

**The NA48 online
and offline PC farms**

Andreas Peters

– University of Mainz –

representing the NA48 collaboration

Parallel Session

Data Acquisition
and

Control Systems

ICHEP Padua 2000

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- " Introduction: the NA48 experiment
- " data acquisition system overview
- " event building and event worker model
- " PC slow control system
- " Level 3 realtime reconstruction filter
- " Level 3 filter reprocessing and steering
- " Summary and future projects

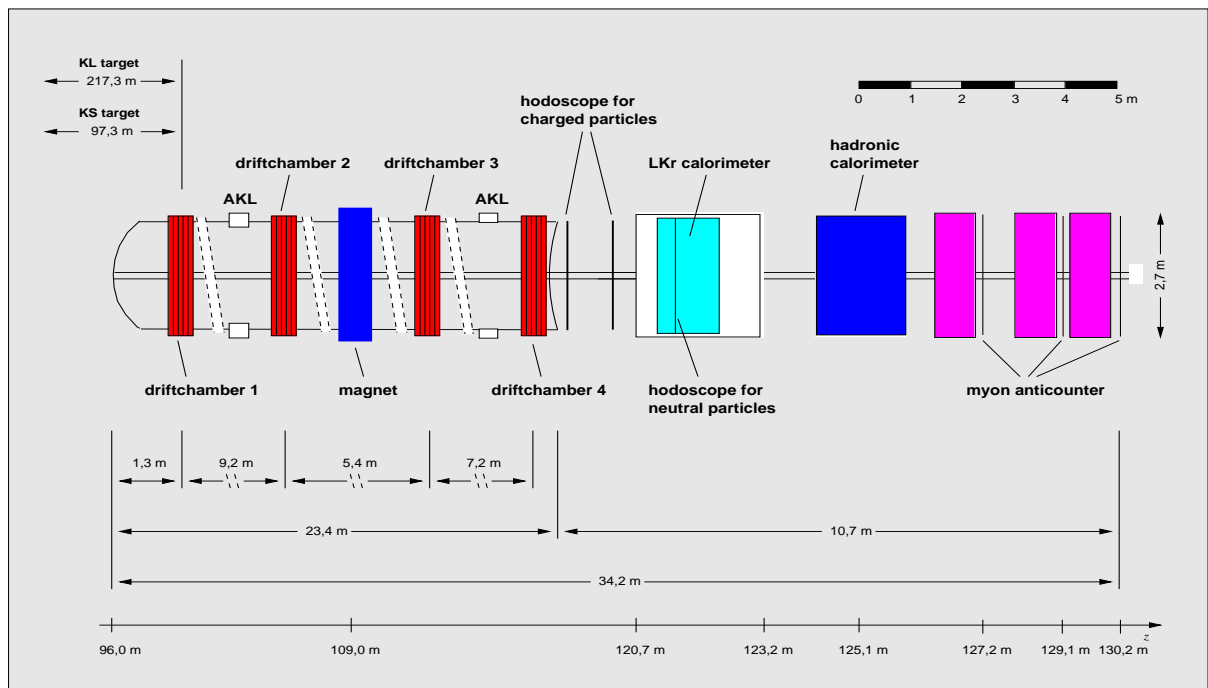
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NA48

measurement of direct CP
violation in the neutral kaon
system

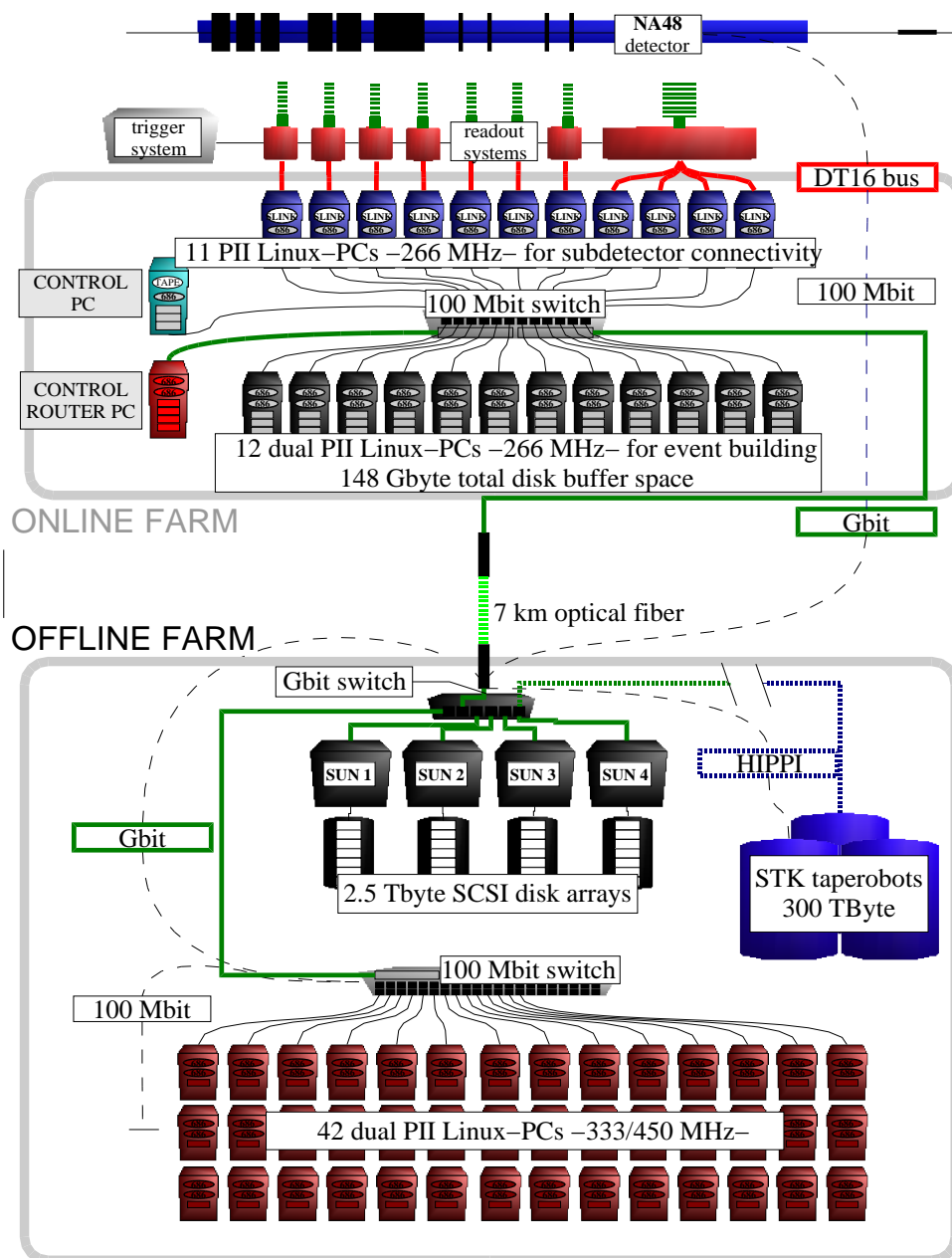
NA48 detector



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DAQ system overview



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DAQ system performance

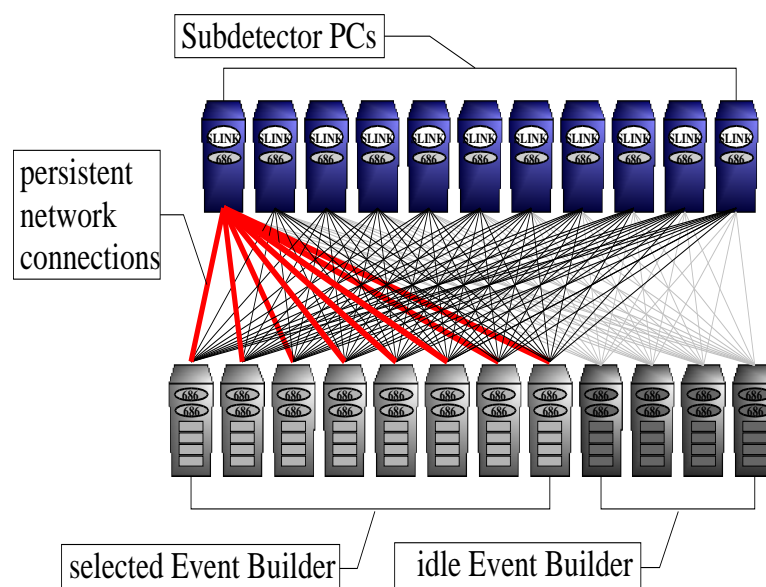
	1997	1998	1999
trigger rate [2.3 s]	6–7 kHz	6.5–7.5 kHz	7–8.25 kHz
Event Building	hardware	software	software
Event Building rate	15 Mb/s	25 Mb/s	30.5 Mb/s
Online–Offline Link	32 Mb/s	32 Mb/s	110 Mb/s
Level 3+CDR	15 Mb/s	15/18 Mb/s	20 Mb/s
nom. data rate	15 Mb/s	17.5 Mb/s	18.5 Mb/s
raw data volume	17.5 Tb	68.5 Tb	100 Tb
taped decays	1.15 bill.	4.5 bill.	6.95 bill.
DAQ efficiency	86.5 %	93.0 %	99.0 %

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NA48 event building and event worker model

- every **14.4 s**: **17k** events – 14kB/event
- **260 MByte/14.4s** transferred to **8** selected event building PCs via Fast Ethernet switched network



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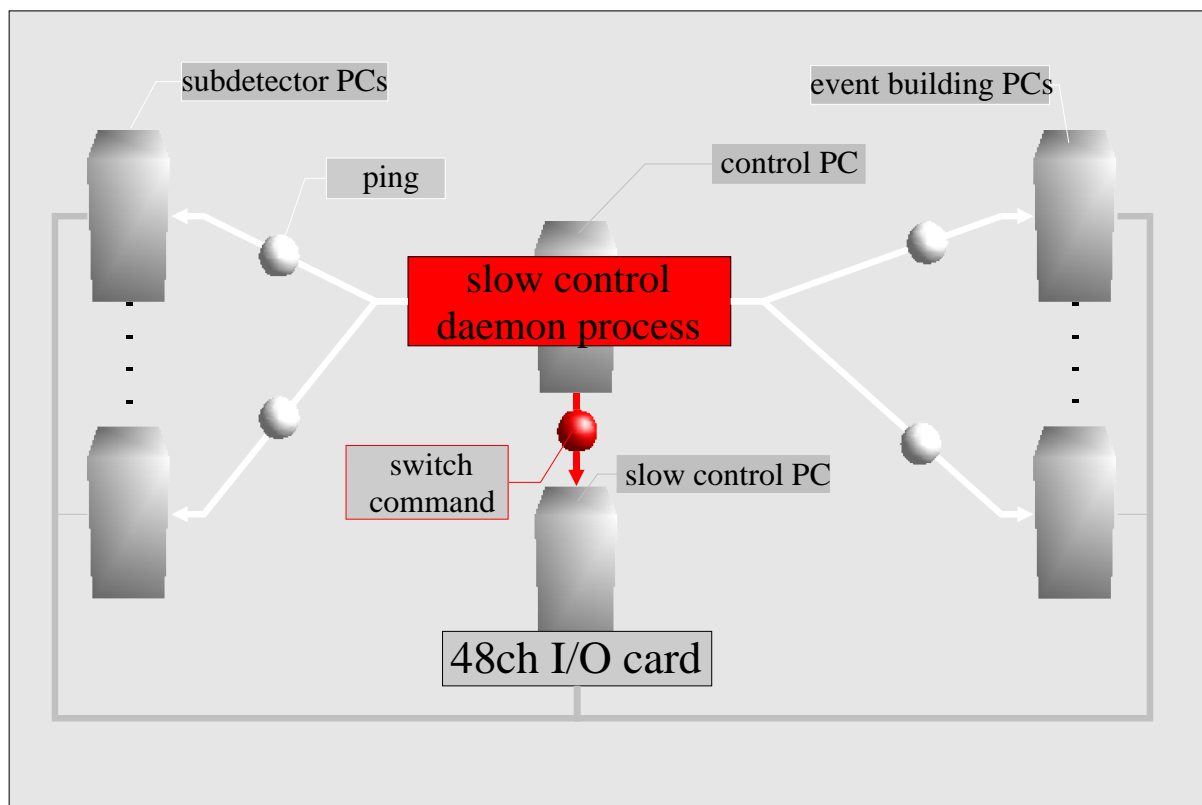
PC *slow control* system & *hot spare* mechanism

- subdetector and event building PCs supervised by **Control PC**
- automatic power–cycle in case of a detected PC crash – PC power and reset switched via 48 ch I/O card by a *slow control PC*
- event worker model treats four event building PCs as *hot spare PCs* – only 1/8 of one burst lost per event building PC crash
- subdetector PC reboot in < **120 s**

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PC slow control system



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Level 3 real-time Reconstruction Filter

- event decoding/reconstruction with best known calibrations: ~**50 ms/event**
- filter facilities in several output streams in raw and a physics data format

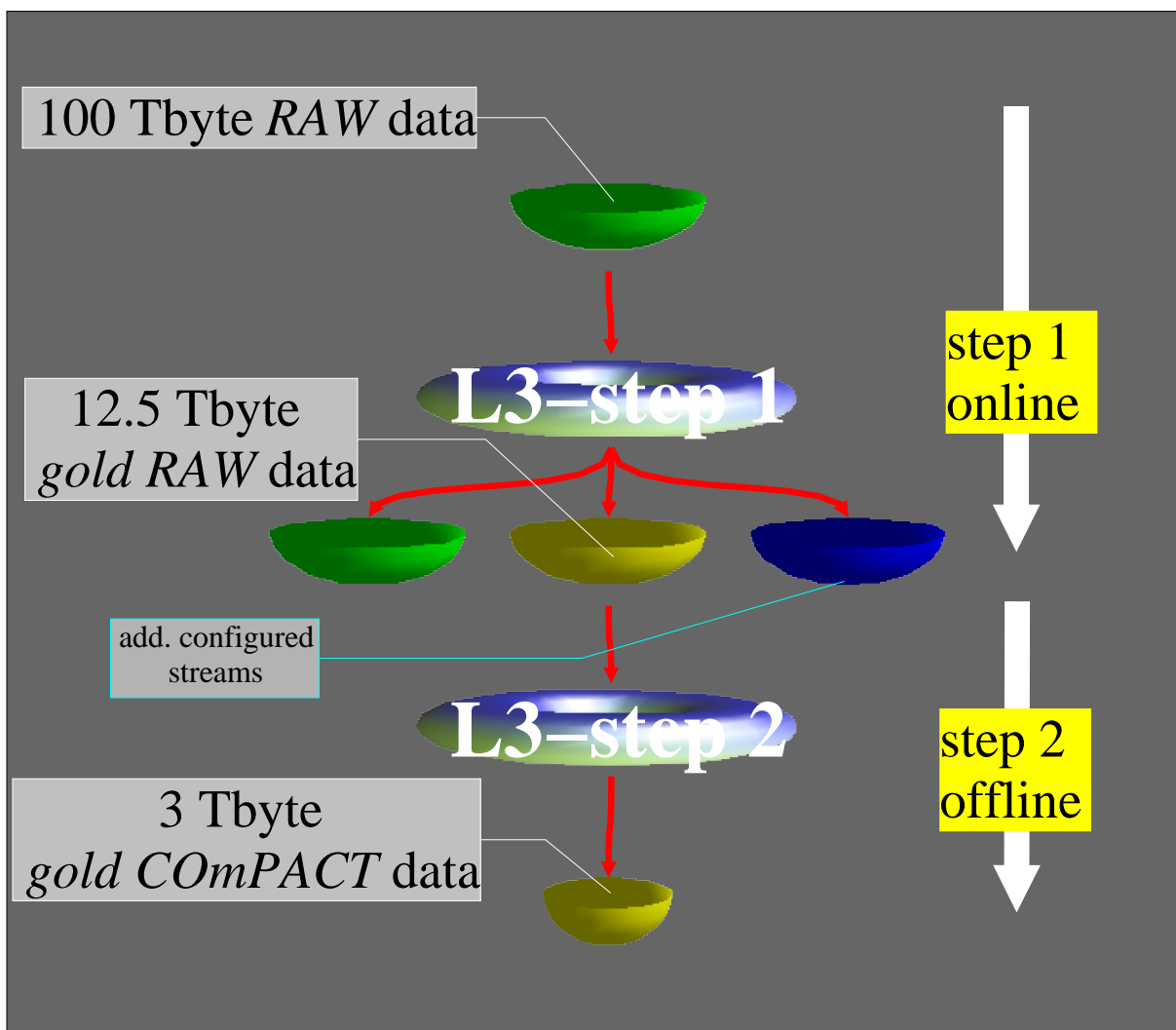
Offline PC farm for Level 3 filter

- **42** dual PentiumII PCs for Level 3 computing
- four **Sun** disk server machines with **3.5 TByte** SCSI disk arrays

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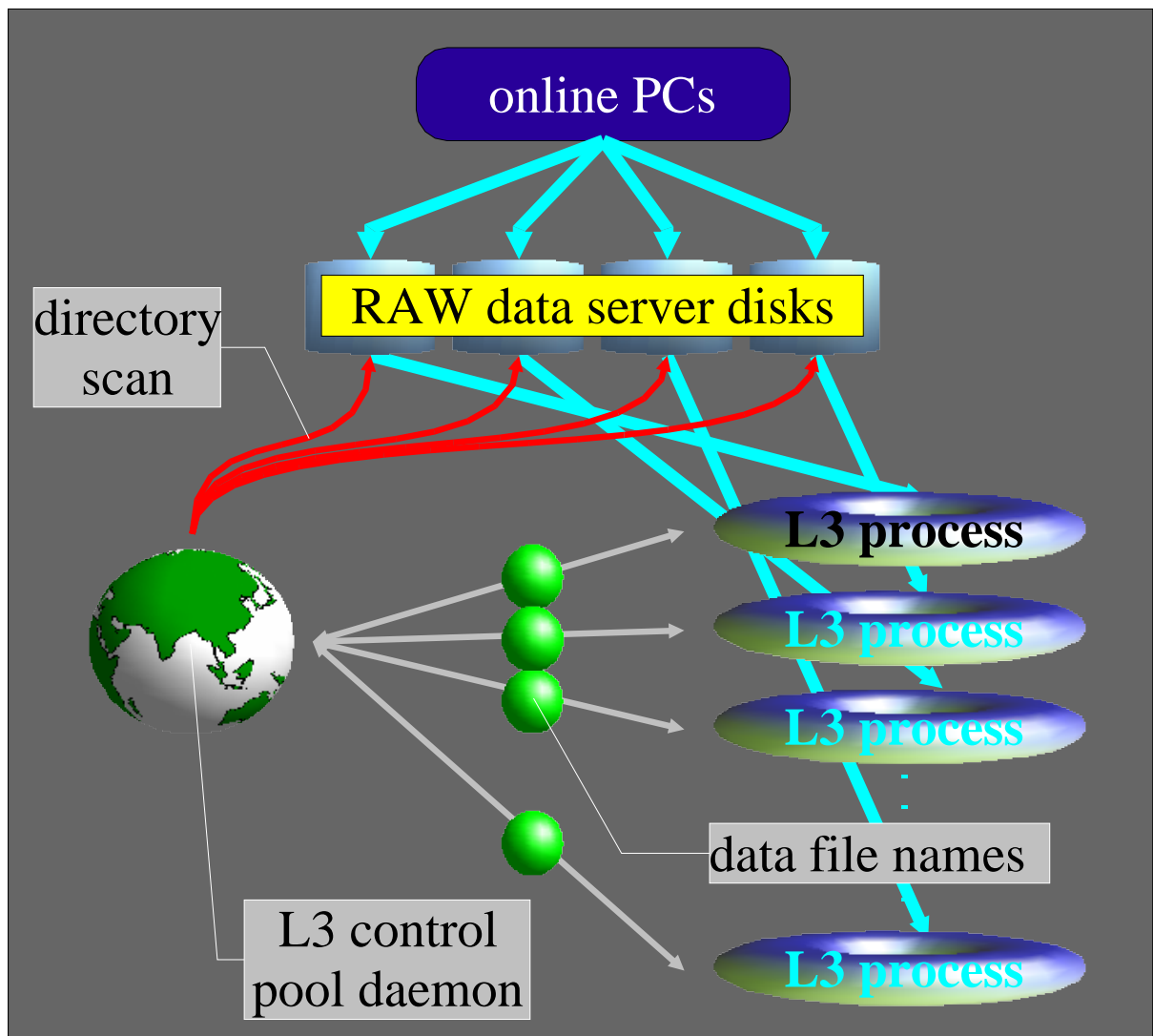
Level 3 'two step' filtering



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Level 3 steering



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Summary and future projects

- NA48 experiment was using **two** Linux **PC farms** in 1999 for online and offline operation
- with the online system **100 Tbyte RAW** data processed in 125 days with **99%** efficiency
- high online efficiency was reached with '**event worker model**' and automatic **PC slow control system**
- Level 3 'two step' processing filter used for data reduction from **100 Tbyte to 3 Tbyte!**
- planned upgrade to **double** the event rates for future rare decay programs