*International Civil Aviation Organization*

**Thirteenth Meeting of the Common aeRonautical Virtual Private Network Operations Group (CRV OG/13)**
*Wellington, New Zealand, 05-08 March 2025*

Agenda Item 9: CRV Operational performance report
– CRV operational issues/matters
– CRV Bandwidth Utilization Rate
Future bandwidth requirements

# CRV POST IMPLEMENTATION ISSUES IN SRI LANKA

(Presented by Airport and Aviation Services, Sri Lanka)

**SUMMARY**

This paper discusses issues related to the serviceability of CRV circuit of Sri Lanka and the support from the network service provider.

## 1. INTRODUCTION

1.1 CRV circuit for Sri Lanka was interrupted with two major service failures. During the restoration efforts and coordination with the CRV provider, several areas for improvement were identified on the provider's part. Sri Lanka expects to discuss this further to retain the guaranteed availability of the Package D.

## 2. DISCUSSION

### 2.1 Background

These service failures resulted in approximately 99.32 hours of circuit unavailability from the time the circuit was commissioned in April 2024. During the resolution process, notable improvements were observed on the PCCW side, which could help to retain the guaranteed serviceability of Package D. A summary of the incidents is presented in the table below.

| Incident Start Date | Nature of the incident | Accumulated outage in hours | Monthly availability |
|---|---|---|---|
| 14-Sep-24 | Intermittent connection flaps | 29.77 | 95.87% |
| 1-Nov-24 | Circuit down for 3 continuous days | 69.55 | 90.34% |

### 2.2 Service Interruptions of CRV Circuit

According to PCCW, the root cause of the first incident was an issue with the Singapore IPsec gateway. PCCW also mentioned that, a device upgrade planned but could not complete by the

time of the first incident, should have prevented the issue. The conflict between the requested downtime and AASL peak hours caused the requested upgrade unsuccessful before the incident. (Please Refer Annex C). A detailed summary of the events during the incident is provided in Annex A.

During the second incident, local ISP confirmed the internet connectivity is normal. IPsec unreachability through the internet was an extremely unlikely scenario. The issue was resolved after PCCW moved the configuration back to the Singapore IPsec gateway, but they were unable to provide an exact root cause. Subsequently, PCCW arranged a backup IPsec gateway to avoid similar incidents in future. A detailed summary of the events during this incident is provided in Annex B.

Furthermore, based on our experience, it is recommended to have a contingency plan in place when using Package D.

2.3 Suggestions for Improvement – Fault Resolution

i. Verified information provided by CRV user is expected to be considered a valid information by PCCW NOC. (Annex A, Item 2)
ii. The technical teams addressing faults are expected to be informed about the connectivity architecture for effective fault resolution. (Annex A, Item 3a, Annex B, Item 3)
iii. Improved coordination between PCCW and their local partner would be beneficial. (Annex A, Item 4)
iv. Maintaining the basic requirements of NOC is expected in PCCW NOC. (Annex A, Item 5)
v. PCCW's response times for faults expected to be improved. (Annex B, Item 1 and 2)
vi. A thorough analysis of root cause identification of a critical failure is recommended. (Annex B, Item 4)

2.4 Suggestions for Improvement – Maintenance Windows

Several maintenance windows were arranged, during which the following suggestions were noted to improve the quality of the circuit.

i. Improving flexibility in arranging maintenance window. (Annex A, Item 1)
ii. Ensuring timely communication of planned outages. (Annex C, Item 1 and 2)

## 3. ACTION BY THE MEETING

3.1 The meeting is invited to:

a) note the information contained in this paper; and
b) discuss any relevant matter as appropriate

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# Annex A: Summary Incident Report for CRV Downtime 2024 September 14th

| Item | Observation | Time (IST) | Incident | Details |
|---|---|---|---|---|
| 1 | PCCW requested downtime for a device upgrade. While they supported rescheduling to avoid peak hours, they couldn't accommodate the required timeslot. | 8/2/2024 7:00 | PCCW adviced about the planned outage | RPO Reference Number : RP942\24<br>Date Time : 15/08/2024 17:00:00 to 15/08/2024 22:00:00 GMT (dd/mm/yyyy)<br>Duration : 300 mins<br>Service/Circuit Affected :<br>SR216381 / CMB(PCG) IP009330-IRA /<br><br>Outage Description : Router:<br><br>var05.sin02<br><br>Reason:<br><br>Upgrade var05.sin02 from 3.16.8S to 17.3.8a<br><br>PCCW Global apologies for all inconveniences caused. |
| | | 8/21/2024 16:16 | AASL responded to the rescheduled planned outage and requested a timeslot to avoid high traffic hours. | Top urgent!<br><br>This is regarding the planned maintenance RPO Reference Number : RP942\24 which was rescheduled to 26th August 2024. Kindly note that we can not facilitate this due to recent planned upgrades in several ATS related systems. Kindly make necessary arrangements to shift this to a date after first week of Septemeber. Further the planned maintenance duration can not be accpted as this duration has the highest air traffic to operate. Hence please also change the duration between 03:30 UTC to 08:30 UTC. |
| | | 8/22/2024 12:06 | PCCW shared the rescheduled timeslot. | Please be informed that the maintenance activity has been rescheduled to the following times:<br><br>**Start of Maintenance Window: 2024-09-09, 17:00 GMT**<br><br>**End of Maintenance Window: 2024-09-09, 22:00 GMT**<br><br>If you have any further questions, feel free to reach out.<br>Thank you. |

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| | | 8/22/2024 14:45 | AASL again emphasized the need for the required timeslot to avoid peak operation hours. | Thanks for the reschedule. However kindly note that during the time 17:00 to 22:00 GMT is a peak time of operations. Hence kindly make necessary arrangements to fix the time between between 03:30 UTC to 08:30 GMT. |
| | | 8/26/2024 13:17 | PCCW informed that it would be difficult to reschedule the maintenance to the requested time. | I apologize, but it would be difficult for us to schedule the maintenance during the weekday Asian day time as previously suggested.<br><br>Would it be possible to reschedule the maintenance to a Sunday instead?<br><br>Please let me know if a Sunday timeframe would work for you.<br><br>Thank you for your understanding. |
| **2** | Support teams were unable to acknowledge the status of the internet connectivity despite multiple customer confirmations, nor did they attempt to verify it from their side. | 9/14/2024 18:10 | In the initial troubleshooting, PCCW asked to check with AASL's service provider | Dear Customer,<br><br>We have created proactive ticket with this circuit under INC000010623379.<br><br>We are seeing tunnel up on our side, but we are unable to ping your end of the tunnel.<br><br>Please check with your internet link provider. Thank you. |
| | | 9/14/2024 18:59 | AASL Confirms Stability of the Internet Connection | 1) Kindly note that we are unable to access to CRV NID router as it is managed by PCCW. Both IPSec and GRE tunnel setting are managed by PCCW.<br><br>2) We confirm that the internet connection is up.<br><br>3) Static public IP assigned to PCCW ( 122.255.62.237) is up and ping is Okay. You can also check ping to this address.<br><br>Hence please make immediate arrangements to rectify the issue as we confirm there is no issue from our side. |

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| 9/14/2024 19:39 | PCCW Still does not accept AASL Confirmation on the stability of the Internet connection | Dear Customer,<br><br>As per checking, Tunnel is up from our end.<br><br>Please check with your internet provider, per our database you have arrange an internet provider. The SP/Network between our network and the CE.<br><br>Thank you. |
| 9/14/2024 22:24 | AASL again Confirms the stability of the Internet connection. | Dear Officer,<br><br>I again confirm that internet connection is up. You can also check it by pinging to 122.255.62.237.<br><br>Best Regards, |
| 9/14/2024 23:09 | PCCW still does not accept this confirmation | Dear Customer,<br><br>There may be some disturbance on the network of your internet provider that may affect the tunnel.<br>You may not see your connection as down, as the disturbance is beyond the 122.255.62.237 GW which is configured on the CE.<br><br>Could you also confirm latest status?<br><br>We are now able to reach your tunnel IP |
| 9/15/2024 1:40 | PCCW kept requesting the stability of the internet connection | Dear Vidura / Customer,<br><br>May we verify is the issue has been raised with your local ISP? We've coordinated with our partner and they confirmed that they are only responsible for the hardware maintenance.<br>As checked, this circuits internet link was arranged by the customer end and the customer should reach out with their ISP for initial checking of the circuit.<br><br>Please be advised. |
| 9/15/2024 4:36 | AASL confirms the stability of the Internet connection for the 3rd time. | Dear Officer,<br><br>We confirmed with the ISP that the internet link is up with the committed BW (256kbps). Please let us know what else could be confirmed with the ISP for the operation of the tunnel.<br><br>Best Regards, |

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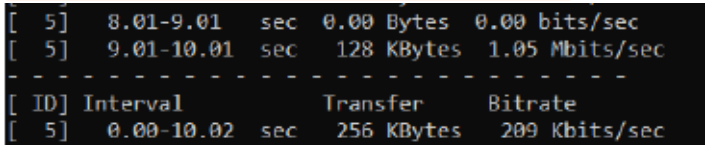
| | | 9/15/2024 2:34 | PCCW accepts this confirmation for the first time. But they do not seem to take necessary actions quickly by delaying the reachability to their local partner to check the CE. | Dear Vidura / Customer,<br>Thank you for confirming ISP connectivity. We'll inform our partner to further check the CE equipment. May we have LCON details that we share with our partner in case they needed onsite assistance? |
| | | 9/15/2024 5:49 | In order to further confirm the customer site Internet connection stability, AASL sends a test report. | Dear Officer,<br>Please refer the BW test of the Internet connection below,<br>  |
| | | 9/15/2024 9:33 | After confirming the stability of the internet connection three times with the necessary proofs, PCCW engineers still seem uncertain and are indicating extra costs for a non-hardware-related issue (i.e., internet connection problem). | Dear Customer,<br>Please confirm if you already rebooted the router. As per our partner, please provide any logs and confirm the device is dead, and they can raise RMA for you.<br>But if it turns out to be a non-hardware-related problem, there might be extra charges for the partner onsite activity. |

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| **3a** | Contradictory information received from NOC: The Terms and Conditions state that the CE Router is managed by PCCW. However, during this incident, the PCCW requested to log in and check certain commands to obtain the router's status. | 9/15/2024 3:39 | PCCW informs customer to login to the router which managed by PCCW. | Dear Customer,<br><br>As per our partner, they would proceed RMA if the device certified dead and requesting you to provide "show tech" , "show log" and the photo to show the LED of the device.<br><br>Kindly let us know the once available. |
| | | 9/15/2024 5:03 | AASL informs that it is not possible and shares light indicators | Dear Team,<br>We cannot access CRV NID. Please refer below image as necessary.<br>  <br>Thank You! |

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| **3b** | Contradictory information received from NOC: While the customer is observing recurrent failures of the IPSec VPN Connection, Tier 2 engineer confirms the stability of the faulty circuit informing a continuous operation of the circuit for 4 hours. After 3 hrs from this confirmation, their platform operations engineer confirms that their VPN is still not stable and migrated their PE at Singapore to PE at Hongkong after which the circuit was stable. | 9/15/2024 18:34 | AASL informs that still the circuit is intermittent and not fully stable. | Dear PCCW Representative,<br><br>We observed again a 10mins drop. Currently ccr up. Please trace the issue and resolve permanently. |
| | | 9/15/2024 18:41 | PCCW has failed to identify this recurrent failure and confirms that the circuit is continuous OKAY for more than 4 hrs. | Dear Customer,<br><br>Our tier 2 confirmed stability for this circuit. You may proceed to use the circuit again.<br><br>For the RFO. Please engage onsite ISP provider AS18001/Dialog Axiata PLC to aid in isolating what was the issue.<br><br>We did not observed downtime as you reported, It remains stable for almost 4 hours now.<br><br>Neighbor V AS MsgRcvd MsgSent TblVer InQ OutQ Up/Down State/PfxRcd<br>192.168.11.49 4 3491 1618 1501 38753 0 0 03:57:19 309 |

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| | | 9/15/2024 23:28 | After more than 4 hrs period, PCCW finds that the circuit is still intermittent and has migrated their PE to Hongkong, after which the circuit was fully operational. | Team,<br><br>I saw the MRS CE has been reloaded. But circuit remains down. Im still seeing the DMPN tunnel status at SG PE is still down. I migrated the circuit to HK and seeing the circuit is UP. Let us observed the status of the circuit.<br><br>crvsrl-cmb-9330#sh ip bgp sum \| i 3491<br>192.168.11.49 4 3491 146 29 330 0 0 00:03:57<br>309<br>crvsrl-cmb-9330#sh clock<br>*18:03:37.111 GMT Sun Sep 15 2024<br>crvsrl-cmb-9330#<br><br>crvsrl-cmb-9330#sh version \| i up<br>Technical Support: http://www.cisco.com/techsupport<br>crvsrl-cmb-9330 uptime is 12 minutes<br>crvsrl-cmb-9330# |
| **4** | Delayed information flow during coordination: Despite the customer's intervention in notifying the PCCW local partner about the incident, delays were observed in the information flow between the local partner and PCCW. | 9/15/2024 10:10 | Customer agrees to provide necessary support and requests the information for the correct procedure to ensure reliable intervention. | **HI Leopoldo, TAC team, Lorraine**<br><br>I just had a call with Vidura and noted that customer now is using their backup circuit/ plan now. and customer IT/ duty staffs are OK to help reboot the equipment/ DTU now.<br><br>1. Please provide procedure and where is the power on/ off for this reboot.<br>2. If the reboot cannot up the circuit, how can customer capture the equipment fail log.<br><br>Please advise. |
| | | 9/15/2024 20:32 | PCCW Responds to the customer's request after more than 10 hrs from the customer's request and after more than 8 hrs from the information shared by the PCCW partner as the CE router details were with them ( according to PCCW). | Dear Vidura,<br><br>Please take a photo of the light before turning off the device.<br>After that, switch off the device, wait for at least 5 minutes, and then turn it back on. While the light stabilizes, please take another photo of it. |

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| **5** | The NOC did not meet the expected standard. When the customer called the provided number (+852 3419 6261), the call was disrupted by background noise, suggesting that the representative was outside the NOC. Please refer to the call recorded by the customer at approximately 04:45 UTC as supporting evidence. | | | |

# Annex B: Summary Incident Report for CRV Downtime 2024 November 1st

| # | Observation | Time (IST) | Incident | Details |
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| 1 | Significant delays have been observed in the vendor's responses. It has taken over six hours to receive initial effective feedback. | 1/11/2024 09.07 AM | Fault logged by AASL. | Dear PCCW Support Team,<br>This is inform to report an issue with the lines connected to Circuit ID CA028-142534-MRS. We are currently experiencing problems with both the Bombay (VABB) and Singapore (WASS) lines, which are queued and not functioning as expected.<br><br>Could you please investigate this issue at your earliest convenience? Additionally, we would appreciate an update on the status and any relevant details concerning the issue.as listed below. |
| | | 1/11/2024 03.08 PM | PCCW informed that they were working with Tier 2 and asked if the router is already rebooted. Also asked whether power supply to the router is secured. | Dear Vidura,<br><br>We are working with our Tier2 on this.<br><br>In parallel, just want to confirm if CE router is already rebooted? Also, is it plugged to power and cable connections are secured? Thank you |
| 2 | Remote troubleshooting took over a day to complete before physical attendance was initiated. | 1/11/2024 09.07 AM | Fault logged by AASL. | Dear PCCW Support Team,<br>This is inform to report an issue with the lines connected to Circuit ID CA028-142534-MRS. We are currently experiencing problems with both the Bombay (VABB) and Singapore (WASS) lines, which are queued and not functioning as expected.<br><br>Could you please investigate this issue at your earliest convenience? Additionally, we would appreciate an update on the status and any relevant details concerning the issue.as listed below. |
| | | 2/11/2024 10.29 AM | PCCW informed that they have shared to their vendor to arranged a dispatch. | Dear Customer,<br><br>This is noted. We have shared to our Vendor to arrange a dispatch. |
| 3 | Even though it is clearly indicated in the terms and conditions that the CE Router is managed by PCCW, PCCW is asking the Customer to log in to the CE router to get CLI outputs. | 1/11/2024 10.55 PM | PCCW said they cannot access the CE and asked to share few command outputs from the CE. | Dear Customer,<br><br>We are trying to access the router but unable to reach.<br>Please assist to provide the following on the router<br>Please kindly provide the "sh tech", "show log" and "show interface" for our review.<br><br>We will check the log and get back you. |

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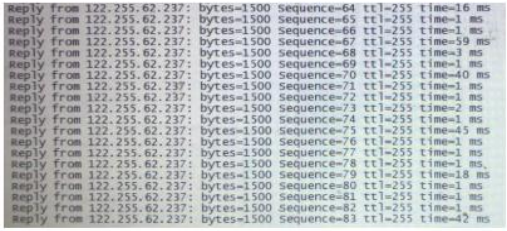
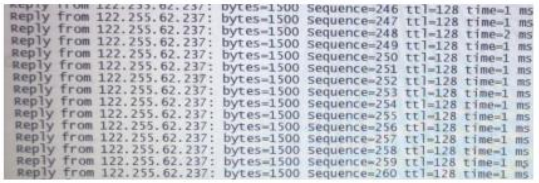
| 4 | Vendor was unable to provide a definitive root cause for the downtime. | 1/11/2024 09.44 PM | AASL has cheked the rechability with their internet service provider. Huge latency was observed to Internet service provider when pining to CE and once CE was replced with a laptop, ping was successful. AASL informed PCCW that this suggested the issue was with the CE and further said cables replced as requested. | Please find below observations from the ISP end. Service provider is above the 122.255.62.232/29 block.<br><br>pinged from service provider to Cisco_4331 (122.255.62.237) ====> latency spikes observed<br><br>  <br><br><br>Replaced Cisco_4331 router with a PC ====> no latency spikes<br><br>  <br><br><br>Ping drops could be the results of above latency spikes. These suggests the issue is with the Cisco_4331.<br><br>However as instructed, cables replaced. |
| | | 3/11/2024 01.40 PM | PCCW informed that router has been replaced but issue persists and they need to investigate internally with the backbone engineering team. | Dear Vidura and team ,<br><br>Per conversation , router was replaced.<br>FE , together with our engineers, did trouble shooting last night 0100~ 0400 gmt +8.<br>Unfortunately, issue persists.<br>our engineers would need to investigate internally with the backbone engineering team .<br>we shall keep CRVSRL team updated as soon as possible.<br><br>@PCCWG - GSOC PH<br>Please be reminded to provide regular updates to CRVSRL team .<br>Thank you . |

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| 3/11/2024<br>05.04 PM | PCCW said that they have moved back the configuration to router SIN02 and BGP has been up for 36mins. | Hi Lorraine,<br><br>Our TAC team have moved back the configuration to router SIN02 as suggested by IPE.<br><br>BGP is now up for 36 min .<br><br>sin02#sho bgp vrf icao vpnv4 unicast summary \| in 192.168.11<br>192.168.11.50 4 64514 323 372 2632548331 0 0 00:36:06 2<br>192.168.11.58 4 64516 128992 146615 2632548331 0 0 11w4d 2 |
| 29/11/2024<br>01.30 PM | PCCW assumed the issue was with the internet service providers and encourage AASL to discuss with AASL's internet service provider. | To determine if the issue was caused by an adjacent ISP, we need to verify if the paths to the two IPsec gateways differ. It would be helpful to confirm whether the destination IPs have distinct routes to reach our network.<br><br>We encourage CRVSRL to contact the internet provider for more information on this matter. |
| 29/11/2024<br>03.02 PM | AASL highlighted that observation during the issue suggested that issue could be with the router it self and asked feedback from PCCW. | As indicated in the email dated 19/11/2024, there were observations suggesting that the issue was in the NID itself. For your convenience, they are reiterated below.<br><br>*The observations below during the fault suggested that the issue could be within the NID itself. Please share any comments if available.*<br><br>*a. While checking with our service provider, below were observed.*<br><br>*Pinged from service provider to NID (122.255.62.237) => latency spikes observed*<br>*Replaced NID router with a PC => no latency spikes*<br>*b. During the issue, NID LAN IP (10.35.255.249) couldn't be pinged from our side (LAN side).*<br><br>I understand that checking the faulty device is maybe necessary to provide an accurate assessment. I would appreciate it if you could share your feedback once the review is complete. |
| 09/12/2024<br>04.53 PM | PCCW stated that the root cause could be either the quality of the internet or the router. | Since the service was improved after replacing the NID, we cannot dismiss the possibility that the NID was problematic at the time of the incident. Along with the quality of the internet, these are the two potential factors that led to the service interruption.<br>Hope this explains.<br>Thank you. |

# Annex C: Summary Incident Report Related to Maintenance Windows

| Item | Observation | Time (IST) | Incident | Details |
|---|---|---|---|---|
| 1 | Although the maintenance window was rescheduled by the service provider, it was not communicated to the circuit user, who had the required resources in place for the original window. | 11/30/2024 0:38 | PCCW advised about the planned 4-hour outage rescheduled for the early morning (IST) of 12/3/2024. | PCCW Global wished to advise you that the following network activity that will affect your service.<br><br>RPO Reference Number : RP1367\24-A1<br>Date Time : 02/12/2024 20:00:00 to 03/12/2024 00:00:00 GMT (dd/mm/yyyy)<br>Duration : 240 mins<br>Service/Circuit Affected :<br>SR216381 / CMB(PCG) IP009330-IRA /<br><br>Outage Description :<br><br>PCCW Global apologies for all inconveniences caused. |
| | | 12/3/2024 11:19 | AASL requested a status update on the outage. | **Dear Lorraine and PCCW team,**<br><br>Can you please update the status of below planned outage?<br><br>Regards,<br><br>**Sasmitha.** |
| | | 12/3/2024 11:40 | PCCW informed that the outage was postponed. | Thank you for reaching out.<br><br>The planned maintenance activity (RPO Reference: RP1367\24-A1) has been postponed. Our team is currently coordinating with Cisco to establish a new maintenance schedule, and we will keep CRVSRL updated on our progress. |

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| | | 12/3/2024 14:33 | AASL emphasized the need to be informed about any changes in the maintenance window. | Below is noted.<br><br>However, we have not received a mail of this postponement. It would be better to **inform such changes in advance of the planned maintenance window**. Because we had to keep the involved teams informed to ensure readiness with alternatives for the given maintenance window. This process involved coordination with both local and multiple international teams. |
| **2** | A considerable amount of time was taken by the service provider to provide feedback on the maintenance window. | 12/21/2024 2:56 | PCCW advised about the planned 3-hour outage rescheduled for the early morning (IST) of 01/20/2025. | PCCW Global wished to advise you that the following network activity that will affect your service.<br><br>RPO Reference Number : RP1455/24<br>Date Time : 19/01/2025 20:00:00 to 19/01/2025 23:00:00 GMT (dd/mm/yyyy)<br>Duration : 180 mins<br>Service/Circuit Affected :<br>SR216381 / CMB(PCG) IP009330-IRA /<br><br>Outage Description : Reason:<br>Upgrade router to Cisco recommended code to solve Cisco bug.<br><br>Router Downtime:<br>Around 1 hour. |
| | | 1/20/2025 9:40 | AASL requested a status update on the outage. | **Dear PCCW Team,**<br><br>Kindly confirm if the following maintenance has been completed.<br><br>Regards,<br>**Sasmitha.** |
| | | 1/25/2025 5:06 | It took the service provider 5 days to confirm the status of the outage. | **From:** "PCCW Global" <pccwg-planned-event@pccwglobal.com><br>**To:** "vidura eane" <vidura.eane@airport.lk><br>**Cc:** remedyhelpdesk@pccwglobal.com, gsocph@pccwglobal.com, bennyche<br>**Sent:** Saturday, January 25, 2025 5:06:56 AM<br>**Subject:** Completion - Planned Outage Notification of International Service - |