The Road to 100G
xena
Xena Networks?

Founded in 2007 and based in Denmark.

L2-L3 Gigabit Ethernet test solutions.

Narrow focus = low cost (50% of competitors).

World’s first “tri-speed” 10/40/100G test module.

Partner in Holland = Tucana
Background on 100G

June 2007:

A trade group called "Road to 100G" formed to extend the 802.3 protocol to 40 Gb/s and 100 Gb/s

Why:

Reduce number of lambdas and limit proliferation of optical fiber.

Better use of bandwidth relative to 10Gbps link aggregates.

Cheaper wholesale, internet peering and datacenter interconnect connectivity.

Wanted to "skip" the relatively expensive 40Gbps and move directly from 10Gbps to 100Gbps.
The race to market - routers & switches

Alcatel-Lucent - June 2009
Followed by Brocade, Cisco, Huawei, & Juniper etc.

Market share in Q4 2010 (according to Dell'Oro)

Cisco = $455 million (58%)
Juniper $242 million (31%)
Huawei = $78 million (10%)

T&M?
Ixia’s K2 in June 2009, Spirent Hypermetrics in Sept ‘09
Xena Networks “tri-speed” 10/40/100 in Feb ‘11.
Who works with 100G?

Who plans to use it?

When?
Furukawa Industrial - Brazil

Tested OM4 MMF channel links over distances from 70 to 520 meters by simulating a real network. (The standard defines 150m with OM4 MMF Cables.)

Reichle & De-Massari (R&M) – Switzerland

Lossless transmission over 550 meters of fiber optic cable and nine MPO connectors / 6-hour demonstration with no bit errors
Transcontinental Latency Testing

- Phase 1 testing from Frankfurt to London
- Phase 2 testing from Frankfurt to New York via London

EQUIPMENT:

Infinera, Brocade, Xena and in-house
PHASE 1 System Diagram

LONDON

Infinera DTN

Brocade Router

Xena 100G Tester

10x 10G connections

FRANKFURT

Infinera DTN

Brocade Router

Xena 100G Tester

10x 10G connections

Tier 1 ISP Production network

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Provision end-to-end 100G circuit check functionality of the 100G TAMs - achieve error free traffic directly using the 100G tester

- Transparency checks
- Fault detection tests (basic frame monitoring tests)
- Check functionality of 100GE CFP modules with code version and chassis
- Basic CLI verification that we see the interfaces(s) and can configure, show, shut, no shut, add IP address etc.
- Remove and inset module repeatedly in routers to ensure OIR works correctly and traffic on 100G interfaces not affected
- Ensure link comes up
- Ensure optical monitoring works
- Ensure you can ping from router 1 to router 2 and back again with various packet sizes
List of Tests (2)

✓ Run layer-3 traffic at 10/20/30/40/50/60/70/80/90/100% with 64/128/256/1024/2048/4096/9000/ IMIX packet sizes
✓ Full RFC2544 and BERT tests, measuring all usual stuff like latency, loss, jitter, out of sequence etc.
✓ Stability test of router-to-router protocols and traffic at 100% for 48 hours
✓ Optical limits – check limits by introduction of attenuators

? Introduce errors and check for reporting for interface, traffic and routing protocols
? Introduce circuit flaps on physical circuit and check for router status
? Use 10GigE tester (more comprehensive) to generate [test] traffic which will be carried over 100GE link
? SNMP counter check (32 and 64 bit IfMIB counters).

× Ensure PIM, ISIS, BGP, OSPFv3, MPLS, link aggregation with just 1 port member all work over link between routers
Questions?

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Product Range

Test Module:
2 x 10GbE XFP SR/LR

Test Module:
2 x 10GbE SFP+ SR/LR

Unique Tri-speed module:
10/40/100GbE – LR4/ SR10/
SR4/SR with CFP cage

Test Module:
6 x dual media SFP
Electrical 10/100/1000M
Optical 100/1000M

Test Module:
2 x 10GbE CX4

Test Module:
6 x 10GbE SFP+ (SR/LR)