



Caelum

The Lab's model data centre

Malcolm Scott



80 Dell R320 servers

- 6 cores; 64GB RAM
- Xeon E5-2430L V2: Ivy Bridge
- Lights-out serial/KVM/media
- Local SSD and HDD storage

4 Arista 7050Q 40Gbit switches

6 ExaLINK 50 layer-1 switches

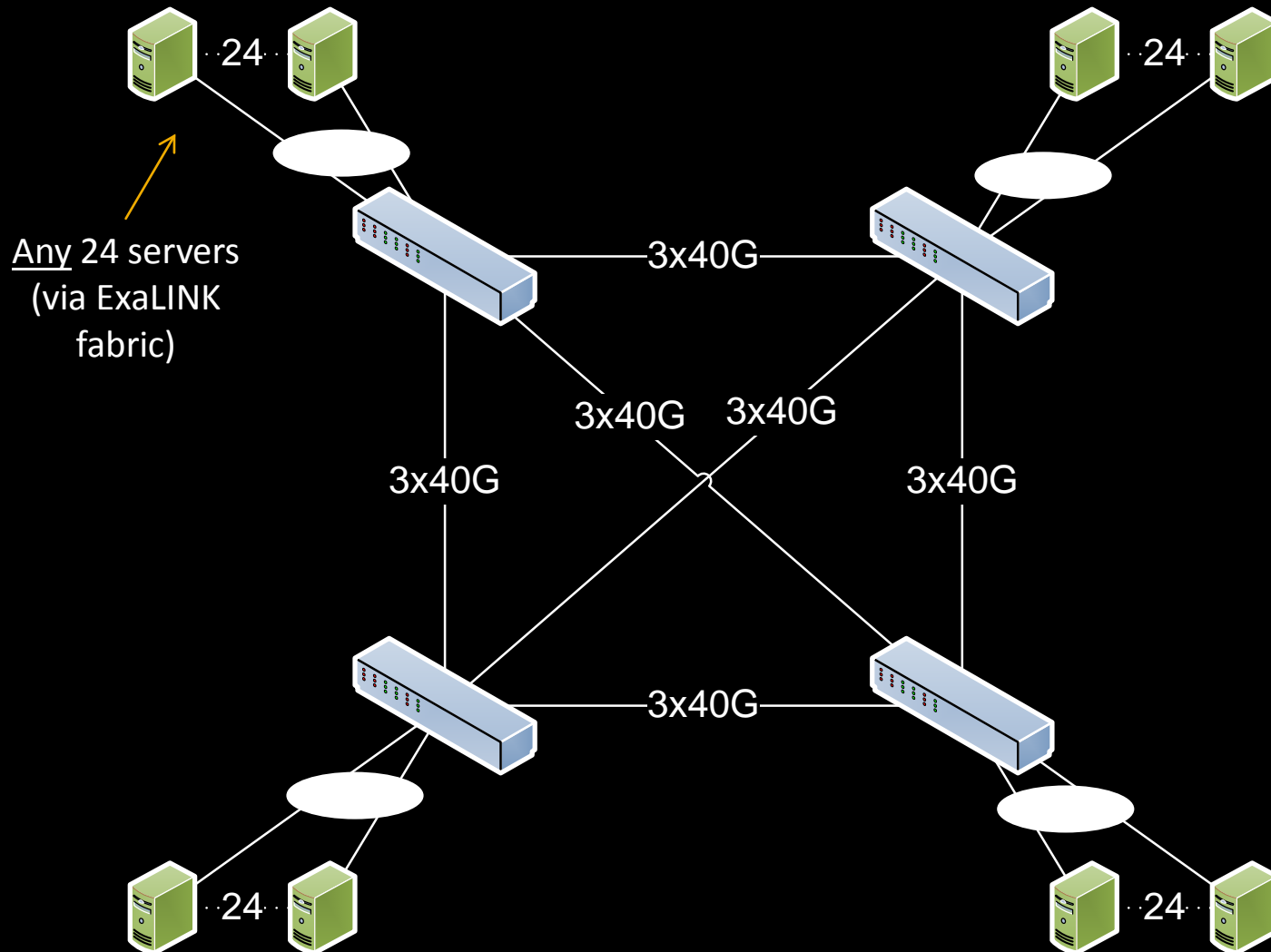
6 smart PDUs (individual
metering and switching)

1.5 km of cabling
(and about 15 m of Dymo label)

16 m³ of packaging processed
(0.9 Gray Whales)

Default 10/40Gbit network topology

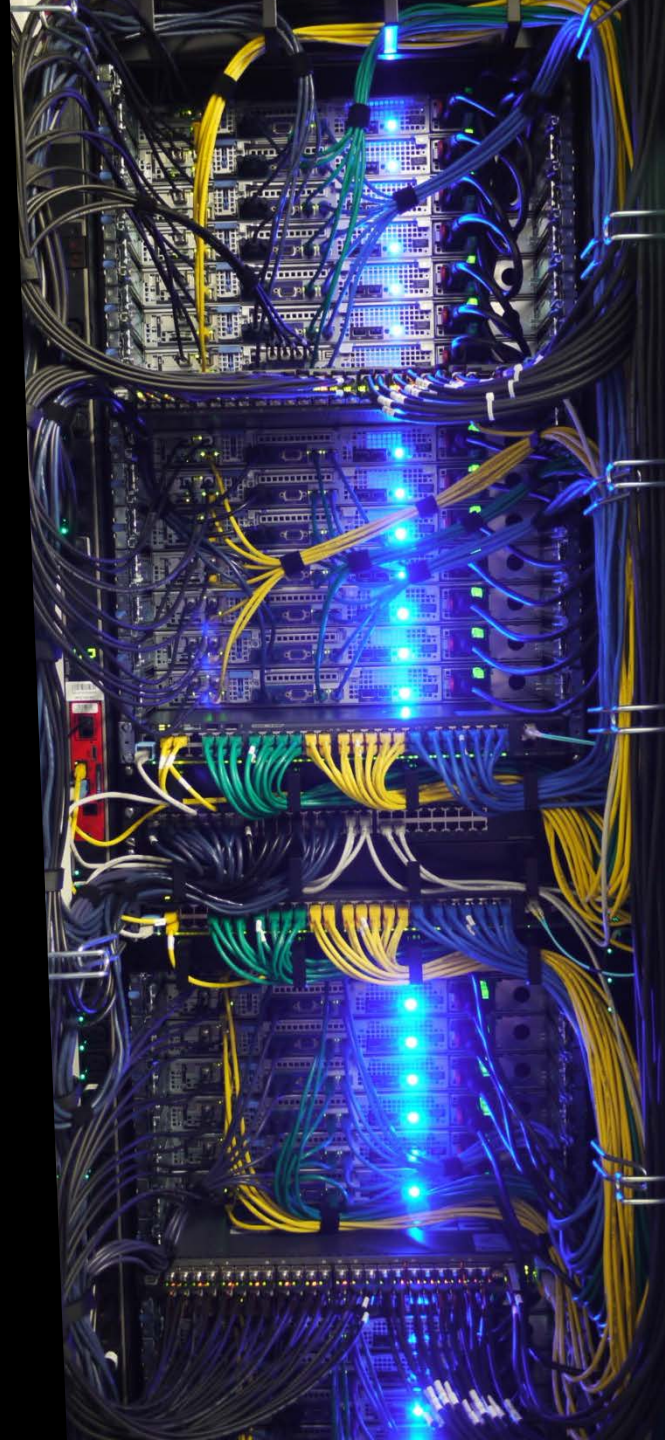
- Full bisection bandwidth
- Can disable links to form other topologies if needed



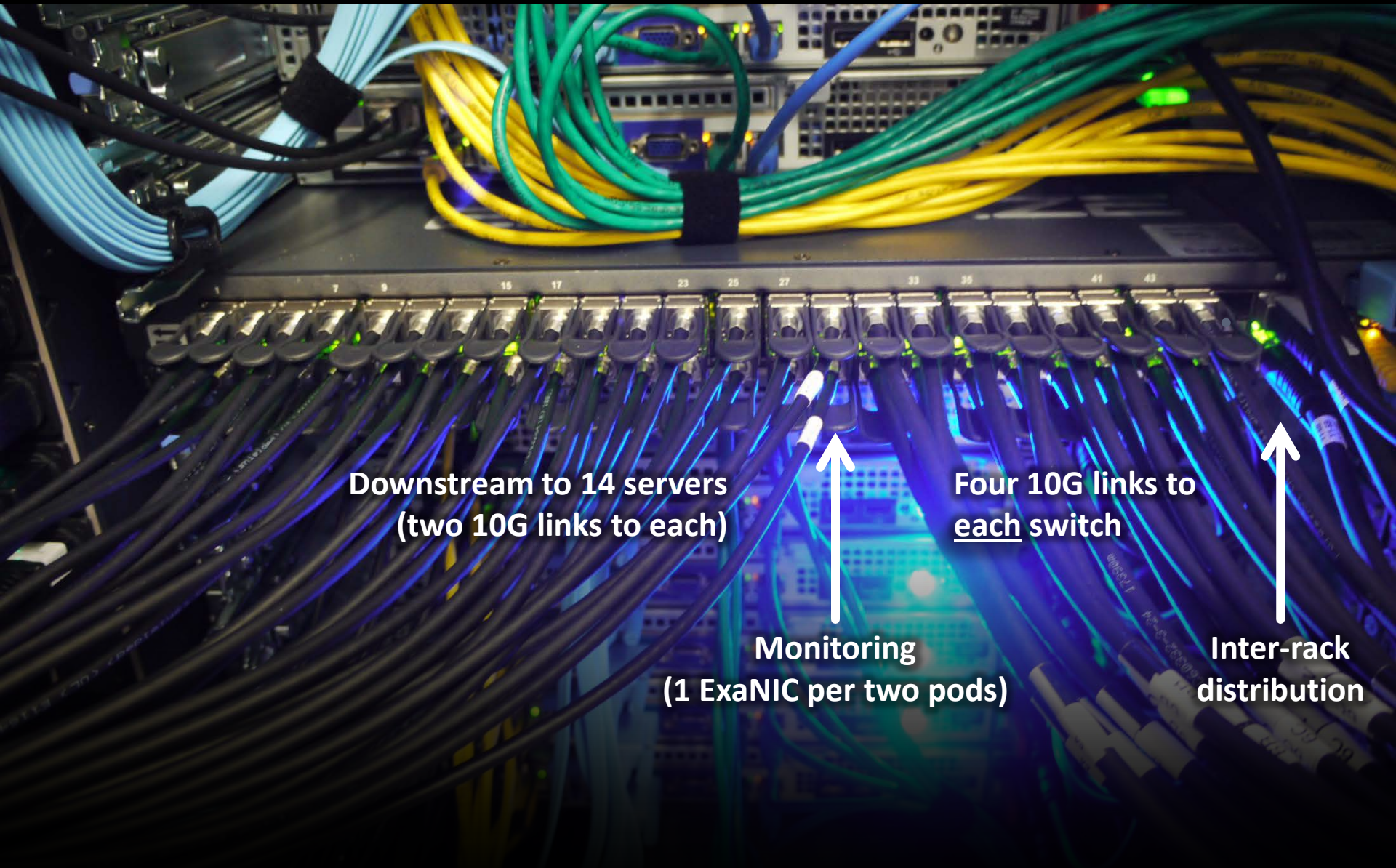
ExaLINK layer-1 switches form a reconfigurable interconnection fabric

Each server's two 10Gbit ports can be connected at runtime to one (or more) of:

- Any Arista switch
- Any other nearby server port
- A dedicated monitoring NIC
- Any other ExaLINK



ExaLINK



Downstream to 14 servers
(two 10G links to each)

Four 10G links to
each switch

Monitoring
(1 ExaNIC per two pods)

Inter-rack
distribution



Caelum admin

Server 214

Power:

1

Current user:

mas90

Location:

pod 2, slot 14

Hardware type:

dell_12g

Inventory number:

[19256](#)

Serial number:

563FD22

BMC:

[bmc-214.caelum.cl.cam.ac.uk](#) (2001:630:212:250:ca1f:66ff:feeb:e739)

PDU:

[pdu-rack1-R.caelum.cl.cam.ac.uk](#) outlet 18

Serial console:

[serial-rack1.caelum.cl.cam.ac.uk](#) port 1

BMC MAC address:

C8:1F:66:CB:E7:39

Primary MAC address:

C8:1F:66:CB:E7:37

Management switch:

gn11-sw1.net;
main, port 2/14; secondary, port 2/42; BMC, port 2/28

(yes, the management network
is mostly IPv6-only 😊)

[KVM](#)

Self-service UI in
development

Power control

Soft reboot (iDRAC)

Serial access

KVM console (iDRAC)

Virtual media (iDRAC)

Semi-automated
deployment

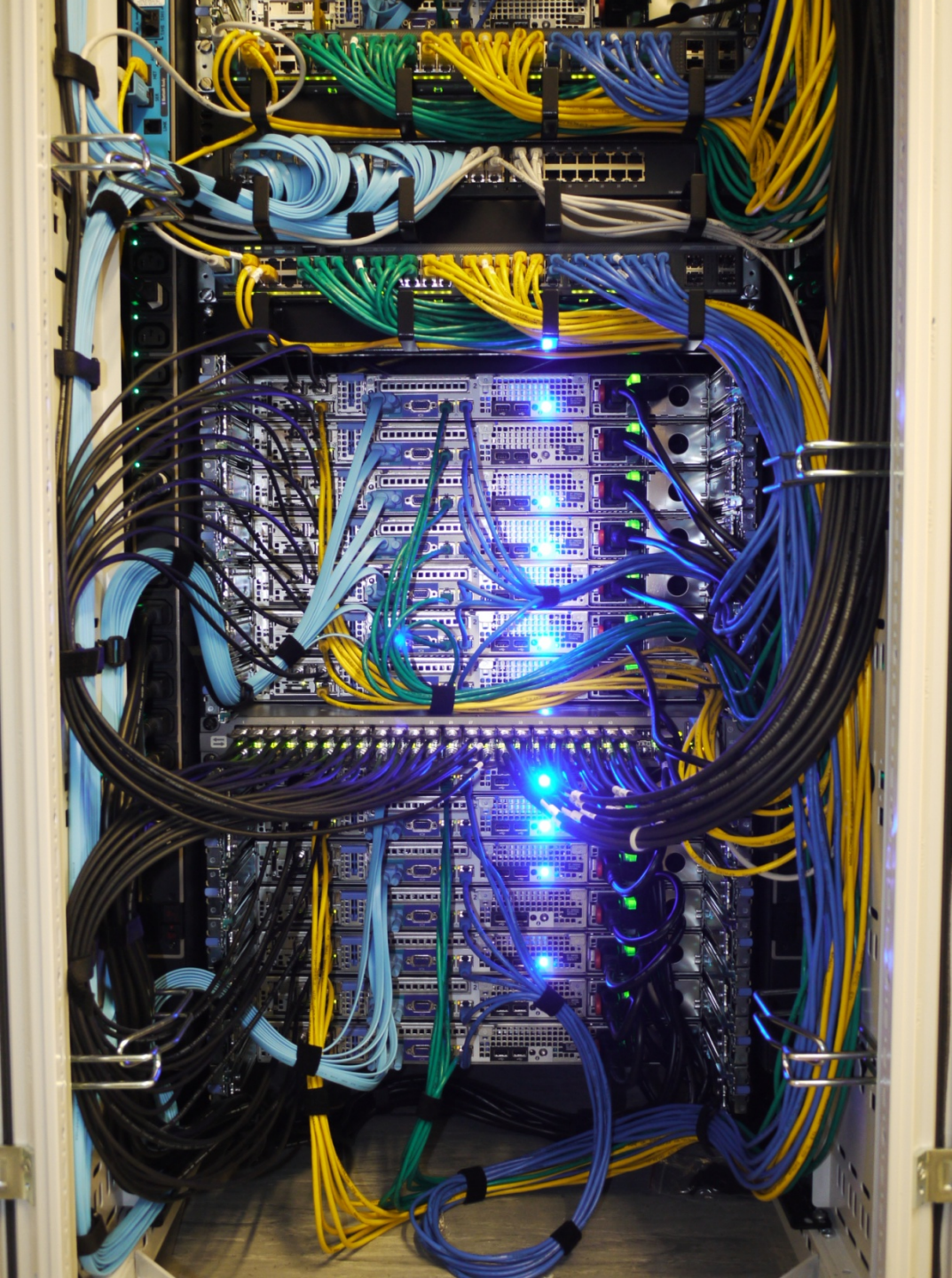
Batch firmware &
configuration updates

So what's it for?

- You tell me.
- Short-term scale-out experiments; borrow the whole cluster for a few days
 - (Lower-priority: preemptible long-term smaller allocations to fill spare capacity)
- Bring your idea
- I will help you plan the deployment
- *(It's not for long-term service hosting.)*
 - *Little resilience, because this is an experimental facility only*
 - *No UPS; no RAID...*

“Bring your idea,” longer-term

- This part of interest to people with grants
- This is an EPSRC designated “Small Research Facility”
- Charging model (being) agreed with EPSRC & University
- Put it on your grant application
 - They will know to expect this
- Details: talk to Andrea Kells
- We’d like this to fund the facility long-term



Caelum is open for business

Tell me how you'd like to use it!

*What I've described is **Phase One***

*Larger computation servers coming later,
and bulk storage*

*There's scope for tweaks/additions to suit
use cases we haven't thought of*