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Fire at the UM Computing Center

- *From:* Jeff Ogden
- *Date:* Fri Oct 01 00:33:48 1999

Those of you that receive messages from the MichNet-inform e-mail list will have seen several messages about a fire at the University of Michigan Computing Center Building in Ann Arbor. The fire started a little before 1 am Thursday morning in an electrical/mechanical space at the Computing Center Building. No one was hurt and little or no damage was done outside of the electrical/mechanical space other than a light covering of soot on just about everything. Some MichNet services were disrupted between 1 am and 7 am or so. By approximately 7 am due to some hard work by a number of people most MichNet services were working normally. We continued to have problems with Mbone service and authentication for our toll free dial-in service wasn't working for a time after 7 am.

The University of Michigan has longer lasting problems, but most of their campus networking was working again by 7 am and other services continued to be restored throughout the day. The service that is taking the longest to restore at UM is the Institutional File System (IFS). That probably won't be fully restored until sometime on Friday.

The rest of this message talks about what happened and what was done to recover or at least as much of it as I know (I don't know all of the details since several different teams from Merit and the University of Michigan were working from different places to fix different problems. I spent most of my time at the UM Computing Center Building while others worked at Arbor Lakes. Not everyone will be interested in or needs to read the rest of this note.

A fire at the UM Computing Center Building (CCB) in Ann Arbor was detected a little before 1 am when the UM Department of Public Safety (DPS) received an over temperature alarm from the electrical equipment room at the CCB. Shortly after this DPS received an alarm telling them that they had lost contact with the alarm system at the CCB, probably as a result of a power failure. At this same time our Network Operations Center (NOC) was seeing huge numbers of alerts and they sent out their first inform message letting people know that there were serious problems.

I used the term "they" for the NOC. In fact there was just one person working at the NOC at the time and he had a very busy shift and did an outstanding job under difficult and confusing circumstances.

Bert Rossi of Merit and UM networking staff were called around 1 am and started working on understanding what was going on and restoring/replacing services or facilities that had been lost due to the fire and power outage at the CCB. Sue Joiner and Mark Gebert of Merit's System Administration Team were called fairly early on as well.

Because almost all of Merit's Ann Arbor equipment had already been moved out of the CCB to Arbor Lakes over the summer, we were in fairly good shape. We did have a bridged ethernet between the CCB and Arbor Lakes and the MichNet1 router was on that ethernet at the CCB. Reconfiguring that was an early step that people took.

Merit still had three servers at the CCB that were out of service. One was Merit.edu that is mostly used as a Domain Name Server. To fix this problem a new server at Arbor Lakes as pressed into service as a virtual Merit.edu and assigned what had been the old Merit.edu's IP address. Another was the RADIUS9 core server. Our version of the RADIUS protocol uses a backup server if a primary RADIUS server fails. So having RADIUS9 off the air didn't cause too many problems. It did disrupt authentication for users of our toll free 800 dial-in service until a new server at Arbor Lakes was pressed into service as RADIUS9. And finally our Ann Arbor MBONE server was down and we didn't make restoring MBONE service a high priority.

I was called around 3 am and arrived at the CCB at 3:30 pm. The Ann Arbor Fire Department had come and gone by that time. When they first arrived they couldn't go into the CCB to fight the fire until electrical power was turned off. UM Electrical Department staff turned off power to several

buildings on the UM's North Campus so that it would be safe for the fire department to enter the electrical room. The CCB electrical room is a scary place when there are no lights, lots of smoke and you are getting ready to fight a fire in an area with two electrical substations, two primary electrical transformers, several secondary transformers, five large uninterruptible power supply (UPS) systems with batteries and a lot of switching equipment. Fortunately the fire largely burnt itself out and the fire department didn't have to spray much water or other substances around.

Once the fire was out the biggest problems were smoke and lack of light. This made it difficult to see and unsafe and uncomfortable to work inside the building. By this time a collection of sleepy UM Plant Department, Merit, UM Information Technology Division and School of Information (a new tenant at the CCB) and UM Occupational Safety and Environmental Health (OSEH) staff had started to gather outside the CCB. Initially much time was spent waiting outside for smoke to clear, for large fans to be brought in, for electrical generators to be brought in and extension cords to be strung from nearby buildings to power the fans, more waiting for smoke to clear and OSEH to give the OK to enter the building for brief periods of time so we could beginning to assess the damage, try to figure out what happened and what we needed to do to recover.

Once some of us could enter the building it was clear that the fire had started in and been largely contained in two or three of the 16 battery cabinets that are part of the UPS systems. The batteries in the cabinets and the cabinets themselves were largely destroyed by the fire. Quite a bit of additional damage to nearby equipment and wiring had been done by the huge amount of heat generated by the fire, but it was difficult to know how much because of the smoke and the fact that all the light we had to work with was from flashlights. More time was spent waiting for the smoke to clear, a fan was lifted to the roof of the CCB and used to exhaust smoke through a trap door. Once the smoke had cleared some, work lights were stung first in the electrical space where the fire occurred and in the electrical substation room next door and then in other areas of the Computing Center building.

At this point we still hoped that we could bypass the damaged UPS unit or units and restore power to most of the building fairly quickly. It soon became clear, however, that too much damage had been done and in particular too much wiring had melted, fused and otherwise been damaged to allow the UPS systems to be bypassed without extensive rewiring.

It is now about 6 am and I thought if a miracle occurred that power might be restored in 12 hours, but is was much more likely that it would take several days before power to the CCB could be completely restored.

At Merit we were already well on our way to moving all essential equipment and services out of the CCB and to Arbor Lakes and we just continued on that path. The University of Michigan had been planning to move the rest of their equipment and servers out of the CCB over the next three to six weeks. UM's Information Technolocyt Division made a decision to abandon the CCB and complete the move in less than 24 hours.

And that is what both Merit and UM did or in the case of UM are still doing.

The UM Plant Department electricians worked to restore power to the CCB by rewiring and bypassing the UPS systems. This was a huge job and they got it done in just 13 hours, which is pretty close to the 12 hours that I had estimated would require a miracle. A large crew that included high voltage electricians, regular electricians, low voltage (alarm) electricians, elevator repairmen and many others worked on this. The OSEH department continued to monitor the building. UM fire investigators looked over the fire site. DSP provided building security since all of the doors were wide open. The UM Risk Management Office began to assess the damage, make plans to clean the building once power was restored and brought in an outside firm to clean computer equipment and circuit boards that weren't damaged, but which were covered with a fine soot. A good portion of this electrical cleaning would be done in less than six hours and another large portion in less than 18 hours.

One of the electricians said that this was the worst electrical disaster that he had seen in his career. It has been estimated that between 40 and 50 people have been working to restore services and to restore power and other services at the CCB. Between 20 and 25 servers and between three and five routers were moved.

While I don't wish a fire of this sort on anyone, it was a real pleasure to watch a team of very talented electricians take on a difficult challenge and get it done in a very short time. It was also a joy to watch them work as a team to get the job done. I was also impressed by how well the many different people from so many different groups worked together. Many people worked very long hours to restore services just as soon as they could. Some of those people are still working as I type this message.

While most services have already been restored and more UM services are expected to be restored during the day Friday, there is still a lot more work to be done over the next weeks and months. The MichNet Operations Group (the folks that install new network attachments, upgrades, repair and otherwise keep MichNet going) have their offices and work areas in the CCB. If they return to the CCB following the fire, there will be a huge clean-up job to do. They are also concerned that we may see some equipment failures over the next several weeks as a result of the fire and the electrical cleaning of components. The MichNet Operations Group may need to reschedule some of their new installations or upgrades for end users.

At the CCB, while power is restored, things are only patched together at

this moment and much will need to be rewired again to fix things right. This will mean more power outages at the CCB over the next weeks and months. Fortunately, since Merit's production equipment is now all out of the CCB, these future outages won't result in disruptions on MichNet.

As you might guess the fire has started us asking questions about the possibility of similar disasters at our new Arbor Lakes data center. I am sure that we'll have many more discussions of this topic in the weeks to come, but the new Arbor Lakes site has several advantages over the CCB: the UPS system at Arbor Lakes is new where the CCB systems were from 15 to 28 years old and Arbor Lakes is equipped with a fire suppression system where the CCB was not.

At this time I don't think anyone knows what caused the fire in the first place.

If you have any questions about the fire or Merit's response to it, feel free to send me e-mail (jogden@merit.edu) or to ask your Merit Network Consultant.

-Jeff Ogden
Merit

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