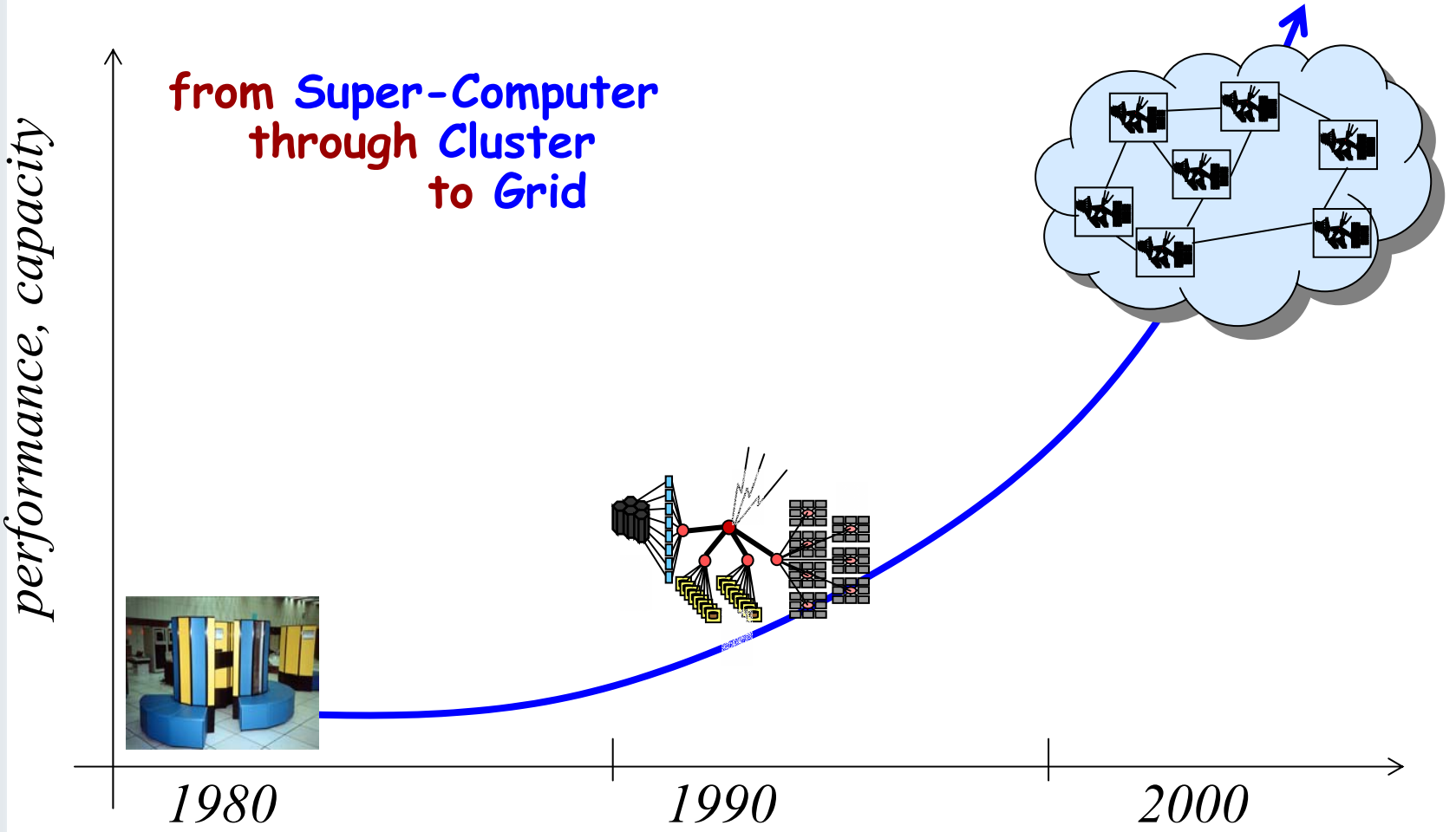
CERN openlab for DataGrid applications

2nd Workshop on Fabric Management

July 7-8, 2003

Welcome !

GRIDs - The next step in the evolution of large scale computing



CERN "Fabric Management" history

- 1980's: Mainframe era
  - ~5-10 analysts or system programmers + help of the company on site
  - Dedicated room for … system manuals
  - The network is the proprietary backplane/switch/interconnect
- 1990's: Unix RISC -> PC Linux
  - 1 sytem administrator/ 100's machines
  - Started to invest in automation/recovery
  - Outsourcing model (MCHF/Year) – now being insourced
  - High speed multivendor local area network (Gigabit networking as of 1990!)
- 2000's: Grid's
  - Must go one step further in automation/configuration…
  - Complex infrastructure problems
  - Operation centers
  - High Speed/high latency multivendor wide area networks

Integrated Management

- 1994: Proposal to install a Convex Exemplar
  - Was ~100% HP/UX compatible
  - Single system image
  - Single Management
  - In theory 1 system administrator for 1000 nodes
  - But 2-3 times more expensive than HP Kittyhawks
  - Project finally abandoned but triggered the adoption of outsourcing

Integrated Management (2)

- 1994: IBM SP2
  - Not single system image
    - Very similar to a single-vendor Unix/RISC distributed system
  - Integrated Management
  - Set of (customizable) tools to give a single system management *view*
  - A few people to manage the 64-node system (but probably could expand with many more nodes without noticeable manpower increase)
  - Things started to become difficult as we were trying to integrate non-IBM equipment (e.g. standard SCSI disks, difficult to enable TAG queing)
  - More expensive than commodity RISC (~ x2)

Integrated Management (3)

- 1998: SGI Origin series
  - Single system image
  - 1 system administrator/1024 CPU's
    - But actually ~ 20 CPU's installed at CERN
  - Complex performance issues
  - Poor support from the company
  - Too expensive

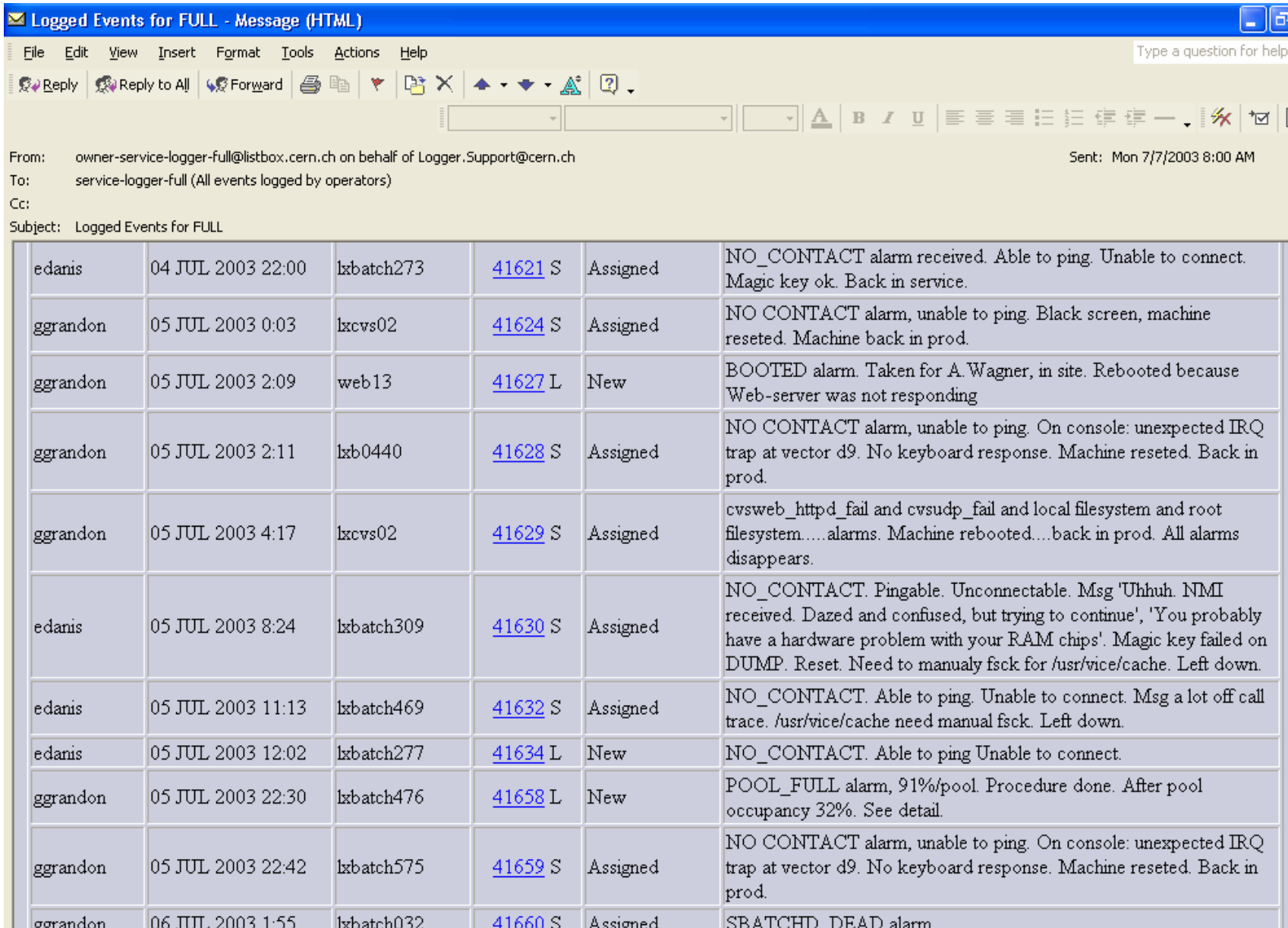
Today

- 1000's of PC/Linux
- Complex Interdependencies
  - Still not able to shutdown the computer centre in 5 minutes
  - Took > 1 day to recover from last Computer Centre power failure
- But …
  - Able to reinstall all systems overnight
  - EDG WP4 tools in real use

Monitoring

- Cray: 6 monitoring consoles/machine
- IBM: could call IBM in Montpellier
- Distributed Unix/Linux
  - Sure 1/2/3, PEM, PVSS, EDG WP4
- Management Suites
  - Looked at CA Unicenter, IBM Tivoli, BMC
  - Too complex, too expensive
- New initiatives
  - Intel WfM, PXE
  - DMI (DMTF)/WBEM
  - HP UDC, IBM Eliza, SUN N1

Reality check



Logged Events for FULL - Message (HTML)

File Edit View Insert Format Tools Actions Help

Type a question for help

Reply | Reply to All | Forward

From: owner-service-logger-full@listbox.cern.ch on behalf of Logger.Support@cern.ch

Sent: Mon 7/7/2003 8:00 AM

To: service-logger-full (All events logged by operators)

Cc:

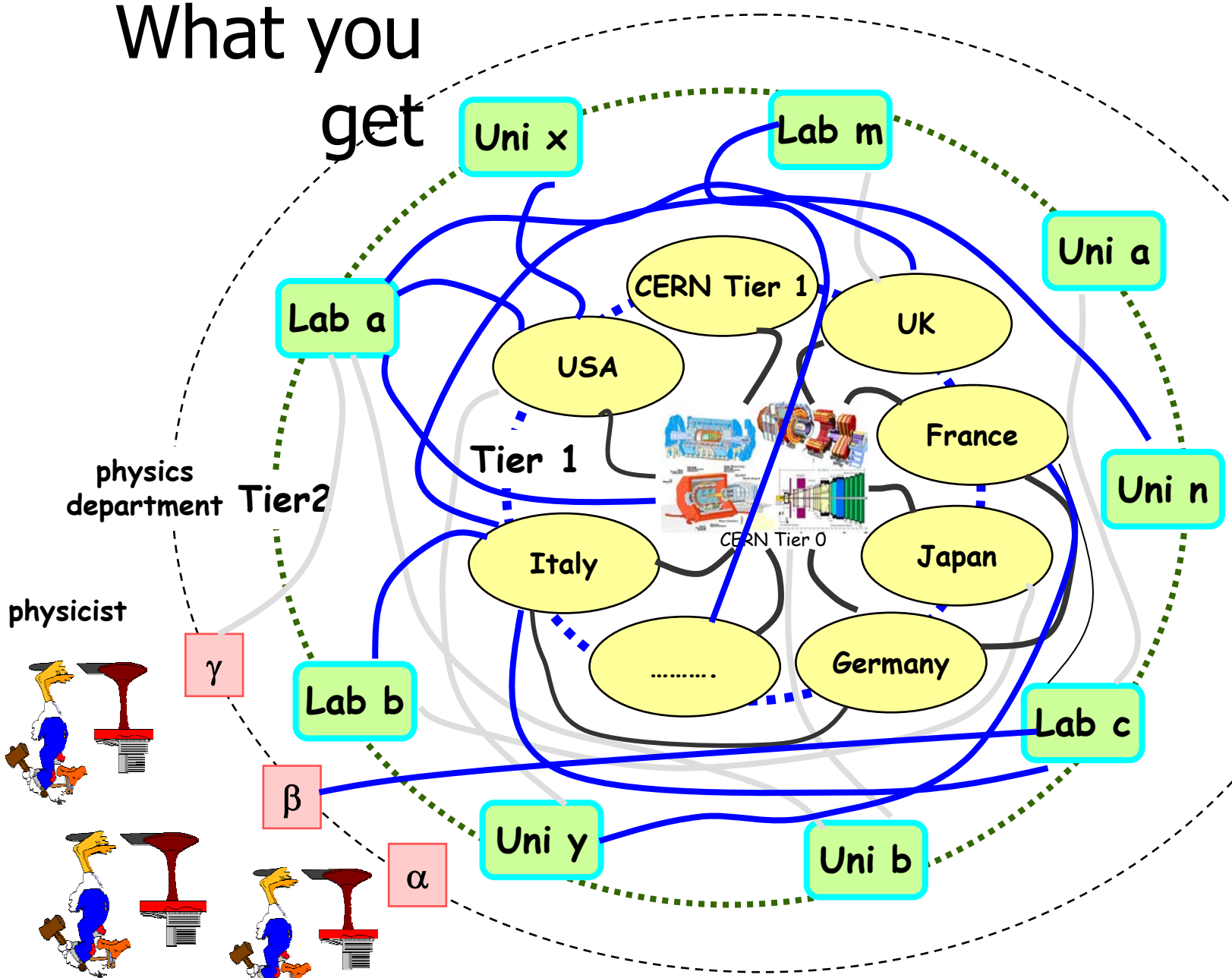
Subject: Logged Events for FULL

edanis	04 JUL 2003 22:00	lxbatch273	41621 S	Assigned	NO_CONTACT alarm received. Able to ping. Unable to connect. Magic key ok. Back in service.
ggrandon	05 JUL 2003 0:03	lxcvs02	41624 S	Assigned	NO CONTACT alarm, unable to ping. Black screen, machine reseted. Machine back in prod.
ggrandon	05 JUL 2003 2:09	web13	41627 L	New	BOOTED alarm. Taken for A.Wagner, in site. Rebooted because Web-server was not responding
ggrandon	05 JUL 2003 2:11	lxb0440	41628 S	Assigned	NO CONTACT alarm, unable to ping. On console: unexpected IRQ trap at vector d9. No keyboard response. Machine reseted. Back in prod.
ggrandon	05 JUL 2003 4:17	lxcvs02	41629 S	Assigned	cvsweb_httpd_fail and cvsudp_fail and local filesystem and root filesystem.....alarms. Machine rebooted....back in prod. All alarms disappears.
edanis	05 JUL 2003 8:24	lxbatch309	41630 S	Assigned	NO_CONTACT. Pingable. Unconnectable. Msg 'Uhhuh. NMI received. Dazed and confused, but trying to continue', 'You probably have a hardware problem with your RAM chips'. Magic key failed on DUMP. Reset. Need to manualy fsck for /usr/vice/cache. Left down.
edanis	05 JUL 2003 11:13	lxbatch469	41632 S	Assigned	NO_CONTACT. Able to ping. Unable to connect. Msg a lot off call trace. /usr/vice/cache need manual fsck. Left down.
edanis	05 JUL 2003 12:02	lxbatch277	41634 L	New	NO_CONTACT. Able to ping Unable to connect.
ggrandon	05 JUL 2003 22:30	lxbatch476	41658 L	New	POOL_FULL alarm, 91%/pool. Procedure done. After pool occupancy 32%. See detail.
ggrandon	05 JUL 2003 22:42	lxbatch575	41659 S	Assigned	NO CONTACT alarm, unable to ping. On console: unexpected IRQ trap at vector d9. No keyboard response. Machine reseted. Back in prod.
ggrandon	06 JUL 2003 1:55	lxbatch032	41660 S	Assigned	SBATCHD_DEAD alarm

What you would like to see

reliable
available
powerful
calm
cool
easy to use .... and nice to look at

What you get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CERN Tier 1
UK
USA
France
Tier 1
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physics department
Tier2
CERN Tier 0
Italy
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physicist
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Summary

- Fabric Management is an issue we need to look at
  - The problem has been around for > 10 years
  - Will be of importance for most Tier 0/1 centers
  - New ideas/initiatives are popping up
  - Costs are not negligible
    - E.g. infrastructure costs
    - Manpower costs even more important
    - Will Launch a TCO study later in the year

Let's try to address some of the issues in the next two days...