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Lab #3: Build a net
Group 3

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Introduction

Main question

How can we build a "cool" network with available resources?

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- Inventorying of resources and technologies.
- Designing according available resources.
- Implementation of a group approved design.
- Examine implementation internally and externally.
- Report results of each step above.

	Outer Switch	Shared Router	Inner L3 Switches**	
	Arista 7124S(X)	Juniper T1600	Nortel 5530	2x Cisco 3750G
XENPAK(1310nm), SC		3 × 10 Gbps		
SPF slots		10 sockets*		4 sockets*
XFP(1310nm), LC			2 × 10Gbps	
Ethernet, 8P8C			24 × 1Gbps	24 × 1Gbps
Arista, LR, LC	4 × 10 Gbps			

Table: Network Devices. *Only 2 sockets are operational/available. No auto-negotiation for optics (10 Gbps ≠ 1 Gbps)

	Shared Router	Inner Switches
	Juniper T1600	2x Cisco 3750
modules		
2 × SFP (1310nm),LC	10 sockets*	4 sockets*
4 × SFP (850nm), LC	10 sockets*	4 sockets*

Table: Optical Modules. *Only 2 sockets are operational/available. No auto-negotiation for optics (10 Gbps ≠ 1 Gbps)

Inventory
Network connectivity and more

Connectivity

- 3 x SC-LC single mode fibers (short range)
- 2 x SC-SC single mode fibers (long range)
- 1 x LC-LC single mode (short range)
- 1 x LC-LC single mode (long range)
- 2 x LC-LC multi mode fiber (orange,aqua)

Extra devices

- 4 physical servers with a single Ethernet NIC.
- 1 Enternet USB dongle

Design
Technological conditions, requirements, constraints

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Functionality/protocols per layer of "Internet model" (RFC 1122)

- Application. NFS, SNMP, SSH
- Transport. TCP
- Internet. IPv4, BGP, OSPF, RIP
- Link. VLAN's, LACP

Software:

- OS. Ubuntu Server 16.04.3
- Monitoring. Cacti v 1.1.36 and related OS's default LAMP stack

File-sharing application (NFS) is spread across 2 data centers for failure mitigation purposes. Data centers are located in one country/region and communicate with peers via the Nortel and Juniper router. There is a direct peer with a network from other region/country.

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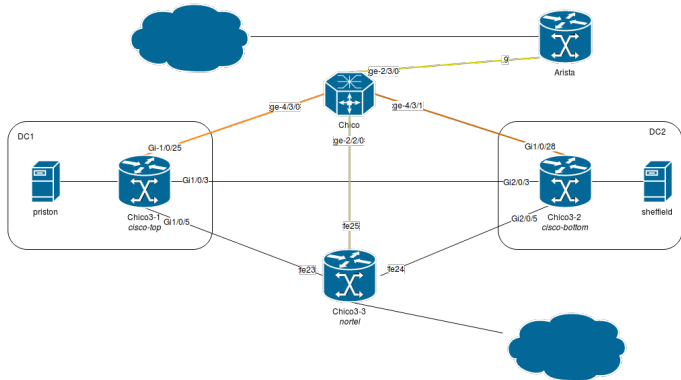
AN Lab3 Group 3 Physical Diagram

Chico Juniper T1600 Router XENPAK-10GB-LR-C 740-013170 10Gb Ethernet 10Base-LR (SC),
2 x 1000Base-X SFP sockes(LC)

Chico3 -(1/2): CISCO Catalyst 3750G-24PS-24 24xEthernet 10/100/1000 ports 4 x SFP sockets (LC)
Chico3 - 3: Nortel BayStack 5510-24T Switch 24xEthernet 10/100/1000 ports, 2 xXFP sockets (LC)
Arista: Arista 7124S(X) Switch (LC)

File server
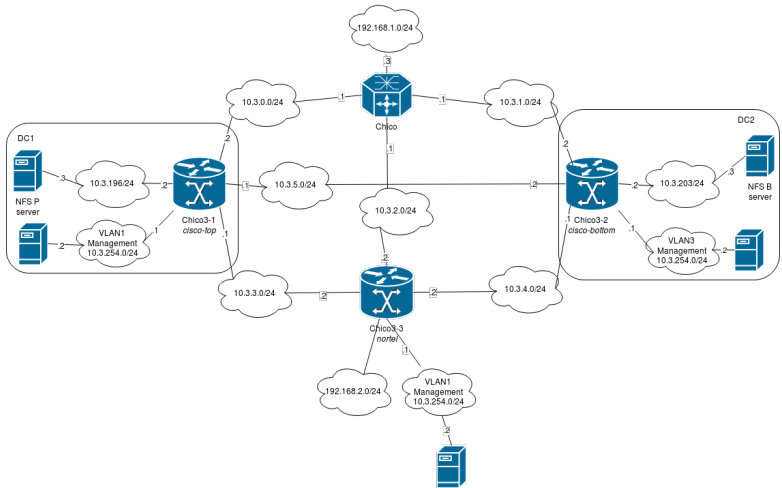
SC - LC fiber optics cable

LC - LC fiber optics cable

Ethernet CAT cable

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- Not all SPF sockets of Cisco switches are operational.
- Nortel require a license for OSPF.
- Nortel supports only STP, no different refinements like Cisco.
- Nortel is bankrupt, so no support available.

Conclusion

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- Proper inventorization might spare implementation time.
- Due to a proper standards implementation even different manufactured devices can communicate with each other.
- Fiber optics require some effort to setup it physically, but works similar to Ethernet.
- No auto-negotiation for optics provides extra limitations during design stage.
- Take into account that theory is not reality

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THANK YOU!