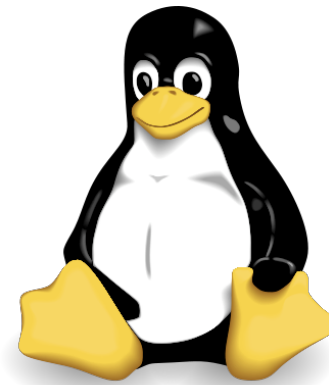


What does my machine really do?

Using Systemtap to analyze performance
and functional problems

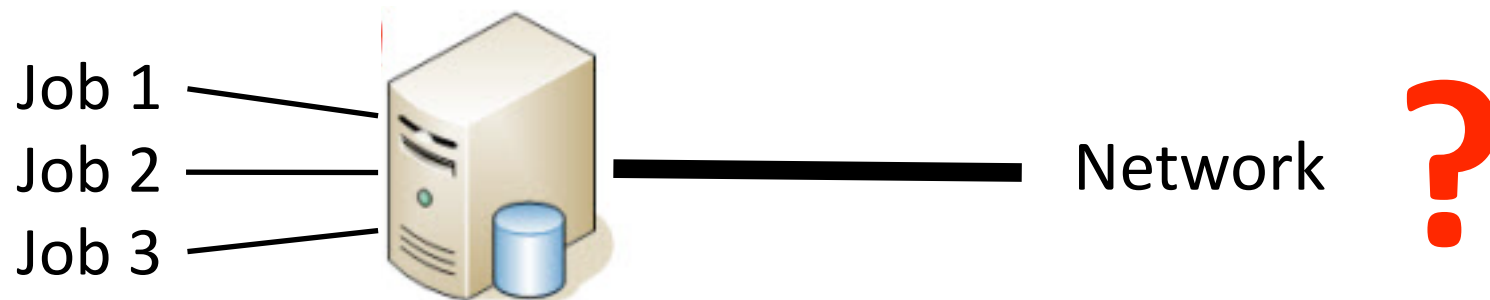


Student presentation @ Cern School of Computing 2009
Malte Nuhn <malte.nuhn(at)rwth-aachen.de>

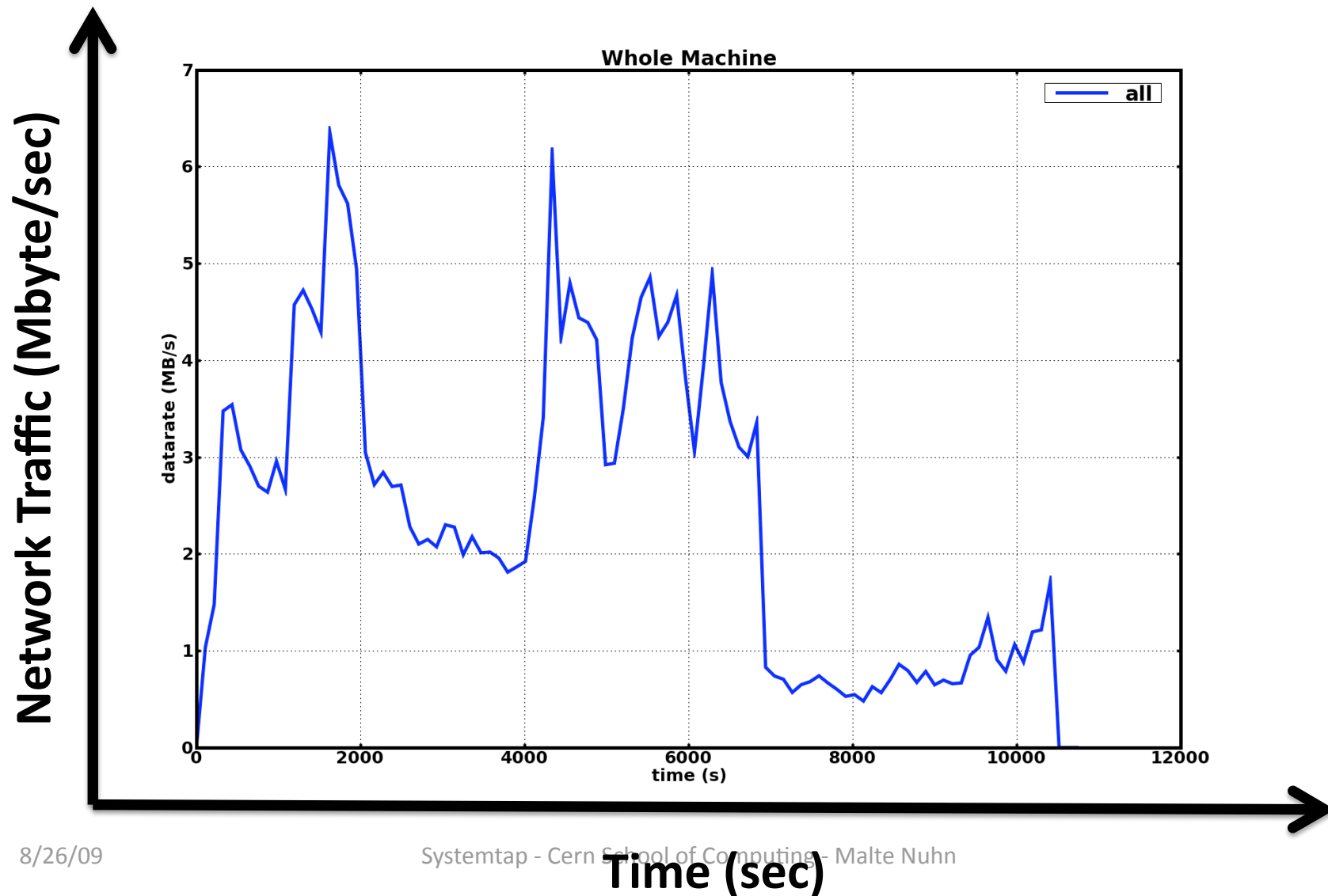
This is only a short (non technical) appetizer.
A lot of technical details were hidden

Monitoring Grid-Jobs

- LHC Computing Grid
- Workernodes that execute jobs
- 8 jobs per machine, no virtualization
- Question:
 - What traffic is produced by which job?



Network traffic per node:



Network traffic per node:



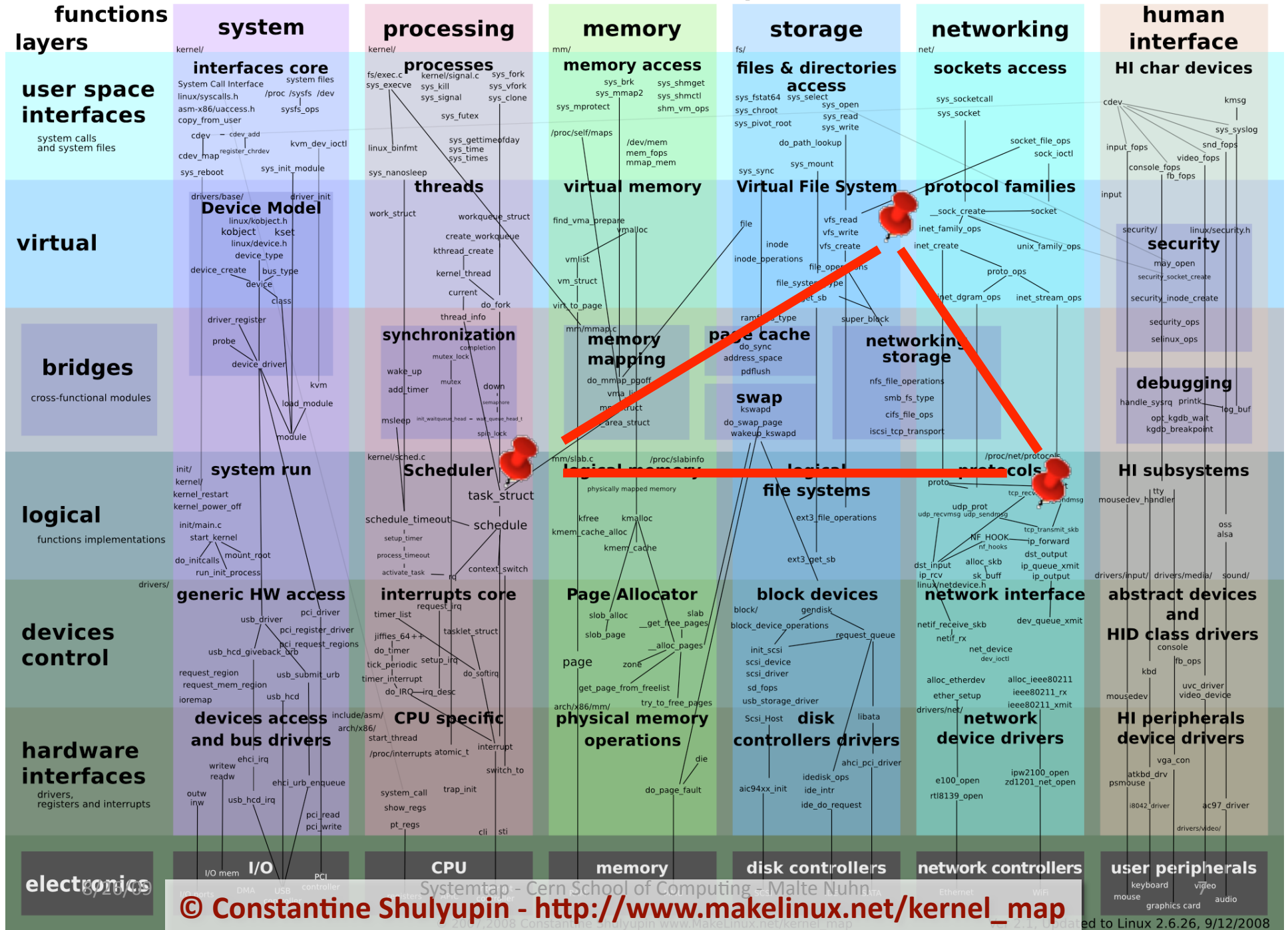
Why is it so difficult to look at the details of *my* machine?

- You are running Linux
- Linux is OpenSource
- You even own your hardware

Hmm...



Linux kernel map



Probing the Kernel #1

Problem: Long term stability of kernel interfaces

Commercial:

Solaris, Mac OS X: Dtrace

AIX: ProbeVue



Linux:

Linux is free and open

Kernel may be changed at any time!



Different approaches: Long term stability vs. vivid development

Probing the Kernel #2

Problem: Writing kernel modules is dangerous

- You are no longer writing ‘user’-code
- You are part of the kernel!

Your whole system might crash if you produce:

 Memoryleaks

 Infinite loops

 Deadlocks

...



Probing framework: Systemtap

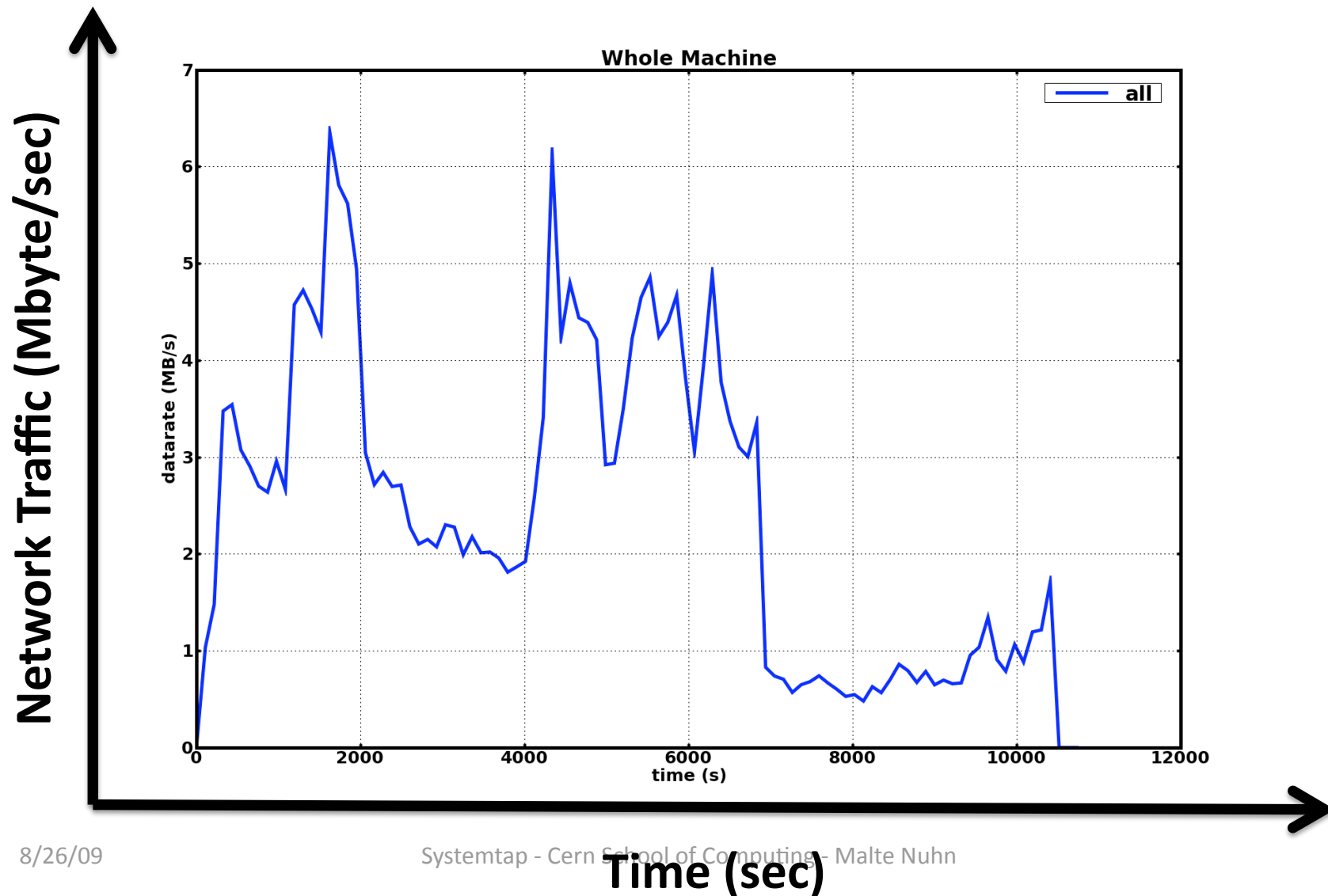
- Systemtap is your friend:
 - Copes with all the danger
 - Provides a simple scripting language
 - Translates scripts into a secure kernel modules
 - Provides maintained „Tapsets“ for everyday use!
 - *My opinion: It is not just another „geek“ toy!
Linux has always lacked such a tool!*



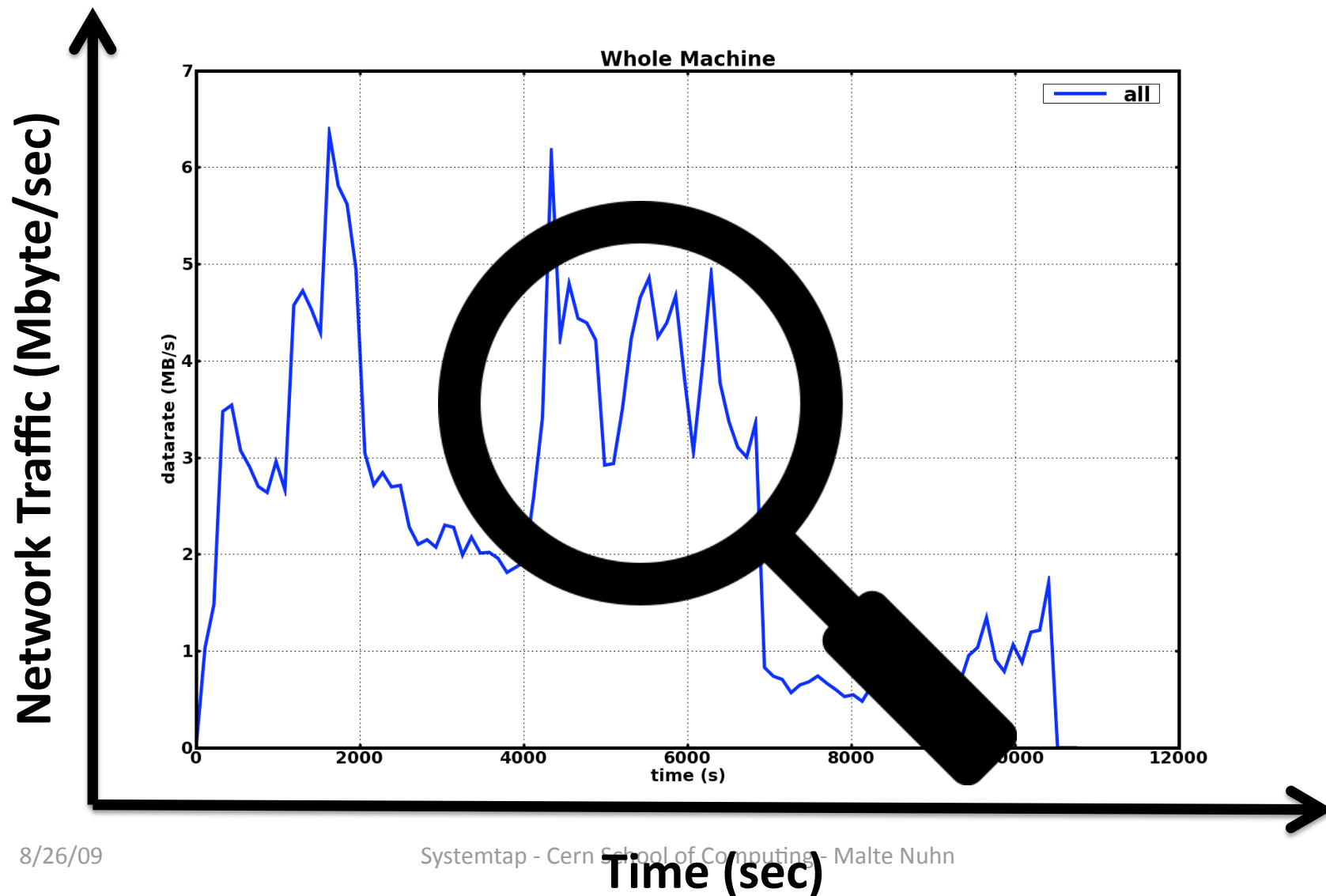
8/26/09



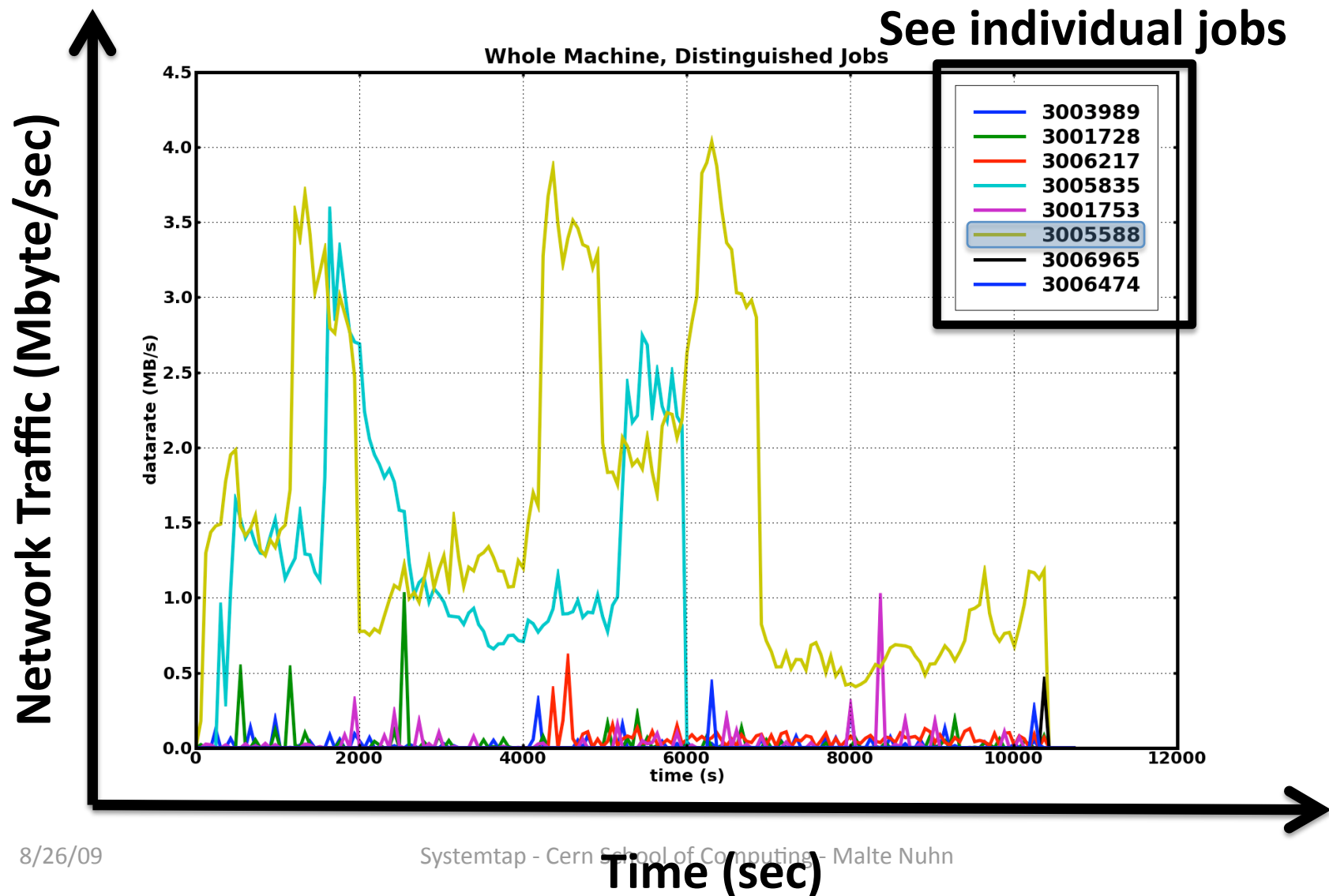
Network traffic per node:



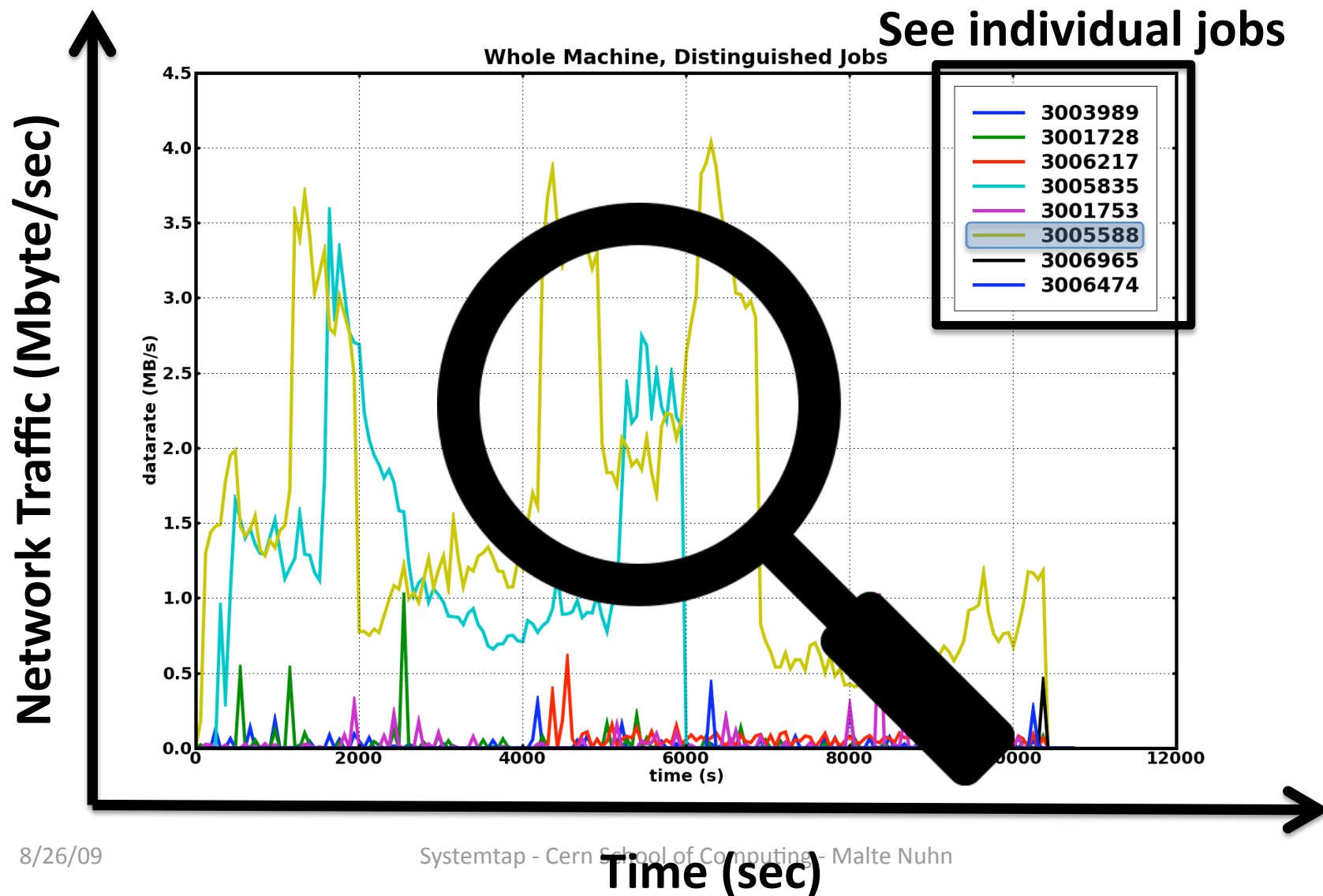
Network traffic per node:



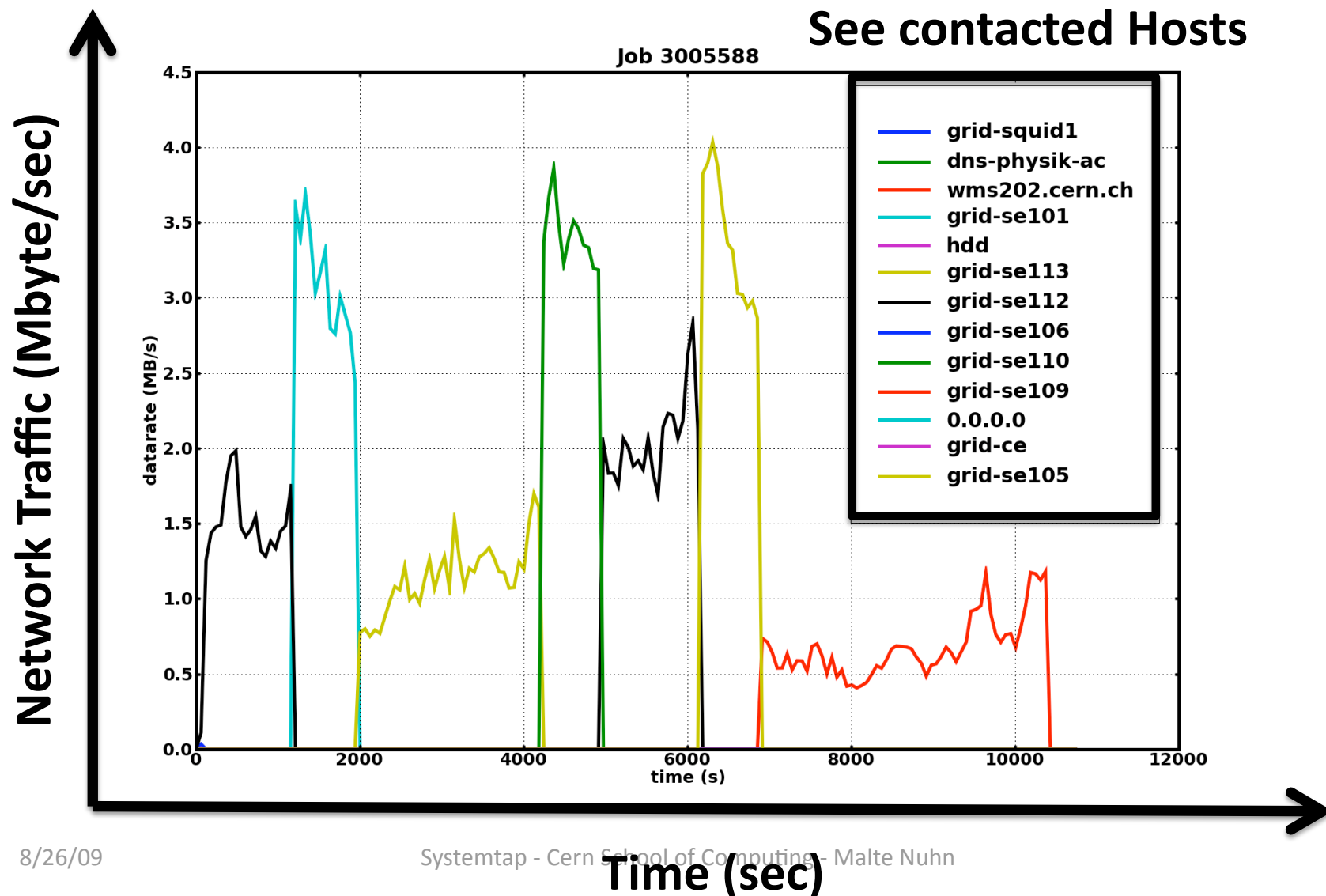
Network traffic per job:



Network traffic per job:



Detailed network traffic for one job:



Summary: Systemtap

- Makes kernel probing easy!
- Works out-of-the box on nearly all modern kernels
- A lot of awesome people and companies involved

... really exciting

Additional information

Systemtap:

- <http://sourceware.org/systemtap/>
- <http://www.redbooks.ibm.com/abstracts/redp4469.html>
- [#systemtap on irc.freenode.net](#)



Linux Kernel:

- <http://kernelnewbies.org/>

