

Testing User Controlled Lightpaths



CANARIE



HEAnet
IRELAND'S NATIONAL EDUCATION & RESEARCH NETWORK

TF-NGN meeting

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Concept & definitions (1)

- **UCLP – User Controlled LightPath**
- **Concept of UCLP originated from CANARIE and Bill St.Arnaud**
- **Lightpath is defined as a deterministic point-to-point bandwidth-guaranteed connection (SONET/WDM wavelength)**
- **Enable users of Lightpaths to own and control their network resources**
- **User stack concept (advertise/lease)**

Concept & Definitions (2)

- **Light path object (LPO) – GE in our case, but in theory could be a wavelength or STS-nc virtual container**
- **Web based configuration and maintenance for users and system administrators**

Building Blocks

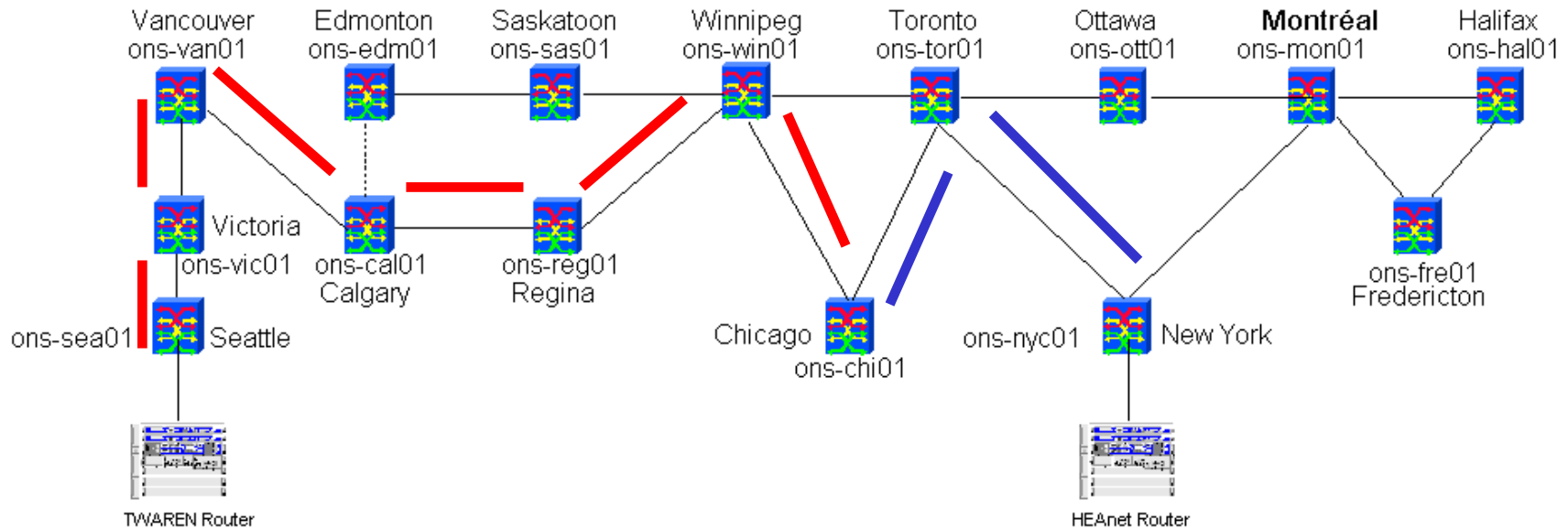
- **Currently 4 software implementations being tested.**
- **We tested the first available one from the University of Waterloo.**
- **Currently only agents developed for Cisco ONS equipment.**
- **TL1 used to configure ONS boxes**
- **Commands in ONS enable cross-connections**

Waterloo Software



- [-] [▶] User Management
- [-] [▶] Advertise LPO
- [-] [▼] Lease LPO
 - [📄] Lease
 - [📄] Extend
 - [📄] Cancel
- [-] [▼] Access/Reconfigure LPO
 - [📄] Access
 - [📄] Reconfigure
 - [📄] Remove
- [-] [▶] Partition LPO
- [-] [▶] Concatenate LPOs
- [-] [▼] End To End LPOs
 - [📄] Establish
 - [📄] Cancel
- [-] [▶] Prog. Controller
 - [🏠] Home
 - [🏠] Sign Out

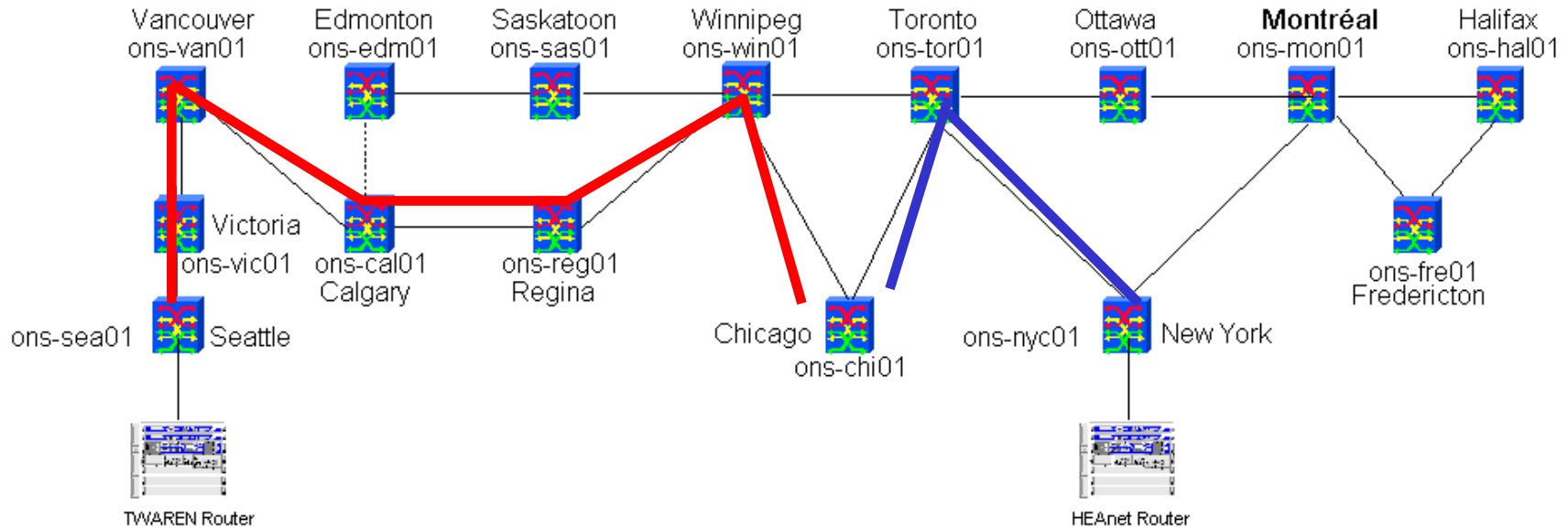
Lease in each domain





 TWAREN Leased LPO's from CANARIE

 HEAnet Leased LPO's from CANARIE

Concatenate and advertise



 TWAREN concatenated LPO from Seattle to Chicago

 HEAnet Concatenated LPO from New York to Chicago

Lease from TWAREN

LPO MANAGEMENT > Lease LPO

Lease of the LPO successfull

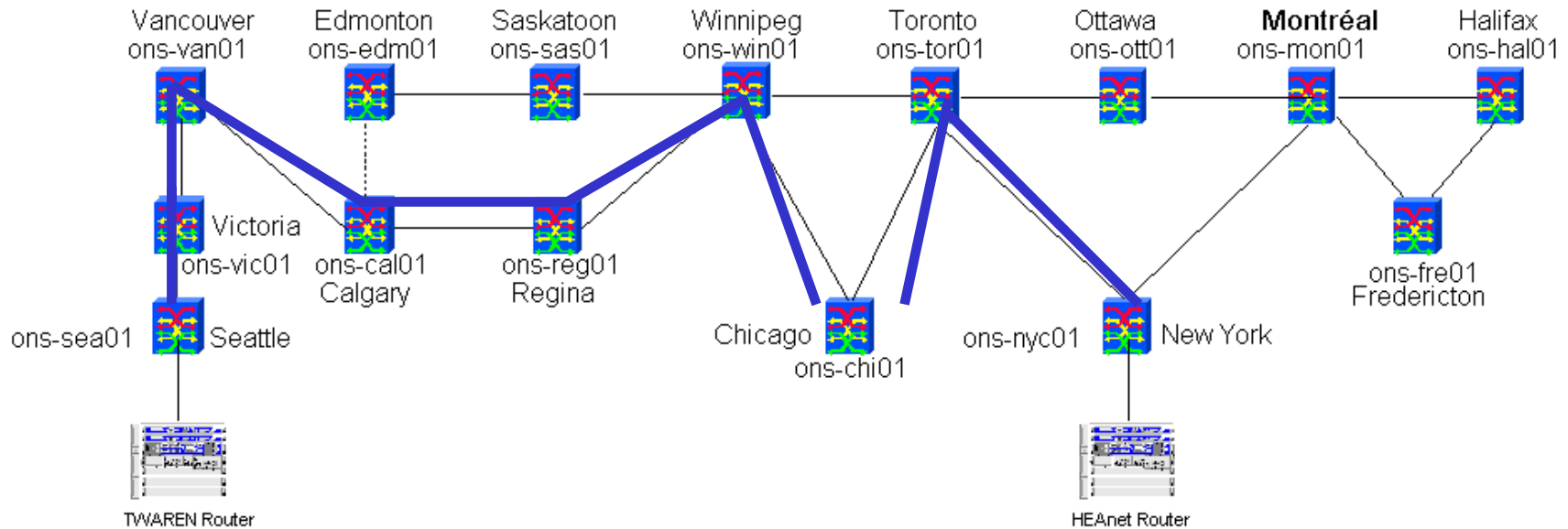
Lease LPO

ID	108
Bandwidth	1244160
Start now ?	<input checked="" type="radio"/> Yes <input type="radio"/> No
Expiration Date	2004-3-30 <input type="button" value="date"/>
Expiration Time	00 : 00 AM

submit

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Leased from TWAREN



— HEAnet Concatenated LPO from New York to Chicago

Concatenate

LPO MANAGEMENT > Concatenate LPO

▶ Please select a search criteria :

Bandwidth

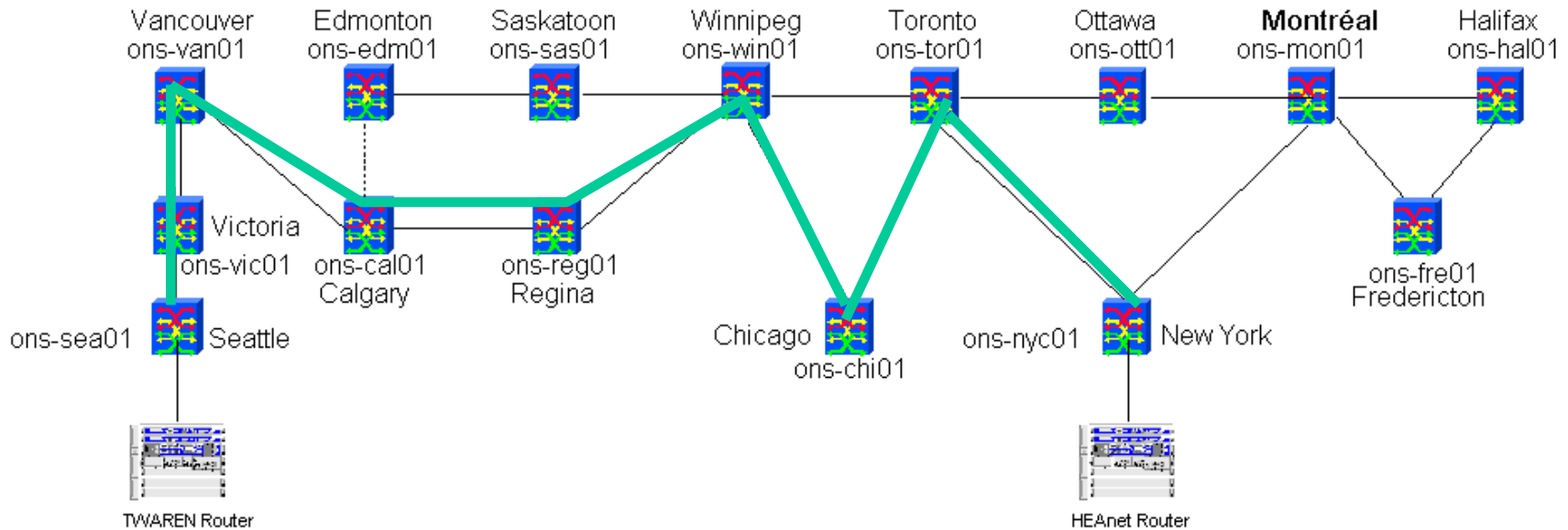
▶ LPO Results

ID	Bandwidth	Source	Destination	
108	1244160	ons-sea01	ons-chi01	<input checked="" type="checkbox"/>
109	1244160	ons-nyc01	ons-chi01	<input checked="" type="checkbox"/>

submit

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Concatenated



———— TWAREN/HEAnet end to end LPO from Seattle to Chicago

End to End LPO

LPO MANAGEMENT > Establish End To End LPO

▶ LPO Results

End To End Paths		
70:	ons-nyc01, ons-tor01	submit
86:	ons-win01, ons-tor01	
68:	ons-reg01, ons-win01	
67:	ons-cal01, ons-reg01	
85:	ons-sea01, ons-cal01	

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Configure Access to LPO

- **The local HEAnet GE port at New York and the TWAREN GE port in Seattle must be connected to the ends of the LPO to connect the GE end to end.**
- **The ONS nodes transparently connect the GE port in Seattle and New York – hence only get link between the 2 routers once connectivity is established.**

Connect GE ports to LPO

LPO MANAGEMENT > Access LPO

Access Successful to the LPO

Source	Destination
Card/Slot: G1000-4 / 4	Card/Slot: G1000-4 / 14
Port: Select Port	Port: Select Port

access

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Issues/experience

- **No Time Zone information caused difficulties in leasing/advertising LPOs. Once it was established that all network times were UTC-5, it made things easier.**
- **Very easy to navigate and use the software – once initial concepts understood**
- **Point and click method very easy to use**
- **Very flexible – ability to configure GE circuits from end to end without intervention from provider**
- **Lack of tools for fault management (loopback as a LPO)**

References

<http://www.canarie.ca/canet4/uclp/index.html>

http://www.canarie.ca/canet4/uclp/uclp_software.html



Building steps

- **Several different methods to build the path!**
- **Here is the one we used:**
 - Lease your LPO from the system admin
 - Concatenate your LPOs
 - Advertise your LPOs to others (if you want others to use them)
 - Lease the advertised TWAREN LPO
 - Concatenate TWAREN and HEAnet LPOs
 - Access node – connect ports to LPO
 - End to End GE circuit completed

Waterloo Software



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