

Lightpath status monitoring

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1 Introduction

Several radio telescopes are connected to JIVE through lightpaths. Lightpaths are created by reserving capacity (time-slots) on several SDH networks, and connecting these to create an end-to-end path. Lightpaths are an economical way to ensure constant bandwidth and latency on long paths. Although SDH technology does provide options for resilience, these are not used in the long-haul lightpaths that JIVE uses and unfortunately, outages occur regularly. To track these outages, we've developed a simple logging system that presents the current and historical status of the lightpaths.

2 Data gathering

SDH technology features advanced error detection and reporting modes. But as an end-user we do not have access to the SDH equipment itself, we only connect to it through regular 1Gb/s Ethernet fiber connections. However, when the SDH layer detects a major problem anywhere on the link, it will shut down the corresponding Ethernet interface which we can easily detect. Whenever an Ethernet port changes its status from up to down or vv., this is logged by the central JIVE switch/router (an HP ProCurve 5412zl).

3 SNMP configuration

Although it would be trivial to regularly poll all of the fiber Ethernet interfaces on the JIVE switch that connect to a lightpath, this would be a poor solution: when the polling interval is long, the time resolution of the gathered data is poor and short outages are missed altogether. A short polling interval in contrast wastes resources on both the network switch and the polling machine. Instead, we are using 'SNMP traps': the switch will send out an SNMP message whenever an Ethernet port changes state. We are using version 3 of SNMP as this is the only version that supports both security and 64 bits data. The SNMP messages that are sent by the switch are therefore authenticated by an encrypted, secret key. It has been configured to send all generated traps to the JIVE network monitoring server, 'graphs.jive.nl'.

4 Processing and presentation

The Linux 'snmptrapd' process on the monitoring server automatically logs all incoming traps to a simple text-file. The resulting log is then processed in two passes. In the first pass, the data is filtered to only contain entries for the interfaces of interest, and duplicates are removed. The second pass generates several graphs that show the status of the interfaces on both short and long timescales. The resulting graphs are available to view on <http://graphs.jive.nl/updown>. The next page shows the resulting graphs.

5 Results

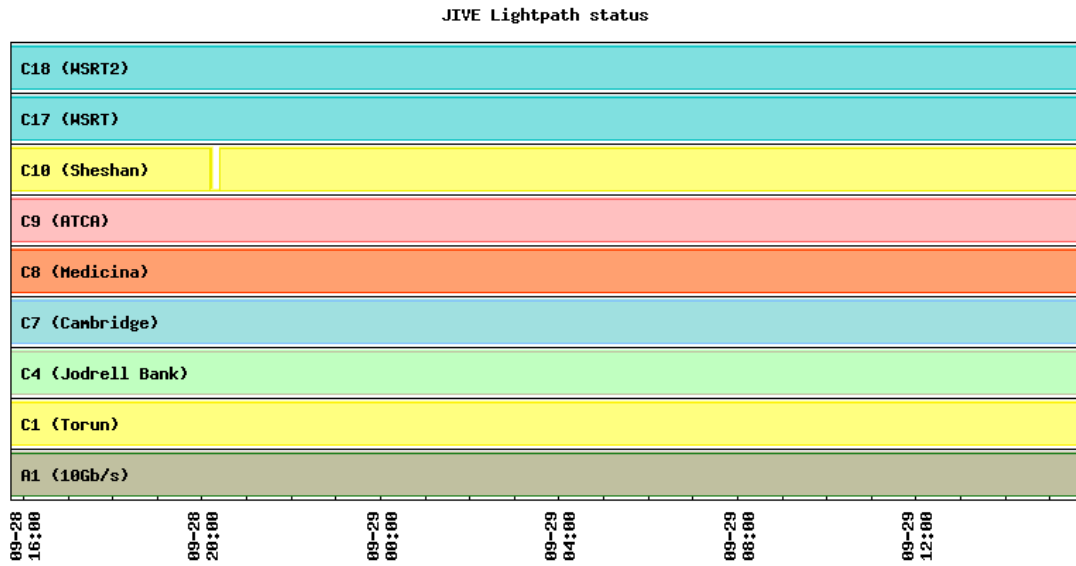


Figure 1: 24 hour lightpath overview

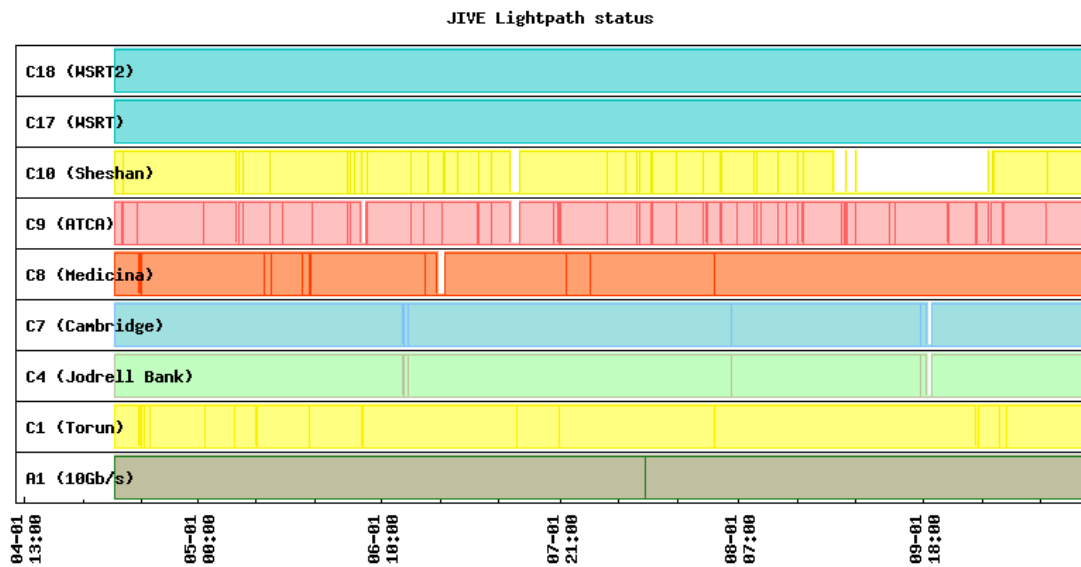


Figure 2: 6 month lightpath overview