A. Archive File Generator:**

My first objective was to understand what messages to look for. We decided to create a collection of different messages, to obtain a better understanding of how the *OMU* interprets them. Having limited access to the control rooms I was able to connect to specific development sets and use an *OMU* function to exported messages to an archive message file. (An archive message file is a collection of messages from the *OMU* history)

The archive message file is a huge file that contains thousands of messages sent to the *OMU*'s history. The file was very hard to interpret because it was exported as a type of XML file. In order to effectively analyze the archive message file, I developed a script that parses through it and grabs the important message data. The script is able to parse through a whole XML archive message file, grab the important message data and neatly display the data into a formatted Excel Worksheet.

The Archive File Generator script automatically creates a legible worksheet for any archive message file that is exported from the *OMU*. I created a detailed Desktop Instruction for others to follow if an archive message file ever needs to be analyzed.

### **B. Message Report**

After creating a formatted worksheet of the archive message file I was able to analyze it more effectively. I went through numerous files and correlated relative information regarding targeted messages. The target messages consist of; messages that should be considered for duplication, messages that should be correlated, suspected Message Storms, messages that have a suspiciously high duplication count.

I created a report that contains these target messages describing the problem they are causing and provide a suggestion on how to resolve that problem.

### **C. Execute Solution:**

Using the Archive File Generator I was able to identify messages that should be considered for correlation. Targeting these messages within multiple archive files I was able to compare intensity of each message within each archive file. While collecting and taking notes of each targeted message I gave my input and suggestions regarding the policy solution of the each message problem. After determining and identifying a solution, the next phase was to resolve the problems with implementation. Policies for the *OMU* will be created to detect these targeted messages and how they will be displayed in the *OMU* message browser. Most of the implementation for these policies will be completed by future interns. I will continue searching for message activity for the remainder of my stay. If there is still time these next few weeks, I will be able to implement some policies to the *OMU*. Creating these policies would strengthen my understanding of problem solving in the field; defining the problem, determining a solution and implementing that solution.

## **V. Conclusion**

Comprehending the setup and the functionalities of the *OMU* was a big task itself. The *OMU* is very a powerful tool that has numerous functionalities that still can be learned. Deriving a connection between the *OMU* and my Archive File Generator was also an interesting task to achieve. The archive message file generated from the *OMU* is an extremely large file that contains thousands of saved messages from the *OMU*'s history. Originally I was given no particular format of how each message was described in the XML. Other members of the group and I went over the file and tried to determine a pattern from scratch and then develop a script to parse through the file. This in itself was a challenging task. The script would often skip messages within the file as well as leave out important data. Once we obtained the XML message format file from an HP *OMU* forum, I edited the script to run a lot smoother. Having the XML message format file, I was able to go through each message string and parse out all of the important message information. It was interesting to go through message files and collect information for the message report. Noticing all of the messages that can be fixed through duplication or correlation was fulfilling. Some implementation will be done in the *OMU* regarding the messages in my report. Overall the number of messages being displayed in *OMU*'s message browser should lesson, which should make it easier for the *MCO* when interpreting messages.

The System Monitoring and Control group does not focus on one set subject but moreover it is involved with the configuring, monitoring and controlling all *SCCS* hardware and software. Not only did I learned a lot while working with this group but to be a member of a group that provides such an important role in support of the *SCCS* is truly fulfilling. I was able to obtain a real professional understanding on how processes and procedures are undergone in order to successfully accomplish tasks by their deadlines, that I know will be carried with me throughout my future career. Working at the Kennedy Space Center has truly been an extraordinary experience. It is amazing to think that I am part of the end result of an organization where thousands of people work together every day in attempts to somehow further world's knowledge of space exploration. Having to witness my first launch was an amazing opportunity that has definitely given me a concrete idea of where I wish to take my schooling. Working with this organization has truly been an inspiration for me and is something that I wish to continue working with sometime in my future career.