TL1 Toolkit

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Ronald van der Pol
<rvdp@sara.nl>

Overview

- What is TL1?
- What is the TL1 Toolkit?
- Examples of use

What is TL1?

- Transaction Language 1 developed by Bellcore (Telcordia)
- Management language for telecom equipment
- Industry standard sold by Telcordia Technologies
- Messages are plain ASCII text
- Machine-man and machine-machine interface
- Widely used (in telecom world)

TL1 session example

```
< ACT-USER:"Asd001A_OME1T":LOGINNAME:42:::;IP 42
<

   "Asd001A_OME1T" 07-09-15 19:24:31
M  42 COMPLD
;
< RTRV-OM-ETH:"Asd001A_OME1T":ETH-1-1-3:42::;IP 42
<

   "Asd001A_OME1T" 07-09-15 19:25:34
M  42 COMPLD
"ETH-1-1-3::INFRAMES=4199295,INFRAMESERR=0,INOCTETS=369435481,INDFR=0,
INFRAMESDISCDS=0,INPAUSEFR=0,INCFR=0,FRTOOSHORTS=0,FCSERR=0,FRTOOLONGS=0,
FRAG=0,JAB=0,SYMBOLERR=0,OUTFRAMES=72352,OUTFRAMESERR=0,
OUTOCTETS=94342790,OUTFRAMESDISCDS=0,OUTPAUSEFR=0,OUTDFR=0,
AUTONEGCYCLES=47,INTERNALMACRXERR=0,INTERNALMACTXERR=0"
;
<
```

TL1 disadvantages

- Difficult to get syntax right
- Difficult to read returned result
- TL1 usually hidden from user by NMS
  - Not every command available
  - No scripting possible

TL1 Toolkit

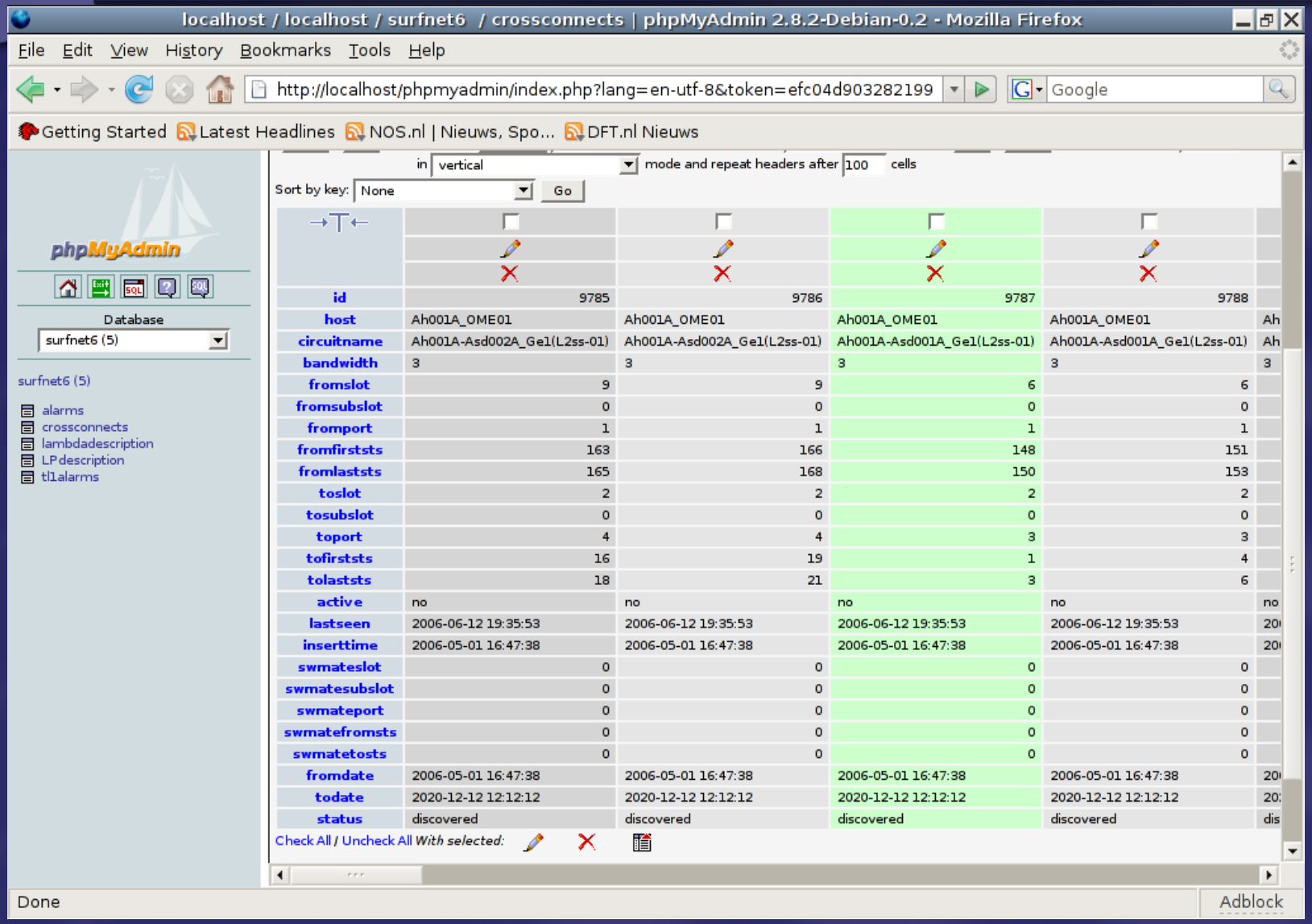
- Perl module to communicate with TL1 capable devices
- Hides TL1 syntax from the user
- Parses output of the device and returns Perl data structures to the user
- Perl because many ISPs use Perl for scripting
- Not an alternative for NMS, but an addition
- Runs on (confirmed): Nortel OME6500, OM5200, HDXc, CPL; Cisco ONS15454; Adva FSP3000
- Funded by GigaPort and SURFnet

Example script

```
#! /usr/bin/perl -w
use tl1;
use strict;

my $ne = tl1->new(hostname => “Wg001A_OME01”,
      username => “xxxxx”, password => “xxxxx”);
$ne->open();
my $version = $ne->retr_swversion();
$ne->close();
```

Crossconnect database



id	9785	9786	9787	9788	
host	Ah001A_OME01	Ah001A_OME01	Ah001A_OME01	Ah001A_OME01	Ah
circuitname	Ah001A-Asd002A_Ge1(L2ss-01)	Ah001A-Asd002A_Ge1(L2ss-01)	Ah001A-Asd001A_Ge1(L2ss-01)	Ah001A-Asd001A_Ge1(L2ss-01)	Ah
bandwidth	3	3	3	3	3
fromslot	9	9	6	6	
fromsubslot	0	0	0	0	
fromport	1	1	1	1	
fromfirststs	163	166	148	151	
fromlaststs	165	168	150	153	
toslot	2	2	2	2	
tosubslot	0	0	0	0	
toport	4	4	3	3	
tofirststs	16	19	1	4	
tolaststs	18	21	3	6	
active	no	no	no	no	no
lastseen	2006-06-12 19:35:53	2006-06-12 19:35:53	2006-06-12 19:35:53	2006-06-12 19:35:53	20
inserttime	2006-05-01 16:47:38	2006-05-01 16:47:38	2006-05-01 16:47:38	2006-05-01 16:47:38	20
swmateslot	0	0	0	0	
swmatesubslot	0	0	0	0	
swmateport	0	0	0	0	
swmatefromsts	0	0	0	0	
swmatetosts	0	0	0	0	
fromdate	2006-05-01 16:47:38	2006-05-01 16:47:38	2006-05-01 16:47:38	2006-05-01 16:47:38	20
todate	2020-12-12 12:12:12	2020-12-12 12:12:12	2020-12-12 12:12:12	2020-12-12 12:12:12	20
status	discovered	discovered	discovered	discovered	dis

Crossconnect overview

SURFnet6 TL1 Application - Firefox

File Edit View Go Bookmarks Tools Help

http://localhost:12631/tl1/sn6/sn6circuits.php?redirect=reset&circuitname=%&orderby=host%20%20%20%20%20%20%20%20

Getting Started Latest Headlines

SURFnet6 Research on Networks NOC

SN6 Lightpath Monitoring: Crossconnect overview

Back

NE FILTER: Ut001a_ome01

CIRCUIT FILTER: ALL

reset

Sorted by: host

NE	circuitname	From	To	Status	Details	Remove
Ut001a_ome01	Asd002a-Ut001a_GE1(OWINSP)	9/1	3/3	reserved		
Ut001A_OME01	Ed001A_Asd002A_GE1(L2SS_Ed)	9/1	2/1	discovered		

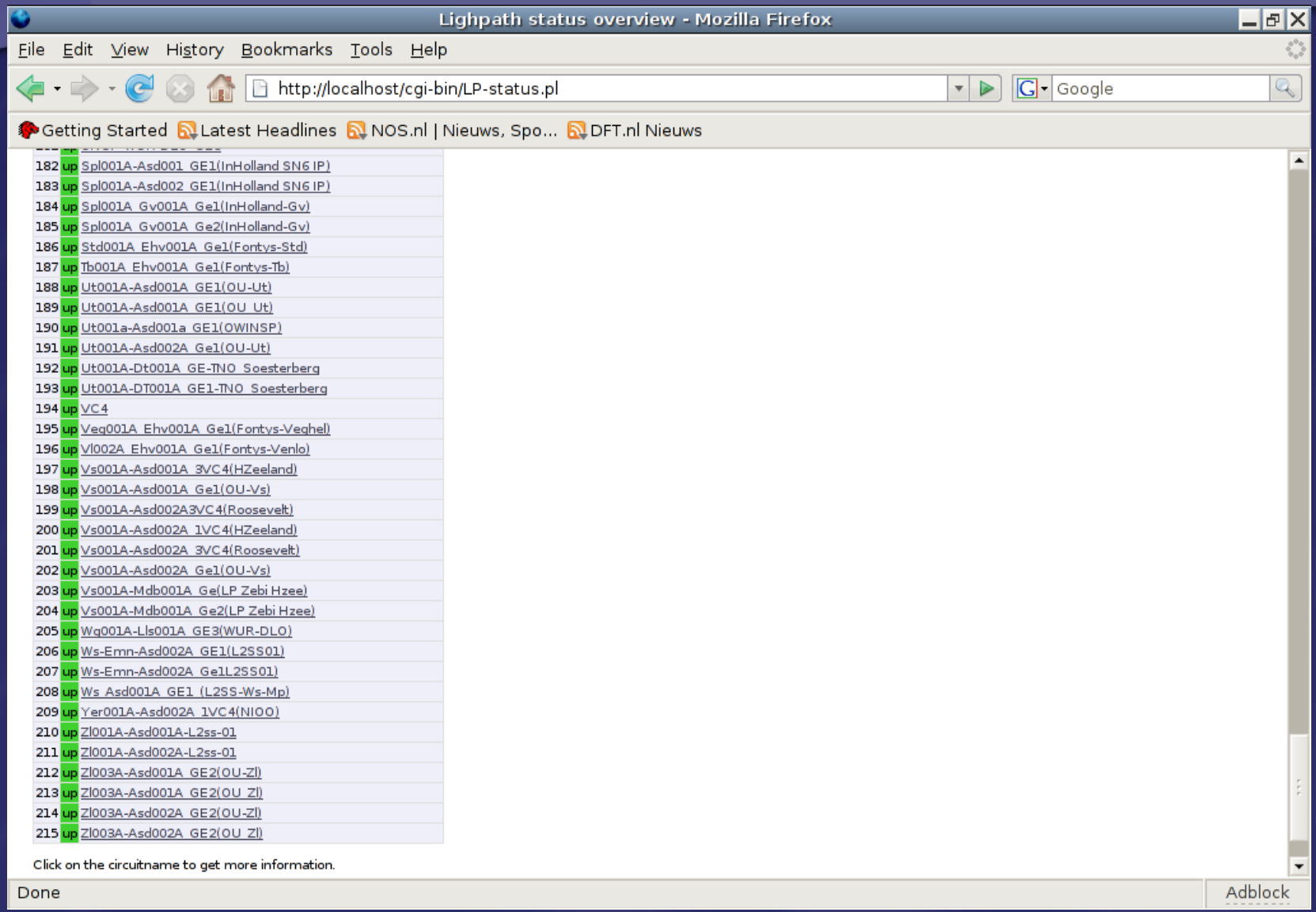
bandwidth	begin	switch-mate	end	uptime
VC-4	POS 9/1 ; VC-4 nr 8	N/A	POS 2/1 ; VC-4 nr 8	25 d 0 h 3 m
VC-4	POS 9/1 ; VC-4 nr 9	N/A	POS 2/1 ; VC-4 nr 9	25 d 0 h 3 m
VC-4	POS 9/1 ; VC-4 nr 10	N/A	POS 2/1 ; VC-4 nr 10	25 d 0 h 3 m
VC-4	POS 9/1 ; VC-4 nr 11	N/A	POS 2/1 ; VC-4 nr 11	25 d 0 h 3 m
VC-4	POS 9/1 ; VC-4 nr 12	N/A	POS 2/1 ; VC-4 nr 12	25 d 0 h 3 m
VC-4	POS 9/1 ; VC-4 nr 13	N/A	POS 2/1 ; VC-4 nr 13	25 d 0 h 3 m
VC-4	POS 9/1 ; VC-4 nr 14	N/A	POS 2/1 ; VC-4 nr 14	25 d 0 h 3 m

NE	circuitname	From	To	Status	Details	Remove
Ut001A_OME01	Ut001A-Asd001A_Ge1(OU-Ut)	2/1	1/3	discovered		
Ut001a_ome01	Ut001a-Asd001a_GE1(OWINSP)	1/1	6/1	reserved		
Ut001A_OME01	Ut001A-Asd002A_Ge1(OU-Ut)	9/1	1/4	discovered		
Ut001A_OME01	UT001A-Dt001A_GE1-TNO_Soesterberg	6/1	3/2	discovered		

TL1 Application (RoN style)

http://localhost:12631/tl1/sn6/sn6circuits.php Adblock

SURFnet6 lightpaths

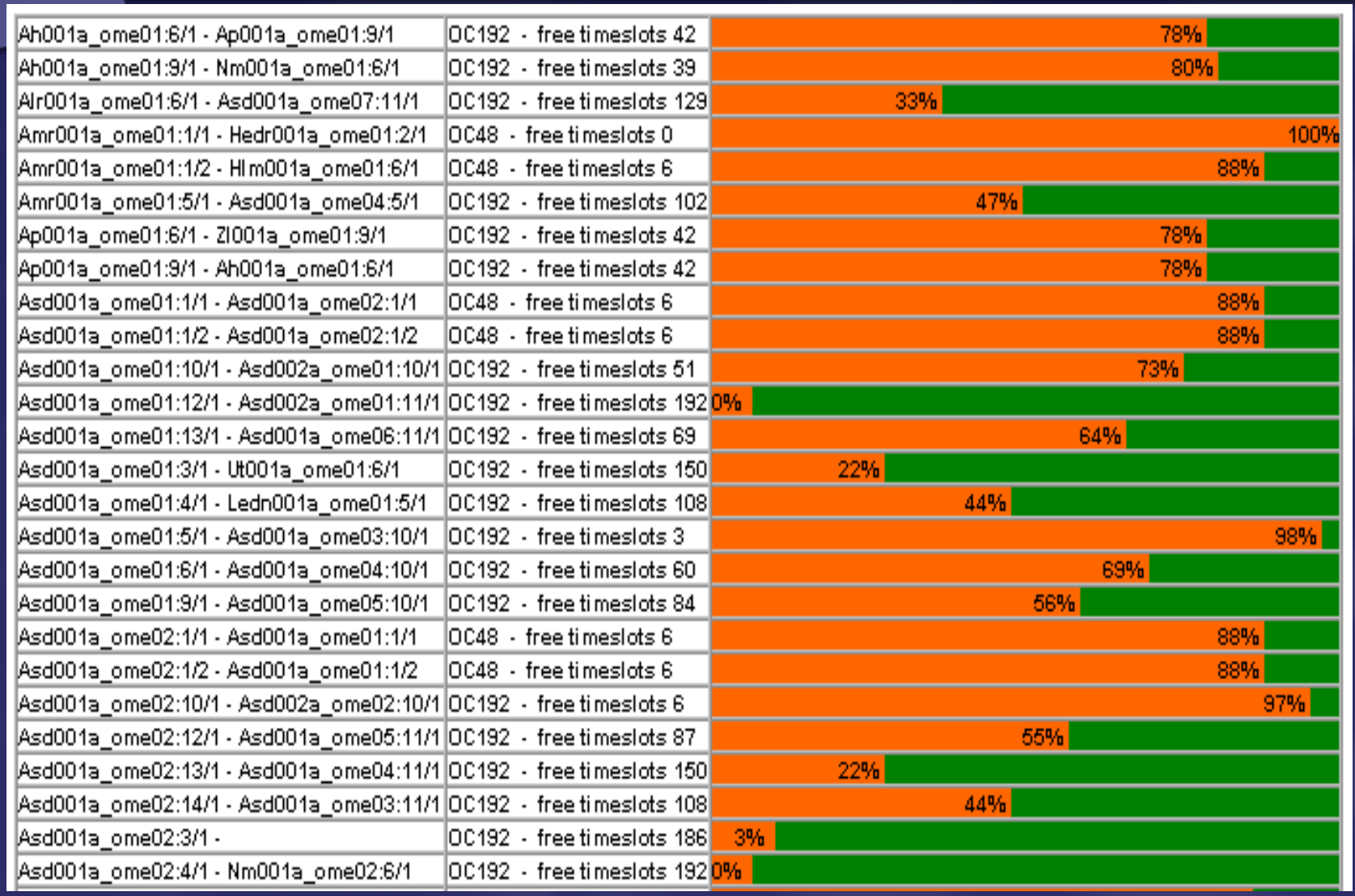


Resources Overview

interface information for Asd001a_ome05

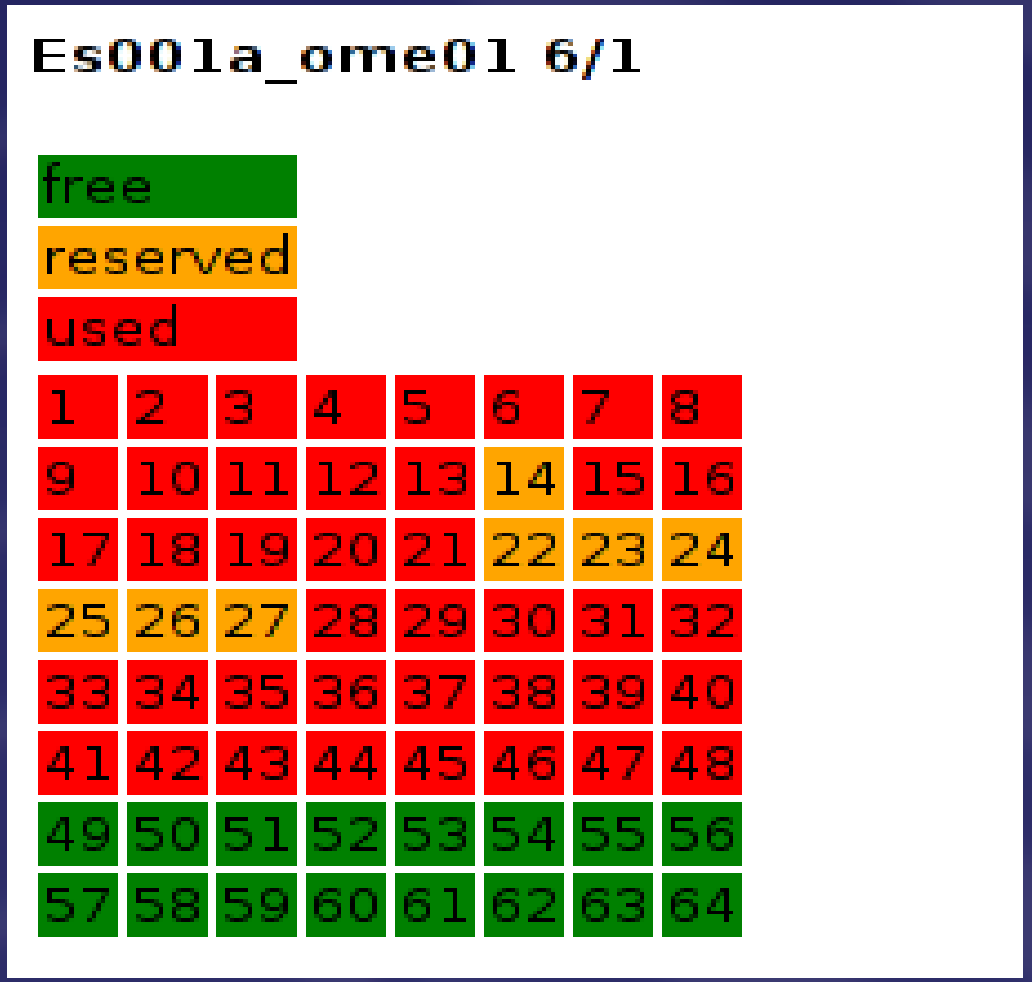
Interface	Card Type	Neigbour	Capacity (STS Timeslots)	number of free STS timeslots
Asd001a_ome05:1/1	GigE	NA	21	0
Asd001a_ome05:1/2	GigE	NA	21	0
Asd001a_ome05:1/3	GigE	NA	21	21
Asd001a_ome05:1/4	GigE	NA	21	0
Asd001a_ome05:10/1	SONET	Asd001a_ome01:9/1	192	84
Asd001a_ome05:11/1	SONET	Asd001a_ome02:12/1	192	87
Asd001a_ome05:2/1	GigE	NA	21	0
Asd001a_ome05:2/2	GigE	NA	21	0
Asd001a_ome05:2/3	GigE	NA	21	0
Asd001a_ome05:2/4	GigE	NA	21	0
Asd001a_ome05:3/1	GigE	NA	21	18
Asd001a_ome05:3/2	GigE	NA	21	21
Asd001a_ome05:3/3	GigE	NA	21	18
Asd001a_ome05:3/4	GigE	NA	21	21
Asd001a_ome05:4/1	GigE	NA	21	0
Asd001a_ome05:4/2	GigE	NA	21	18
Asd001a_ome05:4/3	GigE	NA	21	21
Asd001a_ome05:4/4	GigE	NA	21	0
Asd001a_ome05:5/1	SONET	Ddt001a_ome01:6/1	192	21
Asd001a_ome05:6/1	SONET	Tb001a_ome01:6/1	192	129
Asd001a_ome05:9/1	SONET	Ehv001a_ome01:6/1	192	0

Backbone usage



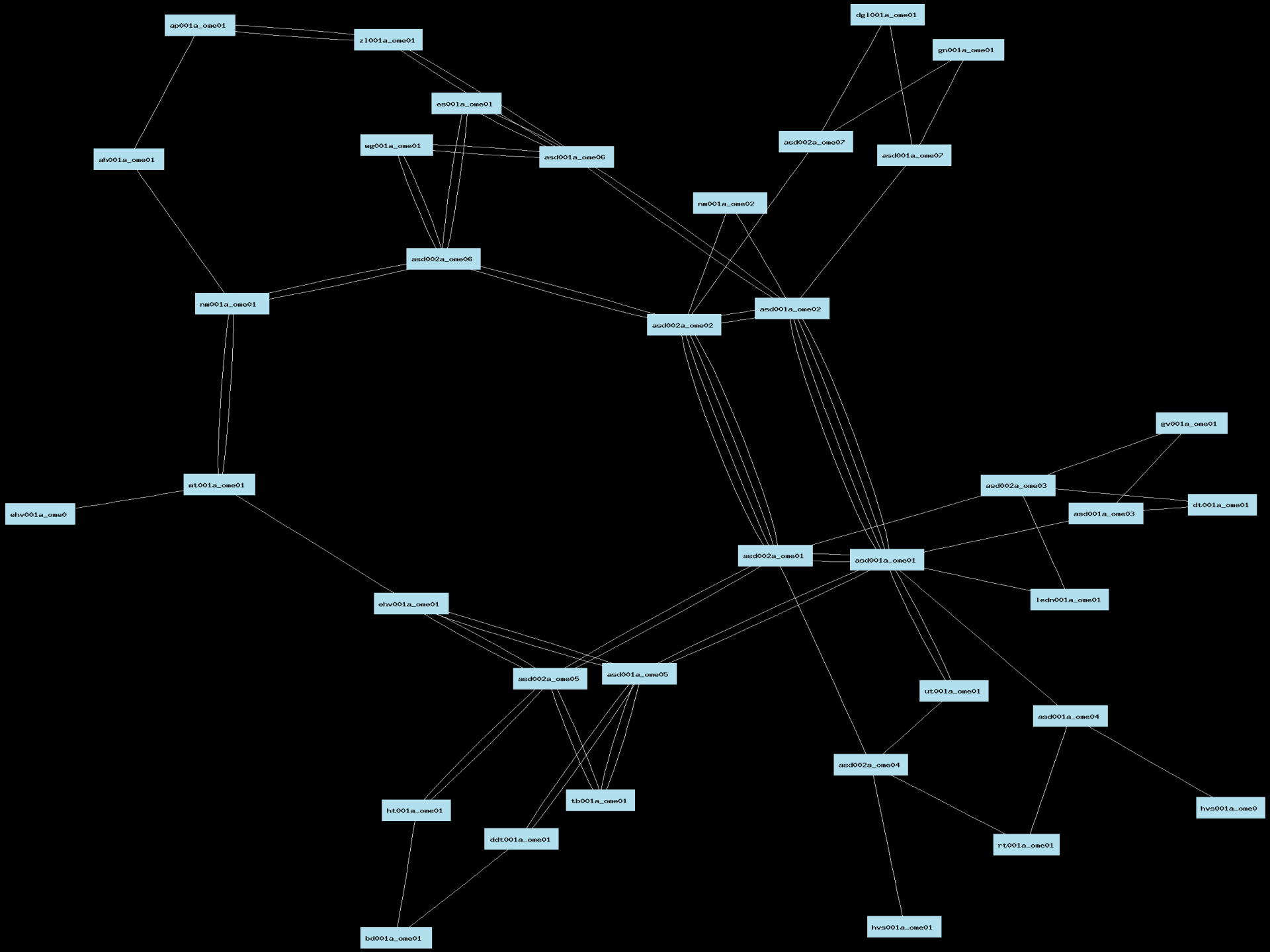
Ah001a_ome01:6/1 - Ap001a_ome01:9/1	OC192 - free timeslots 42	78%
Ah001a_ome01:9/1 - Nm001a_ome01:6/1	OC192 - free timeslots 39	80%
Alr001a_ome01:6/1 - Asd001a_ome07:11/1	OC192 - free timeslots 129	33%
Amr001a_ome01:1/1 - Hedr001a_ome01:2/1	OC48 - free timeslots 0	100%
Amr001a_ome01:1/2 - Hlm001a_ome01:6/1	OC48 - free timeslots 6	88%
Amr001a_ome01:5/1 - Asd001a_ome04:5/1	OC192 - free timeslots 102	47%
Ap001a_ome01:6/1 - Zl001a_ome01:9/1	OC192 - free timeslots 42	78%
Ap001a_ome01:9/1 - Ah001a_ome01:6/1	OC192 - free timeslots 42	78%
Asd001a_ome01:1/1 - Asd001a_ome02:1/1	OC48 - free timeslots 6	88%
Asd001a_ome01:1/2 - Asd001a_ome02:1/2	OC48 - free timeslots 6	88%
Asd001a_ome01:10/1 - Asd002a_ome01:10/1	OC192 - free timeslots 51	73%
Asd001a_ome01:12/1 - Asd002a_ome01:11/1	OC192 - free timeslots 192	0%
Asd001a_ome01:13/1 - Asd001a_ome06:11/1	OC192 - free timeslots 69	64%
Asd001a_ome01:3/1 - Ut001a_ome01:6/1	OC192 - free timeslots 150	22%
Asd001a_ome01:4/1 - Ledn001a_ome01:5/1	OC192 - free timeslots 108	44%
Asd001a_ome01:5/1 - Asd001a_ome03:10/1	OC192 - free timeslots 3	98%
Asd001a_ome01:6/1 - Asd001a_ome04:10/1	OC192 - free timeslots 60	69%
Asd001a_ome01:9/1 - Asd001a_ome05:10/1	OC192 - free timeslots 84	56%
Asd001a_ome02:1/1 - Asd001a_ome01:1/1	OC48 - free timeslots 6	88%
Asd001a_ome02:1/2 - Asd001a_ome01:1/2	OC48 - free timeslots 6	88%
Asd001a_ome02:10/1 - Asd002a_ome02:10/1	OC192 - free timeslots 6	97%
Asd001a_ome02:12/1 - Asd001a_ome05:11/1	OC192 - free timeslots 87	55%
Asd001a_ome02:13/1 - Asd001a_ome04:11/1	OC192 - free timeslots 150	22%
Asd001a_ome02:14/1 - Asd001a_ome03:11/1	OC192 - free timeslots 108	44%
Asd001a_ome02:3/1 -	OC192 - free timeslots 186	3%
Asd001a_ome02:4/1 - Nm001a_ome02:6/1	OC192 - free timeslots 192	0%

Timeslot Information



Network topology

- Automatic topology discovery
- TL1 Toolkit script reads section trace for neighbour information
- NDL topology file generated
- Used for automatic lightpath planning


ap001a_ome01
zl001a_ome01
dgl001a_ome01
gn001a_ome01
es001a_ome01
wg001a_ome01
asd001a_ome06
asd002a_ome07
asd001a_ome07
ah001a_ome01
nm001a_ome02
asd002a_ome06
nm001a_ome01
asd001a_ome02
asd002a_ome02
gv001a_ome01
mt001a_ome01
asd002a_ome03
dt001a_ome01
ehv001a_ome0
asd001a_ome03
asd002a_ome01
asd001a_ome01
ledn001a_ome01
ehv001a_ome01
asd002a_ome05
asd001a_ome05
ut001a_ome01
asd001a_ome04
asd002a_ome04
ht001a_ome01
tb001a_ome01
hvs001a_ome0
ddt001a_ome01
rt001a_ome01
bd001a_ome01
hvs001a_ome01

Where to get it?

- http://nrg.sara.nl/
- Apache 2.0 license
- Next version planned for later this month
- Questions:
  - rvdp@sara.nl

Thank you

(rvdp@sara.nl)