Marlborough Datacenter Loss of Network Connectivity

Scope of Incident – Customer Impact

Starting at 9:00pm EST on June 19th, internet connectivity into Synoptek's Marlborough datacenter was lost. All datacenter infrastructure remained fully functional throughout the event but could not be reached from outside the facility. Customers with network services independently purchased through third parties other than Windstream that did not ride on the same external physical network infrastructure path remained functional. Customers with dedicated Windstream circuits or Windstream MPLS services were offline as well.

Symptom/s

Customers lost access to all systems hosted within the datacenter. Customer systems in the datacenter could not be reached by any means.

Root Cause

The root cause of the event was a fiber line cut approximately 1-2 miles away from the datacenter. Synoptek relies on a redundant Sonet ring from Windstream to deliver our network services in the Marlborough datacenter. This ring was designed to be self-healing such that a single interruption in one path would not bring down the site. In this case, some portion of the redundant paths converged and did so at a point where the fiber cut occurred, interrupting both paths.

It is Synoptek's understanding that a motor vehicle accident impacting a utility pole caused damage to the fiber cable over the length of five poles in an area where the paths were converged. Due to the state of the utility pole, the local utility company had to first completely replace the pole and secure the power lines before the local fiber provider was allowed access to repair the damaged fiber. The work by the local utility company caused significant delays in getting network connectivity restored by the local fiber provider.

Absolute Cause

At this time, Synoptek does not have the results of a final, detailed root cause analysis from Windstream for the absolute cause of the converged ring. Once this is received Synoptek will send a final RCA document with those findings.

Corrective Action/s

The corrective action to restore service was conducted by the local fiber provider to repair the fiber bundle in which the two separate fibers of the Sonet ring that had converged. The first half of the ring was repaired at approximately 7:45 PM EST on June 20th, and the second half of the ring was repaired at approximately 2:00AM EST on June 21st.

During the course of the event, Synoptek also worked very closely with Windstream in an attempt to find alternate paths to route traffic to the datacenter as a workaround to the issue. Due to the complexity of the outage, and the coordination needed with third party fiber providers who have alternate routes to the building, this solution could not be accomplished in a timely enough fashion that it would have been completed sooner than the fiber repair.

Preventive or Follow-up Actions

Synoptek is taking the following actions to prevent future problems of a similar nature. This section will be further updated with the final RCA once remediation details are shared by Windstream for fixing the redundancy issue with their ring topology.

Action	Responsible	Target Date
Add a second network provider into the facility to share bandwidth load and which uses a path over local network infrastructure independent of the path used by Windstream. (An agreement was signed with Level3 for this service on May 31.)	Joe Reazor – Director, Architecture	Circuit Delivery: 7/31/17 Implementation: 8/15/17
Ensure Windstream certifies their Sonet ring is setup in a fully high availability, self-healing configuration, with no physical infrastructure path convergence	Joe Reazor – Director, Architecture	TBD
Resolve outage email notification issue with some customers who were not receiving updates throughout the event	Ric Lavelle – DC Manager	7/15/17
Create a quarterly circuit failover testing plan once the second network provider is operational and share test results with all customers.	Joe Reazor – Director, Architecture and Arthur Miller, Manager, Network Operations	8/31/17

Communications/Time-line of events (All times EST)

Date	Time	Event/Action
6/19/2017	9:00 PM	Monitoring system alarms are received and reports from local staff that Marlborough DC lost connectivity.
	9:29 PM	Synoptek Critical Incident Bridge is started and teams engaged. Synoptek conducts tests to verify the loss of connectivity is not due to problems within our own datacenter infrastructure.
	10:10 PM	First customer notification sent about ongoing event.
	10:45 PM	Windstream support engaged. Confirmed inability to reach their systems. Windstream dispatches a field tech dispatched
	11:00 PM	Synoptek contacted multiple groups within Windstream. Tickets opened with Northeast Repair, IP NOC, and Transport NOC
	11:13 PM	Second customer notification sent and update provided of a major network issue.
	11:47 PM	Synoptek escalated the issue to IP NOC Director and VP within Windstream
6/20/2017	2:45 AM	Synoptek received confirmation from Windstream that a fiber cut had occurred in the Marlborough area and teams were onsite assessing the extent of the issue.
	12:00-6:04 AM	Synoptek continued discussions with Windstream NOCs to try to determine why the diverse path Sonet ring was not protecting us from the outage.
	4:37 AM	Windstream supplied detail that the extent of the fiber cut spanned five utility poles and assessment and remediation was ongoing.
	6:04 AM	Windstream unable to determine why the path which was believed to be redundant was not up, their ability to perform research severely limited due to loss of access to their own systems.
	6:46 AM	Windstream informed Synoptek that one of the utility poles was severely damaged and needed to be replaced. The fiber provider was on hold to repair the fiber until the utility company arrived onsite to replace the pole and fix the power lines. Due to the path of the fiber, there was no option to run a temporary cable to restore service.
	7:51 AM	Update provided to Synoptek that local utility company was expected onsite for pole replacement between 8 and 9am.
	7:58 AM	Synoptek informed by Windstream that they have started to research reroute options but did not have any eta on that option.
	8:11 AM	Synoptek informed that the fiber in question that was cut was a 288-strand fiber, causing significant impact to many businesses in the local area and will require some time to re-splice all fibers. Synoptek stresses the need to prioritize our fibers when that work starts.
	9:02 AM	Synoptek given first potential ETA of 1:00 PM predicated on utility company finishing their work. Utility crews confirmed onsite.
	9:00-12:00 PM	Synoptek continues communication with Windstream requesting regular updates. No new ETA supplied during this time.
	12:10 PM	Synoptek joined internal Windstream conference call with IP and Transport Engineering to discuss possible options for alternate paths into the datacenter.
	12:10 PM – 10:00 PM	Synoptek remains engaged on Windstream bridge to discuss all options, provide input, and get immediate updates from NOC managers.
	12:21 PM	Windstream indicates they are requesting an update ETA from the utility company.

Date	Time	Event/Action
5/20/2017	1:36 PM	Windstream supplied update from their fiber vendor that they don't expect clearance from the utility company until 2:30-3:30 PM and would need at least another hour to perform repairs. Estimated best case ETA of 4:30-5:00 PM
	2:47 PM	Windstream updated that they were unable to determine alternate paths into the datacenter to route around the fiber cut. Still looking at options.
	2:55 PM	Fiber provider starting prep work on fiber repairs, waiting for power company to release them and trying to get an updated ETA.
	4:31 PM	Utility company cleared the fiber vendor to start their work, Synoptek fibers confirmed to be prioritized for restoration.
	5:15 PM	Synoptek provided an updated ETA that is no longer dependent on the utility company. Estimated at a 2-3 hour window for service restoration based on input from the fiber repair technicians.
	5:35 PM	With fiber repairs underway, alternate route options no longer being researched by Windstream as no viable solutions had been found by this time.
	6:02 PM	Fiber technicians confirmed that work is underway for splicing at both ends, locating proper fibers and performing splices.
	7:13 PM	Synoptek escalating to Windstream senior management for updates as first target range coming up.
	7:34 PM	Windstream confirms that ETA of 7:30 had been supplied by fiber vendor but had been missed, pushing for updated ETA.
	7:46 PM	Update from Windstream that they are starting to see some services restored.
	7:52 PM	Confirmation by Synoptek that we are seeing services restored. Initial restoration is of one path only, Marlborough to Worcester. Synoptek remains engaged to get status on Marlborough to NYC path.
	8:00-10:00 PM	Continue to follow up with customers on service restoration. All signs indicating all customers are returning to service, no reports of anyone still unable to access the DC, but second path still not up.
	10:15 PM	Synoptek leaves the Windstream conference call giving them the proper contacts to notify once the second path has been restored.
	10:31 PM	Windstream supplied an ETA of midnight for restoration of the second path.
6/21/2017	2:07 AM	Synoptek confirmed with Windstream that the second path was up and operational. All services restored to their previous state.