

Exh. JDW-25
Docket UT-181051
Witness: James D. Webber

**BEFORE THE WASHINGTON
UTILITIES AND TRANSPORTATION COMMISSION**

**WASHINGTON UTILITIES AND
TRANSPORTATION COMMISSION,**

Complainant,

v.

**CENTURYLINK
COMMUNICATIONS, LLC.,**

Respondent.

DOCKET UT-181051

**EXHIBIT TO
TESTIMONY OF**

JAMES D. WEBBER

**ON BEHALF OF STAFF OF
WASHINGTON UTILITIES AND
TRANSPORTATION COMMISSION**

*CenturyLink Responses to Staff Investigation Data Requests
RS-1 – RS-11, September 2019*

December 15, 2021

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DATA REQUESTS DIRECTED TO: CenturyLink Communications LLC

REQUESTED BY: Regulatory Services Staff

UTC STAFF DATA REQUEST NO. RS-1:

What was the state (status) of the PSAP migration project transitioning the CenturyLink PSAP service and management to TCSYS/Comtech PSAP service and management during the WA 911 network outage period covering Dec. 27-Dec. 28, 2018?

CENTURYLINK RESPONSE:

The migration project has three phases:

- Phase 1: Move Washington PSAPs that do not decommission to a Comtech NG911 network.
- Phase 2: Move the PSAPs on the Comtech NG911 network from the WEST ALI database to the Comtech ALI database.
- Phase 3: Move all connections from the Central Offices to a direct connection to the Comtech RCL.

On December 27, 2018, Phase 1 was underway. As of that date, CenturyLink had cut over 47 PSAPs to Comtech and continued to provide 911 service to 15 PSAPs. ~~Six-Five~~ (65) PSAPs had been decommissioned.

RESPONDENT: Phil Grate

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UTC STAFF DATA REQUEST NO. RS-2:

Please report on which of the three phases of the migration project were each of the PSAPs in at the time of the outage (all WA PSAPs not just those migrating to TCSYS/Comtech).

CENTURYLINK RESPONSE

On December 27, 2018, all PSAPs were in Phase 1, meaning that some had cut over to Comtech and some had not. Phases 2 and 3 had not yet occurred for any PSAP. On December 27, 2018, CenturyLink still provided 911 service to the following 16 Washington PSAPs:

- Klickitat Sheriff's Office 911 Center
- Northeast King County Regional Public Safety Communications Agency
- Valley Communications Center (Valley-Com)
- Puyallup Communications South Sound 911 - FireCom
- Whatcom County Communications Center
- Spokane County 911 Emergency Communications Backup
- Stevens County 911
- Spokane County 911 Emergency Communications
- Fairchild Air Force Base FD
- Colville Tribal Police Department
- Yakima County (SUNCOM) Backup
- King County Sheriff's Office
- Multi Agency Communications Center (MACC) - Grant
- SNOPAC911
- SNOCOM 911
- Bellingham FD/WHAT-COMM Backup

As of December 27, 2018, CenturyLink no longer provided 911 service to the following 47 Washington PSAPs:

- RiverCom 911
- WHITCOM 911 Emergency Center
- Columbia County Public Safety Communications
- Lewis County 911
- Okanogan County Sheriff's Office

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- Pend Oreille County 911
- Lincoln County Sheriff's Office
- Adams County Communications Center
- Garfield County Sheriff's Office (WESCOM)
- King County Test PSAP
- University of Washington Police Department
- Joint Base Lewis McChord (JBLM)
- WSP - Wenatchee
- Bothell Police Dept.
- Issaquah Police Department
- Enumclaw Police Department
- Seattle Police Dept.
- Skamania County Sheriff's Office
- Redmond Police Dept.
- Ferry County E911
- WSP - Bellevue
- WSP - Marysville
- Kitsap County Central Communications (CENCOM)
- San Juan County Sheriff's Office
- Kittitas County 911 (KITTCOM)
- Walla Walla Emergency Services Communications Center (WESCOM)
- WSP - Spokane
- South Sound 911, SS911 Eastside (fka Puyallup Comm), Tacoma Fire
- Southeast Communications Center (SECOMM) (Benton)
- WSP - Yakima
- Port of Seattle Police/Fire Communications
- Skagit 911 Center
- TCOMM 911
- Clark Regional Emergency Services Agency
- Wahkiakum County Sheriff's Office
- Yakima Public Safety Communications Center (SUNCOM)
- Seattle Fire Dept.

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- WSP - Vancouver
- Cowlitz County 911 Center
- WSP - Tacoma
- Pacific County Sheriff's Office Communications
- Grays Harbor E911 Communications
- Peninsula Communications
- JEFFCOM 911 Communications
- Island County Emergency Services Communications Center (I-COM 911)
- WSP - Bremerton
- Mason County Emergency Communications (MACECOM)

All Washington PSAPs were either migrating to Comtech or decommissioning prior to the end of Phase 1. As of December 27, 2018, the following PSAPs were decommissioned:

- Franklin County Sheriff
- Franklin County Backup
- JEFFCOM 911 Backup
- Tacoma Fire Communications Center
- West Pierce Fire & Rescue

RESPONDENT: Phil Grate

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UTC STAFF DATA REQUEST NO. RS-3:

Were any of CenturyLink's WA State non-emergency services customers impacted by the CenturyLink voice, IP and transport services outages during the Dec. 27, 2018 – Dec. 29, 2018 period as reported in this Outage-State Summary?

CENTURYLINK RESPONSE:

CenturyLink objects to this data request as overbroad, and seeking information that is not within the jurisdiction of the Commission. This includes interstate services, and non-telecom services such as IP based services. Without waiver of this objection, CenturyLink provides the response below.

Yes, there were impacts to CenturyLink non-emergency services in Washington as a result of the December 27-29, 2018 network event. Long distance services in Washington were subject to network congestion for approximately 21 hours during the event. Importantly, this network congestion was intermittent and did not impact all calls or areas within the state. Affected customers would have experienced a fast busy or static signal.

Customers of CenturyLink transport services located in Washington may have also been affected by this event depending on several factors including, but not limited to, network design.

RESPONDENT: Jeanne Stockman

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UTC STAFF DATA REQUEST NO. RS-4:

Was the CenturyLink element management system based on an out-of-band management network or in-band management network (in relation to the production data networks) during the Dec. 27 – Dec. 29, 2018 outage timeframe?

CENTURYLINK RESPONSE:

The network management system for the affected network domain is an in-band management system. The in-band management system was impaired during the event affecting the ability to troubleshoot.

RESPONDENT: Jorge Magana

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UTC STAFF DATA REQUEST NO. RS-5:

Please provide a detailed technical packet-level description of the “erroneous traffic” (as used/described in Attachment B to the December 27 Outage-State Summary, January 15, 2019 FINAL) generated by the failed network management card. Docket 181051 UTC Staff Data Request Nos. RS-1 – RS-11 to CenturyLink Communications LLC August 22, 2019 Page 2

CENTURYLINK RESPONSE:

CenturyLink notes that it cannot locate the term “erroneous traffic” in the document referenced above, but is providing the below information which it hopes will be responsive. Early on December 27, 2018, a switching module in CenturyLink’s Denver, Colorado node spontaneously generated four malformed management packets. Malformed packets are packets that, while not rare, are not typically generated on a network and are usually discarded immediately due to characteristics that indicate that the packets are invalid. In this instance, the malformed packets included fragments of valid network management packets that are typically generated. Each malformed packet shared four attributes that contributed to the outage: 1) a broadcast destination address, meaning that the packet was directed to be sent to all connected devices; 2) a valid header and valid checksum; 3) no expiration time, meaning that the packet would not be dropped for being created too long ago; and 4) a size larger than 64 bytes.

Due to the packets’ broadcast destination address, the malformed network management packets were delivered to all connected nodes. Consequently, each subsequent node receiving the packet retransmitted the packet to all its connected nodes, including the node where the malformed packets originated. Each connected node continued to retransmit the malformed packets across a proprietary management channel to each node with which it connected because the packets appeared valid and did not have an expiration time. This process repeated indefinitely.

The exponentially increasing transmittal of malformed packets resulted in a never-ending feedback loop that consumed processing power in the affected nodes, which in turn disrupted the ability of the nodes to maintain internal synchronization. Without internal synchronization, the nodes’ capacity to route and transmit data failed. As these nodes failed, the result was multiple outages across CenturyLink’s network.

RESPONDENT: Jeanne Stockman

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UTC STAFF DATA REQUEST NO. RS-6:

Was the failed Infinera Management Card performing traffic engineering (TE) on the WA State 911 traffic flows prior to the Dec. 27 – Dec. 29, 2018 911 network outage period?

CENTURYLINK RESPONSE:

The card was not performing traffic engineering functions during the event. The network components impacted by this event were performing normal transmission functions.

RESPONDENT: Jorge Magana

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UTC STAFF DATA REQUEST NO. RS-7:

Please provide all call logs and call detail recording (CDR) information on all 911 calls that were completed to WA State PSAPs still under CenturyLink's management during the Dec. 27 – Dec. 28, 2018 911 outage.

CENTURYLINK RESPONSE:

Please see Confidential Attachment A.

RESPONDENT: Carl Klein

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UTC STAFF DATA REQUEST NO. RS-8:

Please provide all call logs and call detail recording (CDR) information on all failed 911 calls into Washington PSAPs which traversed CenturyLink's infrastructure during the Dec. 27 – Dec. 28, 2018 911 outage.

CENTURYLINK RESPONSE:

Please see Confidential Attachment B.

RESPONDENT: Carl Klein

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UTC STAFF DATA REQUEST NO. RS-9:

Please describe why the West/CTL ALI services were unavailable to TCSYS/Comtech managed PSAPs during the 911 outage period covering Dec. 27 – Dec. 28, 2018?

CENTURYLINK RESPONSE:

The request appears to assume that West/CTL ALI services were unavailable. The West/CTL ALI services remained in service and available for TCSYS/Comtech's use during the Dec. 27 – Dec. 28, 2018 period. If West/CTL ALI services were unavailable to TCSYS/Comtech managed PSAPs during the 911 outage period, it would be as a result of a failure in the Comtech network to which CenturyLink has no visibility.

RESPONDENT: Phil Grate

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UTC STAFF DATA REQUEST NO. RS-10:

Please provide the results of the forensic analysis performed by Infinera on the failed network management card.

CENTURYLINK RESPONSE:

The cards that were in the CenturyLink network at the time of the event were delivered to the Infinera lab for analysis. Infinera attempted to recreate the conditions at the time the event occurred, but was unable to replicate the problem. However, CenturyLink implemented steps to mitigate any future occurrence.

RESPONDENT: Jorge Magana

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UTC STAFF DATA REQUEST NO. RS-11:

Please provide a summary of Infinera's and CTL's root cause analysis for the failed management card.

CENTURYLINK RESPONSE:

The outage was caused by a faulty network management card in Denver, Colorado that caused invalid traffic replication and increased processing utilization on devices across CenturyLink's network via a proprietary communications channel.

RESPONDENT: Jorge Magana