Precision Castparts Corp. Report

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MECOP Internship #2

Summer/Fall 2015

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November 27, 2015

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1 Introduction

For my second MECOP internship I was fortunate to be placed at Precision Castpart Corp.. This was my second time being immersed into a professional atmosphere in the field that I am studying and I enjoyed it equally as much as the first. I am a computer science student with a focus on security and I thought that Precision Castparts Corp. was more of an "old school" non-tech company before my internship. I was greatly mistaken. Precision Castparts Corp. has a lot of advanced technology and very intricate security. It was beneficial for me to learn the basics of how a large corporation like Precision Castpart Corp. handles security. I now feel more well rounded and have at least some experience relating to my security focus.

2 Precision Castparts Corp.

2.1 What does Precision Castpart Corp. do?

When I was first placed at Precision Castpart Corp. I had not heard much about them. I was not aware that they were one of Oregon's two fortune 500 companies. Precision Castparts Corporation specializes in the casting of metal aerospace parts. They are the world leader in investment casting, forged components, and airfoil castings. The company was started over 60 years ago in Portland, OR by Joseph Cox, the owner of Oregon Saw Chain. The initial intention was to cast a special cutter for his chain saw products. The company began focusing their time on developing the casting operations and looking for more outside work. This portion of the company became so successful that it branched out and became a separate business called Precision Castparts Co. The company began pushing to create larger castings and, by 1962, was able to pour a casting weighing 1,000 pounds. PCC soared above all of the competition, and later signed contracts with General Electric, Boeing, Pratt & Whitney, and several other aerospace companies. The company began developing their processes with titanium, nickel, and stainless steel alloys. PCC soon became the world leader of manufacturing large titanium castings as well. The company currently has several campuses throughout Portland, and has recently been acquired by Warren Buffett's Berkshire Hathaway.

2.2 MIS

During my internship at Precision Castparts Corp I was exposed to many different departments. The casting process has not changed much over the 60 years Precision Castparts Corp has been around, but what has changed a lot has been the technology that they have been using to refine the casting process and this is where the MIS department comes in. All of the technology is managed by the MIS (Management Information System) department. For a large portion of my internship I was stationed at the helpdesk. I liked the atmosphere of the helpdesk and the opportunity to get hands on experience with technology all around the plant. I would help individual users with minor problems like email to large issues that were halting production like robotic arms.

2.3 Mentor/Supervisors

My mentors were the managers of the MIS department Steve Jessie and Dave Rajkumar. Both Steve and Dave were responsible for keeping all of Precision Castparts Corp technology up to date and secure. Management encompassed the LAN Admins, Programmers, Helpdesk, and the Telecom employees. I was often at my desk in the helpdesk which was separate from the MIS department we kept a close relationship

with the other programmers, LAN admins, and techs. I worked with a lot of individuals during my time at Precision Castpart Corp. often times when a problem would arise we would all have a role in getting the issue resolved.

3 Projects

3.1 Aras Innovator Upgrade

The first large project that I had the opportunity to work on was upgrading Aras Innovator. The drive for the MIS department to upgrade Innovator was that the current version when I began at PCC only worked on Internet Explorer 9. We wanted to move all of our computers to Internet Explorer 11 and to do this we had to make sure that Innovator would continue to work. Innovator is a unique process control visualization tool that is used company wide and a seamless upgrade with no errors was required. I worked very closely with Kyle Grotjohn who was the lead in the upgrade. We both had to create a comprehensive test plan that would get as close to 100% coverage as possible. This plan was huge, if there was a check box that could be clicked there was a whole test just to test that one check box. I spent about 4 weeks going through the test plan and creating bug reports for any errors I came across. The bug report contained screenshots, the steps taken to reproduce the error, and my description of the what was supposed to happen. Aras corp were actually the ones in charge of fixing the bugs, so I would package all of my reports up and send it to them.

This was the first time I have been introduced to the Aras Innovator Application. Since Kyle had begun to test this tool before me, he was a great mentor on the application. It was really nice to have some tests in place before I started, and to view how a professional laid out the base of the test plan. Mimicking the style helped me create and execute a well designed test plan.

One of the biggest takeaways from this project was the importance of clear and easy to read documentation. In my past projects that I developed tests, I never created a test plan which probably resulted in many functions not getting coverage. Studying the test plan before beginning my work on this project, I noticed that there were clear comments everywhere. Since I mimicked Kyle's testing style, I too used an abundance of comments. I soon came to the realization how much easier it is to understand and take care of bugs when you know where they come from.

Things Learned:

- .Net framework
- Internet Explorer compatibility
- Creating Bug reports
- Work with others following a plan

3.2 Security Audit

Many of the contracts that Precision Castparts Corp. has, cyber security has to be top notch. Precision Castparts Corp. would conduct bimonthly security audits that would check every computer that is in our domain. We would get separate lists of computers that had reported missing mandatory security software. Each list would have the computers that would require us to manually connect to each machine

and verify that the computer either reported a false-positive or was indeed missing the software. I saw this as a great opportunity to implement automation. I began creating scripts that would make the audit process quicker and more accurate. The first Script that I wrote would take all the computer names and try to gather more info on them. The script would ping each computer to see if they are currently online, get the last user who logged into the workstation, and the last time time the computer was logged in.

At first the other PC techs were skeptical of using my scripts since they had been doing the security audits many times in the past and did not want to cause more problems. After a while they began to see the usefulness in what the scripts accomplished. Each script needed to increase the productivity of the audit process. I spent time developing the scripts which put me behind schedule on the first audit but the audits that came after the scripts increase my productivity tremendously.

Before the first security audit I had not used Powershell to create scripts. It was a slight learning curve that I had to overcome. I am very familiar with the Unix shell environment and Powershell shared many of the same characteristics. One challenge that I had to overcome was that Windows would not actually run any Powershell script that had not been signed. This was a problem since I did not have access to a Windows development key for signing, I ended up creating a wrapper Batch script that would enable unsigned execution and then, after executing, set the execution policy back to the default. Needless to say writing the batch script wrapper was more difficult than the Powershell script. The Batch script syntax was very different from the familiar Unix shell environment.

Things Learned:

- Powershell scripts
- SCCM reporting
- Active Directory
- Windows CLI

4 Minor Projects

4.1 PC Builds

One of the main tasks that the PC technicians at the helpdesk were responsible for were building computers for the employees. The first step in building a PC was to either construct a computer for previously deployed machines or taking one out of stock. My previous experience of building my own computers helped a lot in this task. Once we had a working computer we would have to image it with a working OS. With all of the standard applications that need to be installed on each machine, it would take a long time to get each computer installed with the required applications. SCCM actually allows you to build a PC with a set of Applications preinstalled. I never knew this was a feature of SCCM and it made the build process much faster and easier.

After the SCCM image was complete the computer still needed some manual tech work. Each computer must be fully encrypted. All the PC we would build have an on-board hardware encryption module called TPM (Trusted Platform Module). With my security interest I enjoyed learning how to enable the TPM and preform a full disk encryption.

Things Learned:

- Determining hardware requirements
- SCCM Network Images

- TPM Encryption

4.2 Application Installs

Many of the Precision Castparts Corp. employees needed specialized non-standard applications. A lot of the applications that I had to install were in-house applications that had very vague and abnormal installation procedures. I became very familiar with asking other techs and sometimes the developers how to install the requested application. I enjoyed the learning curve that was required to install some of the applications. It was rewarding knowing the very unique installation procedure the second time around and giving advice to the new techs on how to install the application.

Before working at the helpdesk I never had to provide remote assistance to anyone. It was pretty weird remoting into peoples computers even when I was on the phone with them. I felt like I was invading their privacy. After I became more familiar with remote assistance etiquette I no longer felt this way.

Things Learned:

- Asking developers for install instructions
- Remote Control assistance
- Analyzing install time

5 Conclusion

5.1 What I learned

During my 6 month internship I learned a comparable amount of degree related knowledge to what I would have at school. The main difference was that the things I learned while Working at Precision Castparts Corp. no class could teach. One of my most exciting things I learned during my internship is how to be efficient. I consider myself 100% more comfortable in a Windows environment. I believe that I will be a much more well rounded programmer and will be able to produce a higher quality of work from the tips and tricks that I learned during my time at Precision Castparts Corp. The real world work environment seems far less scary to me now that I have had a slight taste of it. It was very neat to see how my background knowledge from school got integrated into the work place. I would often times recall information from previous classes that would help me solve problems I faced during my internship.

5.2 How the internship benefited me

This internship has benefited me in many ways. One of the best benefits I will takeaway from this internship is knowing that I can work in the industry. It was enlightening to see that I was working on real projects alongside full time employees were working on and finding solutions to real time problems. I liked working on nonstandard problems in contrast to school where I was finishing a homework assignment that

I knew every other CS student had solved before me.

5.3 How I benefited Precision Castparts Corp.

I didn't realize how important my contributions were to Precision Castparts Corp. until Kyle one of my coworkers wrote a recommendation on my Linkedin profile saying "I worked with Sam on the Aras Innovator System upgrade from version 9 SP3 to 11 SP2. Sam was invaluable as a testing resource throughout the entire upgrade, have it be following test plans and bringing up issues or writing some test plans himself that followed user procedure more closely. The learning curve to the Aras UI is only trumped by the high level of customizability within the solution and with all of those hurdles Sam still continued with a positive demeanor and continued to exceed my expectations. His ability to understand and learn business practices, customized programmatic solution, and following/creating test plans were invaluable to me throughout the entire upgrade process. I am confident that Sam possesses the determination and learning capability to succeed wherever his career takes him.". After I heard this I truly felt that Precision Castparts Corp. valued my work and that I was actually making a difference.