

Incident Report on Service Disruption on 18 March 2013

1. Introduction

On 18 March 2013, a service disruption occurred in outgoing calls from SmarTone customers to fixed networks. SmarTone submitted a preliminary report on 21 Mar 2013. This report provides an update on the preliminary report, together with the measures taken and to be taken in order to avoid similar incidents.

2. Incident Description

2.1 Events leading to the service disruption

On 18 March 2013 at around 10:17 am, we observed that our customers had difficulty making outgoing calls to fixed networks. The service disruption was found to be caused by a software problem in the ONP (Operator Number Portability) platform, responsible for providing information for outgoing call routing to fixed networks. All data services, SMS and voice services, which included outgoing calls to mobile, incoming calls and emergency calls, were not affected.

2.2 Incident Event Log

Time	Event
10:17 am	SmarTone's Network Operations Centre observed that the ONP platform encountered a problem and call routing for outgoing calls to fixed networks from our customers had failed. The problem was immediately escalated to our vendor for investigation.
10:17 am	Support engineers and the vendor performed immediate actions to restore the ONP platform but it could not take up traffic as normal. In parallel, a procedure for bypassing the ONP platform was triggered.
10:31 am	SmarTone informed OFCA that there was a software problem in our ONP platform and that outgoing call services from our customers to fixed networks were affected. All data services, SMS and voice services, which included outgoing calls to mobile, incoming calls and emergency calls, were not affected.
11:15 am	Support engineers bypassed the ONP platform and all outgoing calls to fixed networks resumed as normal.
11:22 am	SmarTone reported to OFCA that outgoing call services to fixed networks had resumed as normal.

3. Remedial actions taken

SmarTone's support engineers and the vendor took urgent remedial actions to restore the ONP platform but it could not take up traffic as normal. At the same time, our support engineers worked to bypass the ONP platform and route all affected calls to our back-up fixed network operators for call terminations at destination networks. The bypass was completed at 11:15 am and outgoing call services to fixed networks resumed as normal.

The ONP platform was restored by 11:21 am. However, since the root cause of the software problem had not been identified at that moment, detailed testing was conducted to verify functionality before traffic was put back into it. At around 8:20 pm, the ONP platform gradually started to take up traffic in a controlled manner.

4. Root cause analysis and problem resolution

After detailed investigation and fault simulations by our vendor, the root cause of the service disruption was identified to be a software problem in one of the software blocks called the Message Handler. The Message Handler is responsible for submitting routing requests from the ONP application to the ONP database, and returning the routing information from the ONP database back to the ONP application. Our vendor has identified that software resource hanging occurred in this software block after the traffic volume continuously maintained at a very high level. As the hanging of software resource accumulated, the ONP application took longer time to process routing requests. When software resource was no longer available in the Message Handler, a snowball effect was triggered and caused most routing requests to time out. Eventually, the ONP platform was unable to handle any new routing requests.

The ONP platform consists of three ONP nodes, located in three different switching centres, with full resilience in load sharing mode. During the incident, one of the three ONP nodes failed to handle routing requests when all its software resource was used up. The sustaining high traffic was then concentrated to the other two ONP nodes. Due to chained effect, the other two ONP nodes eventually also failed to handle any outgoing call traffic to fixed networks.

A software patch was developed by our vendor to resolve the resource hanging issue on 26th March 2013. After thorough verification and stress tests, the software patch was implemented to all ONP nodes. All outgoing call traffic to fixed networks has been put back to the ONP platform since the morning of 28th March 2013.

5. Number of affected customers

We estimate that less than 40,000 customers, or 2.8% of our active customer base, who might have attempted to make outgoing calls to fixed networks during that period of time were affected.

6. Communication with our customers and the public about the incident

SmarTone has communicated with customers and the public about the service disruption through the following channels on the day of incident:

6.1 Communication through our Retail and Hotline staff

Immediately after the occurrence of the service disruption, our retail and hotline were notified about the situation.

At 11:30 am, notification was issued to inform retail and hotline staff that service had been restored.

6.2 Communication through Facebook

At 10:56 am, a notification was posted about the service disruption.

At 11:31 am, an updated notification was posted about the service restoration.

6.3 Communication to customers via Corporate Website

At 10:57 am, a notification was posted about the service disruption.

At 11:31 am, an updated notification was posted about the service restoration.

6.4 Communication to the media

At 10:57 am, an email was sent to mass media about the service disruption.

At 11:31 am, an email was sent to mass media about the service restoration.

7. Improvement measures

In order to prevent occurrence of similar incident in future, we have identified the following improvement measures:

1. We have demanded our vendor to thoroughly review and audit all systems with similar design before the end of April 2013, to prevent any potential occurrence of software resource hanging issues.
2. After this incident, our vendor has implemented a new resource hanging alarm mechanism for early problem detection and immediate remedial actions as required.