Incident Management
Automated Diagnostics for Managed MPLS Services

Overview

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Introduction

The purpose of this presentation is to provide an overview of some of the automated diagnostics used in Verizon’s incident management process for managed MPLS (WAN).

The overview includes related examples as published on the On-Line portal.

Automated diagnostic offer the following advantages:

1. Faster incident resolution, because
   - Automated diagnostics can be performed even if all NOC technicians are busy
   - The output of the automated diagnostics assist NOC technicians with their troubleshooting
2. Drive a globally consistent “best practice” incident resolution process
3. Incident resolution progress is published almost real-time and in a consistent way on the On-Line portal and via email notifications

This presentation should assist to provide a better understanding of the incident resolution steps and information published on the On-Line portal.

- It does not cover non-standard networks or be-spoke custom arrangements
Triage

A newly created* proactive ticket is always placed in the “Triage” phase. (Example 1, slide 5)

Various automatic diagnostics programs are run during this phase:

- The type of diagnostics are technology dependent (i.e. Ethernet versus DSL)
- The output (i.e. Diagnostics data) may be highly technical (Example 4, slide 6)
- The output is published on the On-Line portal (Example 5, slide 9)

If the automation determines that further troubleshooting is required, the following happens:

- The ticket will be automatically transferred from Triage to the responsible NOC (Example 3, slide 5)
- A NOC technician will be automatically assigned to perform further diagnostics (Example 2, slide 5)
- Additional diagnostic programs run after the triage phase (Monitor Service, Power Loss diagnostics, etc.)

* See “Event Management for Managed MPLS Services” for more information
### Ticket Examples of the TRIAGE Phases

#### Example 1

**Start Work**

07-28-2016 06:03:01 AM GMT

Resulting Status: OPEN | Workgroup TRIAGE.EMS2

Automated testing has started. More information on Verizon's troubleshooting automation can be found at:

http://www.verizonenterprise.com/support/emea-service-assurance-user-guides/

**Entry:** 36

#### Example 2

**Unassign User**

07-28-2016 06:03:00 AM GMT

Resulting Status: OPEN | Workgroup TRIAGE.EMS2

Automated testing has finished. If the service remains impacted this ticket will be assigned to a Verizon NOC technician.

**Entry:** 53

#### Example 3

**Add Comment**

07-28-2016 06:13:12 AM GMT

Resulting Status: OPEN | Workgroup MNSO.EMS2

This incident ticket has passed through our automatic troubleshooting diagnostics programs. The ticket has now been transferred to our Network Operations Center for further diagnostics. Any further results will be shared online, real time.

**Entry:** 81
The Integrated Test System (ITS) performs automated diagnostics immediately after proactive ticket creation and publishes the results on the online portal during the triage phase:

Example 4
LAN Automated Testing

Customer owned LAN → Router → Verizon MPLS Backbone → SMARTS / IMPACT → Incident Ticket

Alarm on Router LAN interface triggers proactive ticket

Proactive Incident Ticket creation after 7 minutes, on hold for 12 hours

Customer Time  06-02-2016 07:01:02 PM GMT

Resulting Status  DEFERRED  |  Workgroup  TRIAGE.EMS2

Automated testing has determined that the alarm probably originates from a customer owned LAN device connected to the Verizon managed equipment at your premises. We recommend a check of power, cabling and equipment of your LAN device(s). The ticket has been placed on hold until we receive customer feedback regarding these checks. No engineer will be assigned during this hold period (12:00:00 hour(s):min(s):sec(s)). If the alarm clears during the hold period the ticket will be closed automatically.

Customer Time until 2016-06-03 07:01:01 GMT.

“VZ Private”
Remote Power Verification

1. Device unreachable -> Proactive ticket creation
2. Command Factory tries to access the CPE via the Out of Band Modem (OOB) modem via PSTN or Wireless connection
3. If Command Factory is able to access the CPE then it is assumed that both the CPE and the access circuit modem have power as well. In this case automation publishes the positive power verification on the portal (see next slide for example).
Remote Power Verification - Example

<table>
<thead>
<tr>
<th>Modify Ticket</th>
<th>05-25-2016 04:10 PM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resulting Status</td>
<td>OPEN</td>
</tr>
<tr>
<td>Workgroup</td>
<td>TRIAGE:EM32</td>
</tr>
<tr>
<td>Incident Status</td>
<td>The power to your Premise Equipment has been verified remotely. Power and Equipment changed from 'Not Verified' to 'Verified Remotely'</td>
</tr>
</tbody>
</table>

Example 5
DSL – Short duration outages

Historically, DSL is a less stable access method and Verizon allows additional time for DSL issues to stabilize. A proactively created trouble ticket for a DSL access circuit will be released to a technician after 45 minutes if the alarm is still active. In case all alarms have cleared within 45 min after ticket creation the ticket will be closed automatically. No in-depth root cause analysis is provided as most DSL providers will not research root cause if the service recovers quickly.

- Verizon holds the ticket for 45 minutes to allow service to stabilize in the triage phase.
- If the alarms is still present after 45 minutes a technician will be assigned.
- In case all alarms have cleared within 45 minutes the ticket will be automatically closed without an indepth root cause analysis.

The example on the next slide shows an online view of a DSL short duration outage ticket from triage.
DSL TRIAGE Phases - Ticket Example

TRIAGE assignment:

Assign User  07-28-2016 09:38:54 AM GMT

Resulting Status: OPEN  |  Workgroup: TRIAGE.EMS2

Verizon allows additional time for DSL services to stabilize. This ticket is currently on hold and will be released to a technician after 45 minutes if the alarm is still active. If the alarm has cleared during this period, then the ticket will be automatically resolved and closed.

Update Customer  07-28-2016 10:10:07 AM GMT

Resulting Status: OPEN  |  Workgroup: AUTOMATION

Dear Customer,

All alarms associated with this ticket have now cleared and your service should be operational at this time. If this is not the case, then please verify your equipment. If your service remains down, then please let us know by adding an update to your ticket via our on-line tools.

Kind regards,

EMEA Service Desk
Short Hits Automation

Alarm clears during automated ITS testing:

This automation has been developed to handle cases when during the automated testing phase of proactive tickets (first 20-30 minutes of ticket life) the systems determine that the initiating alarm has cleared. Depending on the exact automated test result the following may happen:

1. The ticket is automatically resolved and closed.
2. The ticket is set to Monitor Service for 72 hours to verify service stability before automatic ticket closure.

When the Router/Interface is down an alarm is generated that starts the automated testing phase by ITS
**Ticket Example:**

<table>
<thead>
<tr>
<th>Event Type</th>
<th>Date/Time</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Create Ticket</td>
<td>08/08/2016 09:38:48 AM GMT</td>
<td>Was this status helpful? - Entry 1</td>
</tr>
<tr>
<td>Resulting Status</td>
<td>OPEN</td>
<td>Workgroup: TRIAGE.EMS2</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Start Work</strong> 08/08/2016 10:00:24 AM GMT</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Was this status helpful? - Entry 32</td>
</tr>
<tr>
<td>Resulting Status</td>
<td>OPEN</td>
<td>Workgroup: TRIAGE.EMS2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Automated testing has started. More information on Verizon's troubleshooting automation can be found at: <a href="http://www.verizonenterprise.com/support/emea-service-assurance-user-guides/">http://www.verizonenterprise.com/support/emea-service-assurance-user-guides/</a></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Modify Ticket</strong> 08/08/2016 10:01:06 AM GMT</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Was this status helpful? - Entry 40</td>
</tr>
<tr>
<td>Resulting Status</td>
<td>OPEN</td>
<td>Workgroup: TRIAGE.EMS2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Incident Status - The power to your Premise Equipment has been verified remotely. Power and Equipment changed from 'Not Verified' to 'Verified Remotely'</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Resolve</strong> 08/08/2016 10:09:16 AM GMT</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Was this status helpful? - Entry 54</td>
</tr>
<tr>
<td>Resulting Status</td>
<td>RESOLVED</td>
<td>Workgroup: TRIAGE.EMS2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Resolution: 2016-08-08 09:59:20</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Platform: MGD. NTWK - Managed Networks</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Call/Equip: -</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Equip Cat: -</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Resolve Cct: GAMECLEAR - NETWORK ALARM CLEARED</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Outage Cause: UNKN EVENT - UNKNOWN EVENT</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cust Impact: -</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Status - MON SVC AUTO CLOSE. Auto Close date/time - 08/11/16 10:00</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Resolve Time of 2016-08-08 09:59:20 was pre-selected based on the time the alarms cleared.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>User Comment: A conclusive resolution summary is not available. The incident cleared prior to Verizon's intervention. The ticket has been placed in the resolve auto-close status and will be closed at 2016-08-11 10:09:16 if the alarms do not re-appear.</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Update Customer</strong> 08/08/2016 10:09:20 AM GMT</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Was this status helpful? - Entry 56</td>
</tr>
<tr>
<td>Resulting Status</td>
<td>RESOLVED</td>
<td>Workgroup: AUTOMATION</td>
</tr>
<tr>
<td></td>
<td></td>
<td>We apologize for your service disruption and hope we were able to meet or exceed your expectations during the repair process.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>In order to help us provide superior quality and improve how we serve you, a short Customer Survey may be emailed to you. In this survey you are given the opportunity to provide feedback on the quality of our efforts restoring your service. Your response will assist Verizon in our ongoing efforts to improve your experience. It has been our goal to minimize any inconvenience this may have caused to you.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Thank you for choosing Verizon,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Verizon Network Services Center</td>
</tr>
</tbody>
</table>

*“VZ Private”*
Monitoring Service

The Automation “Monitor Service” continuously checks if the alarm conditions have cleared.

Once the alarm clears the Monitor Service automation starts:

• The ticket is placed in the deferred state while Impact monitors for service stability.
  • In case the alarms re-occur, the ticket will be automatically assigned to the next available NOC technician.

• If the alarm remains clear the ticket enters in a loop of Monitor Service cycles of 2 hours until an engineer resolves it.
  • After 3 cycles, when no engineer is available to check and resolve the ticket, the ticket will be automatically resolved and automatically closed after 72 hours.
  • In case the alarms re-occur, the ticket will be automatically assigned to the next available NOC technician.
Ticket Example:

Update Customer 12-17-2016 11:24:31 PM GMT

ResultingStatus DEFERRED Workgroup AUTOMATION

Dear Customer,

All alarms associated with this ticket cleared. The service should be operational at this time. If your service has not recovered, then please verify your equipment. If your service remains down, then please let us know as soon as possible using the links below.

Kind regards,

EMEA Service Desk

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Update Customer 02-09-2016 03:38:25 AM GMT

ResultingStatus DEFERRED Workgroup AUTOMATION

Dear Customer,

The alarms associated with this ticket reoccurred. The ticket will be released to a NOC engineer for further diagnostics. In case of repetitive alarms, Verizon will suspend Alarm Clear/Reoccurrence notifications for this ticket.

Kind regards,

EMEA Service Desk

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Add Comment 02-10-2016 11:18:21 AM GMT

ResultingStatus DEFERRED Workgroup MINSO.EMS2

The alarms associated with this ticket have cleared again at 2016-02-10 11:16:14 GMT. The ticket will be released to a NOC engineer for further diagnostics. In case of repetitive alarms, Verizon will suspend Alarm Clear/Reoccurrence customer notifications for this ticket.

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Update Customer 02-24-2016 08:02:51 AM GMT

ResultingStatus RESOLVED Workgroup AUTOMATION

Monitoring — Verizon is monitoring your service to ensure it is stable. If the service doesn’t remain stable during this period a technician will reach out to you with a plan of action.

Thank you,

Amie
Power Loss Diagnostics

The Power Automation retrospectively detects a device loss of power directly after the service has been restored. When the systems determine that a device had been temporarily unreachable due to a loss of power, the ticket is automatically resolved and automatically closed.

1. Device unreachable -> Proactive ticket creation
2. Device is reachable again and log shows device was rebooted
3. Ticket is automatically resolved and closed
Ticket Example:

Update Customer 07-28-2016 03:37:15 AM GMT

Resulting Status DEFERRED | Workgroup AUTOMATION

Dear Customer,

All alarms associated with this ticket have now cleared and your service should be operational at this time. If this is not the case, then please verify your equipment. If your service remains down, then please let us know by adding an update to your ticket via our on-line tools.

Kind regards,

EMEA Service Desk

Resolve 07-28-2016 05:38:43 AM GMT

Resulting Status RESOLVED | Workgroup MNSO EMS2

Resolution -
Resolve D/T: 2016-07-28 05:37:05
Platform: MGD NTWK - Managed Networks
Cats/Equip: -
Equip Cat: - POWER EQUIPMENT
Resolve Cd: POWER RSTD - Power Restored
Outage Cause: POWER - UPS / GENERATOR / COMMERCIAL POWER ISSUE
Cust impact:
Resolve Time of 2016-07-28 05:37:05 was pre-selected based on the time the alarms cleared.
User Comment: The Verizon monitoring platform shows that this service outage was caused by a local power outage and that power has been restored for 6 minutes. If this was a scheduled power maintenance at your site, please note that it is possible to prevent the creation of a proactive ticket by submitting a change management request.


* Visible in the VEC Repairs module only

"VZ Private"
Change Management

Planned Maintenance

The diagnostic systems check if there is known Planned Maintenance in progress against the alarming device.

If planned maintenance is in progress, the ticket is opened as priority-4 and no automatic testing is performed. The ticket stays in the triage phase.

As soon as the maintenance finishes the ticket is automatically closed. If the alarm has not cleared when the maintenance window ends a new priority-1 ticket is automatically created.
Scheduled Maintenance on Quick Status and VEC portal:

Planned maintenance tickets are displayed in the Quick Status with only simple information as status notifications quantity is minimized to prevent flooding customer with messages during such planned events:

The VEC portal offers a more complete view, displaying scheduled maintenance time and equipment details on ticket creation:
Scheduled Maintenance Resolution Notification Email Example:

Status Notification

Verizon ticket resolved on August 4, 2016 19:45:35 GMT.

Ticket #: 2016080424111
Customer Ticket # or Description:
For Service ID: NETRAS-CENNA2-11404075E001

Resolve Category:
Resolve Description: SCHED COMP
Resolution Company Category: VERIZON

Other Comments: The Verizon monitoring platform shows this issue was related to a scheduled maintenance event. If the alarms have not cleared a ticket with the appropriate priority will be created.

Please confirm and contact Verizon if the issue remains.

Was this status helpful?  Yes  No

View & Update your ticket online!

Thank you for using our online and e-mail status automation tools,

Verizon Customer Service
Thank You