

# Tango Meeting

## DESY Status Report

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SOLEIL, 27. May 2010

# Online Computing at HASYLAB

## PETRA III

- 14 BLs (9 DESY, 3 EMBL, 2 GKSS)
- 6 GeV, 100 mA, 1 nrad, 2.3 km

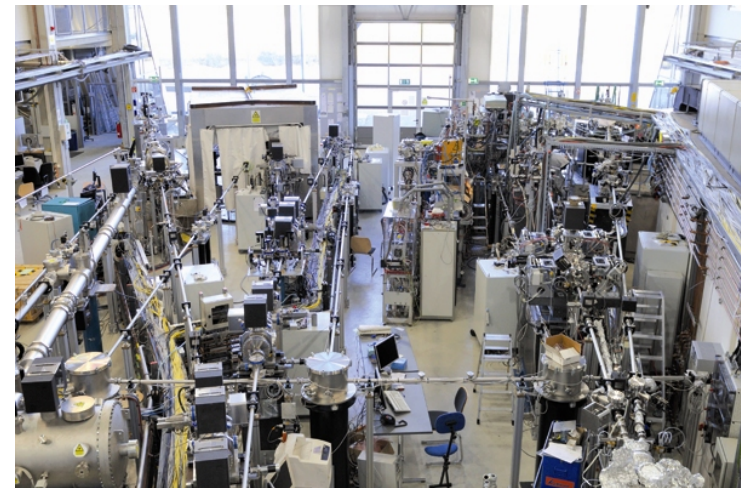


## DORIS

- 33 BLs (21 DESY, 6 EMBL, etc.)
- 4.5 GeV, 120 mA, 289 m



## FLASH: 5 BLs, 180 eV







# PETRA III

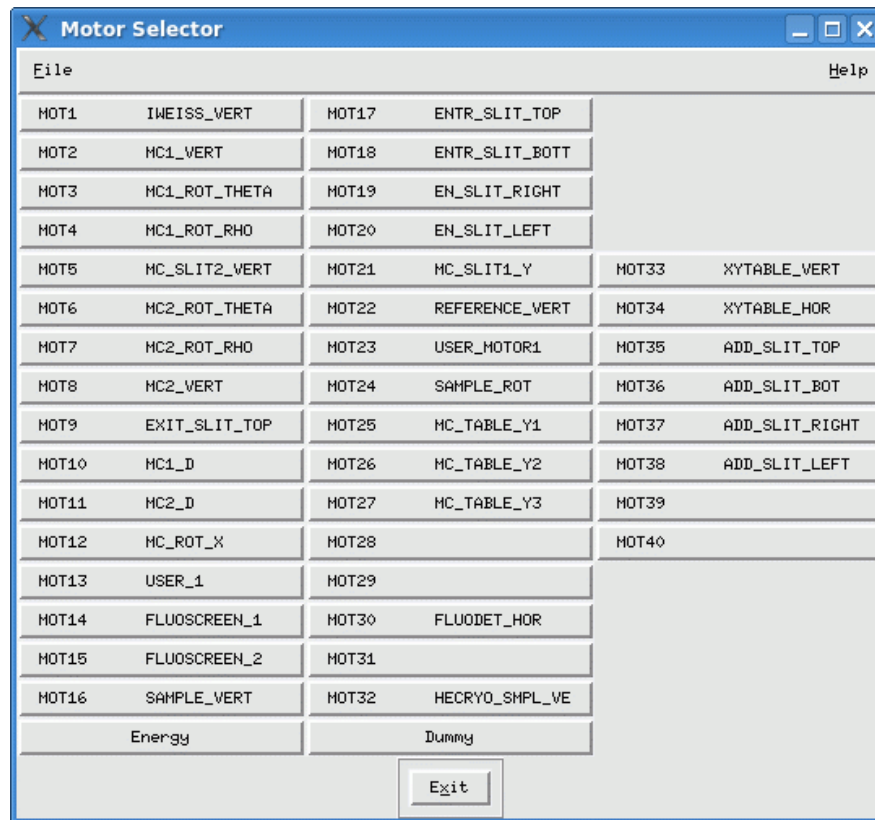


# PETRA III Beamline Status

- P03 Micro- and Nanofocus X-Ray Scattering
  - $\mu$ GISAXS,  $\mu$ SAXS tomography
  - commissioning
- P07 High Energy Material Science (GKSS)
  - 50 – 300 keV, sub-micrometer focus
  - commissioning
- P08 High Resolution Diffraction
  - crystalline, amorphous, liquid samples: nm -  $\mu$ m
  - commissioning/ user operation
- P09 Resonant Scattering and Diffraction
  - linear, circular polarized beams: 2.4 – 50 keV
  - investigation as function of temperature, magn. field, pressure
  - commissioning/user operation
- P10: Coherence Applications
  - Dynamics: musec – s, micro- and nanostructures
  - commissioning, friendly users



# Online Computing at DORIS: MotorSelector at A1



File		Help			
MOT1	IWEISS_VERT	MOT17	ENTR_SLIT_TOP		
MOT2	HC1_VERT	MOT18	ENTR_SLIT_BOTT		
MOT3	HC1_ROT_THETA	MOT19	EN_SLIT_RIGHT		
MOT4	HC1_ROT_RHO	MOT20	EN_SLIT_LEFT		
MOT5	HC_SLIT2_VERT	MOT21	HC_SLIT1_Y	MOT33	XYTABLE_VERT
MOT6	HC2_ROT_THETA	MOT22	REFERENCE_VERT	MOT34	XYTABLE_HOR
MOT7	HC2_ROT_RHO	MOT23	USER_MOTOR1	MOT35	ADD_SLIT_TOP
MOT8	HC2_VERT	MOT24	SAMPLE_ROT	MOT36	ADD_SLIT_BOT
MOT9	EXIT_SLIT_TOP	MOT25	HC_TABLE_Y1	MOT37	ADD_SLIT_RIGHT
MOT10	HC1_D	MOT26	HC_TABLE_Y2	MOT38	ADD_SLIT_LEFT
MOT11	HC2_D	MOT27	HC_TABLE_Y3	MOT39	
MOT12	HC_ROT_X	MOT28		MOT40	
MOT13	USER_1	MOT29			
MOT14	FLUOSCREEN_1	MOT30	FLUODET_HOR		
MOT15	FLUOSCREEN_2	MOT31			
MOT16	SAMPLE_VERT	MOT32	HECRYO_SHPL_VE		
	Energy		Dummy		
<input type="button" value="Exit"/>					



# Online Computing at PETRA III: MotorSelector at P10

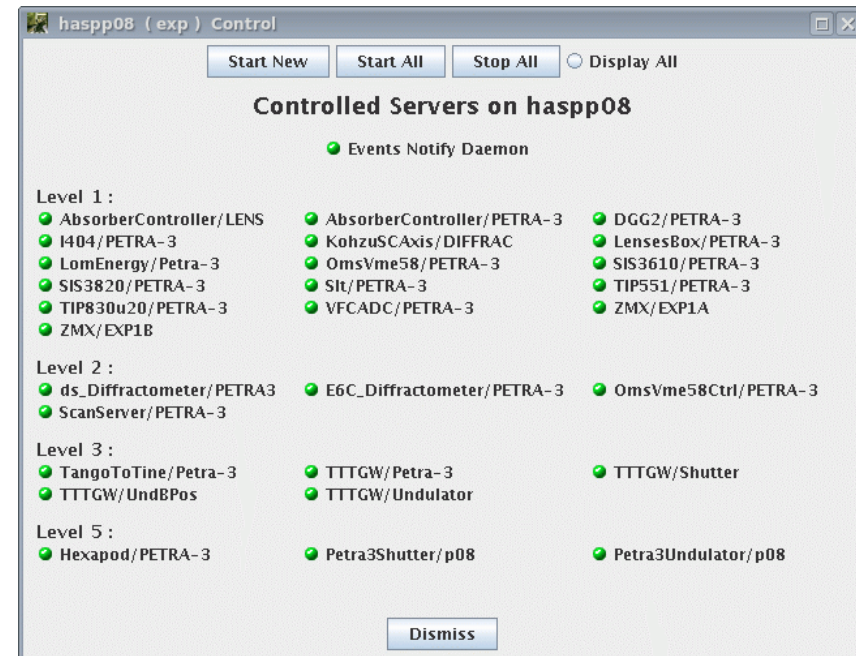
Motor Selector											
File											
E1_MOT01	BPH_Y	E1_MOT33	E1_MOT65	E2_MOT01	T2_Y1	E2_MOT33	SLIT_Y	E2_MOT65	T4_X1	G1BOTTOM	
E1_MOT02	BPH_Z	E1_MOT34	E1_MOT66	E2_MOT02	T2_Y2	E2_MOT34	SLIT_Z	E2_MOT66	T4_X2	G1CX	
E1_MOT03	BPH_MON	E1_MOT35	E1_MOT67	E2_MOT03	MON2_Y	E2_MOT35	MON3_Z	E2_MOT67	T4_Z1	G1CY	
E1_MOT04	SHUTTER_Z	E1_MOT36	E1_MOT68	E2_MOT04		E2_MOT36	TSAH_Y	E2_MOT68	T4_Z2	G1DX	
E1_MOT05	T1_Y1	E1_MOT37	E1_MOT69	E2_MOT05	T2_Z1	E2_MOT37	TSAH_Z	E2_MOT69	T4_Z3	G1DY	
E1_MOT06	T1_Y2	E1_MOT38	E1_MOT70	E2_MOT06	T2_Z2	E2_MOT38	SAH_TILT	E2_MOT70	DET_Y	G1LEFT	
E1_MOT07	ABS1	E1_MOT39	E1_MOT71	E2_MOT07		E2_MOT39	SAH_Y	E2_MOT71	SLT3_BOTTOM	G1RIGHT	
E1_MOT08	ABS2	E1_MOT40	E1_MOT72	E2_MOT08		E2_MOT40	SAH_X	E2_MOT72	SLT3_TOP	G1TOP	
E1_MOT09	T1_Z1	E1_MOT41	E1_MOT73	E2_MOT09	T2_Z3	E2_MOT41	SAH_Z	E2_MOT73	SLT3_RIGHT	OPT_MOT01	
E1_MOT10	T1_Z2	E1_MOT42	E1_MOT74	E2_MOT10		E2_MOT42	SAH_TH	E2_MOT74	SLT3_LEFT	OPT_MOT02	
E1_MOT11	MON1_Y	E1_MOT43	E1_MOT75	E2_MOT11		E2_MOT43	SAH_TTH	E2_MOT75		OPT_MOT03	
E1_MOT12		E1_MOT44	E1_MOT76	E2_MOT12		E2_MOT44	MON2_Z	E2_MOT76		OPT_MOT04	
E1_MOT13	T1_Z3	E1_MOT45	E1_MOT77	E2_MOT13		E2_MOT45		E2_MOT77		OPT_MOT05	
E1_MOT14		E1_MOT46	E1_MOT78	E2_MOT14		E2_MOT46		E2_MOT78		OPT_MOT06	
E1_MOT15	BDU_T_Y	E1_MOT47	E1_MOT79	E2_MOT15		E2_MOT47		E2_MOT79		OPT_MOT07	
E1_MOT16	BDU_T_Z	E1_MOT48	E1_MOT80	E2_MOT16		E2_MOT48		E2_MOT80		OPT_MOT08	
E1_MOT17	BDU_X	E1_MOT49	E1_MOT81	E2_MOT17	SLT1_BOTTOM	E2_MOT49	T3_Y1	E2_MOT81	DETY1	OPT_MOT09	
E1_MOT18	BDU_Y	E1_MOT50	E1_MOT82	E2_MOT18	SLT1_TOP	E2_MOT50	T3_Y2	E2_MOT82	DETX	OPT_MOT10	
E1_MOT19	BDU_K1RZ	E1_MOT51	E1_MOT83	E2_MOT19	SLT1_RIGHT	E2_MOT51	T3_Z1	E2_MOT83	DETY	OPT_MOT11	
E1_MOT20	BDU_K2RX	E1_MOT52	E1_MOT84	E2_MOT20	SLT1_LEFT	E2_MOT52	T3_Z2	E2_MOT84	DETRZ	OPT_MOT12	
E1_MOT21	BDU_K2RZ	E1_MOT53	E1_MOT85	E2_MOT21	SLT2_BOTTOM	E2_MOT53	T3_Z3	E2_MOT85	DETRX	OPT_MOT13	
E1_MOT22		E1_MOT54	E1_MOT86	E2_MOT22	SLT2_TOP	E2_MOT54		E2_MOT86	DETY2	OPT_MOT14	
E1_MOT23		E1_MOT55	E1_MOT87	E2_MOT23	SLT2_RIGHT	E2_MOT55		E2_MOT87		OPT_MOT15	
E1_MOT24		E1_MOT56	E1_MOT88	E2_MOT24	SLT2_LEFT	E2_MOT56		E2_MOT88		OPT_MOT16	
E1_MOT25		E1_MOT57	E1_MOT89	E2_MOT25	GSLIT_X	E2_MOT57		E2_MOT89		OPT_MOT17	XTAL2_ROLL
E1_MOT26		E1_MOT58	E1_MOT90	E2_MOT26	GSLIT_Y	E2_MOT58		E2_MOT90		OPT_MOT18	XTAL2_PITCH
E1_MOT27		E1_MOT59	E1_MOT91	E2_MOT27	GSLIT_Z	E2_MOT59		E2_MOT91		OPT_MOT19	HONOZ_R
E1_MOT28		E1_MOT60	E1_MOT92	E2_MOT28		E2_MOT60		E2_MOT92		OPT_MOT20	HONOZ_LU
E1_MOT29		E1_MOT61	E1_MOT93	E2_MOT29		E2_MOT61		E2_MOT93		OPT_MOT21	XTAL1_ROLL
E1_MOT30		E1_MOT62	E1_MOT94	E2_MOT30		E2_MOT62		E2_MOT94		OPT_MOT22	HONORZ
E1_MOT31		E1_MOT63	E1_MOT95	E2_MOT31		E2_MOT63		E2_MOT95		OPT_MOT23	HONOZ_LD
E1_MOT32		E1_MOT64	E1_MOT96	E2_MOT32		E2_MOT64		E2_MOT96		OPT_MOT24	HONOR
	Energy		Dummy								

Redesign the MotorSelector widget?



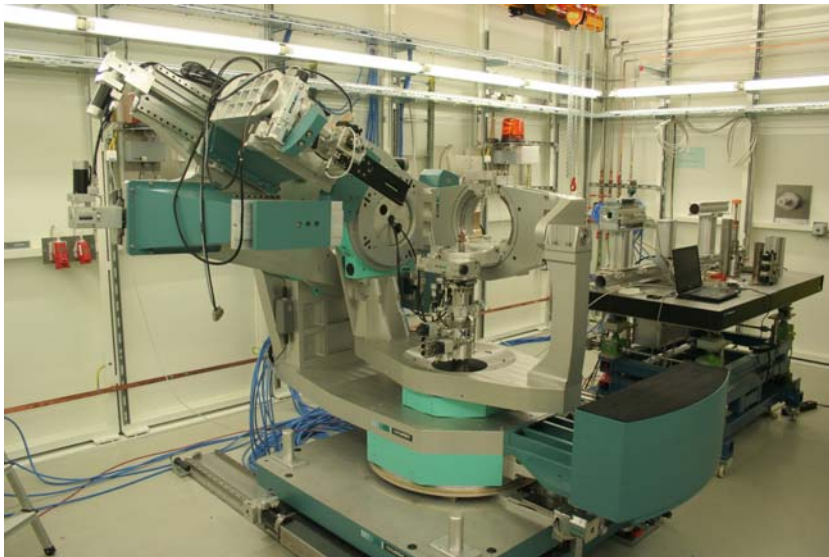
# Online Computing at PETRA III: Tango

- One DB/beamline
  - ~ 40 Classes (svn)
- Performance Spectra/PyTango
  - OmsMaxV: local 3.5/ 3.9 kHz, remote 0.96/ 0.86 kHz
  - Counter: local 6.7/ 4.5 kHz, remote 1.7/ 0.9 kHz
- Clients:
  - Spectra
  - Python scripts, user scripts, test scripts
  - jddd
  - jive, astor
  - diff. GUI (SOLEIL)
  - Spock, on test PCs



# Online Computing at PETRA III: Spectra

- Mapping of Tango device names to internal names: online.xml
  - Virtual counters, motors
  - Access Tango attributes/command via BLSC widgets
- Diffractometer server (SOLEIL) E4C, E6C
  - Used at P08, P09



Large Offset MC

File Options Help

Large Offset MC Idle

energylom: 8916.58 eV  Test

Crystal spacing: 1.637478

ConstantExit: 1250 mm

Motors

Lom1Pitch :	25.2858	Deg	<input type="text"/>
Lom1Lin :	-532	mm	<input type="text"/>
Lom1Lat :	73.0004	mm	<input type="text"/>
Lom2Pitch :	25.1243	Deg	<input type="text"/>
Lom2Lin :	528.297	mm	<input type="text"/>
Lom2Lat :	73.0004	mm	<input type="text"/>

Exec Stop Clear Refresh Exit

- Bugs

- Tango servers
- Newly installed hardware, base address selection
- Encoder operation, homing
- Request tracker installed

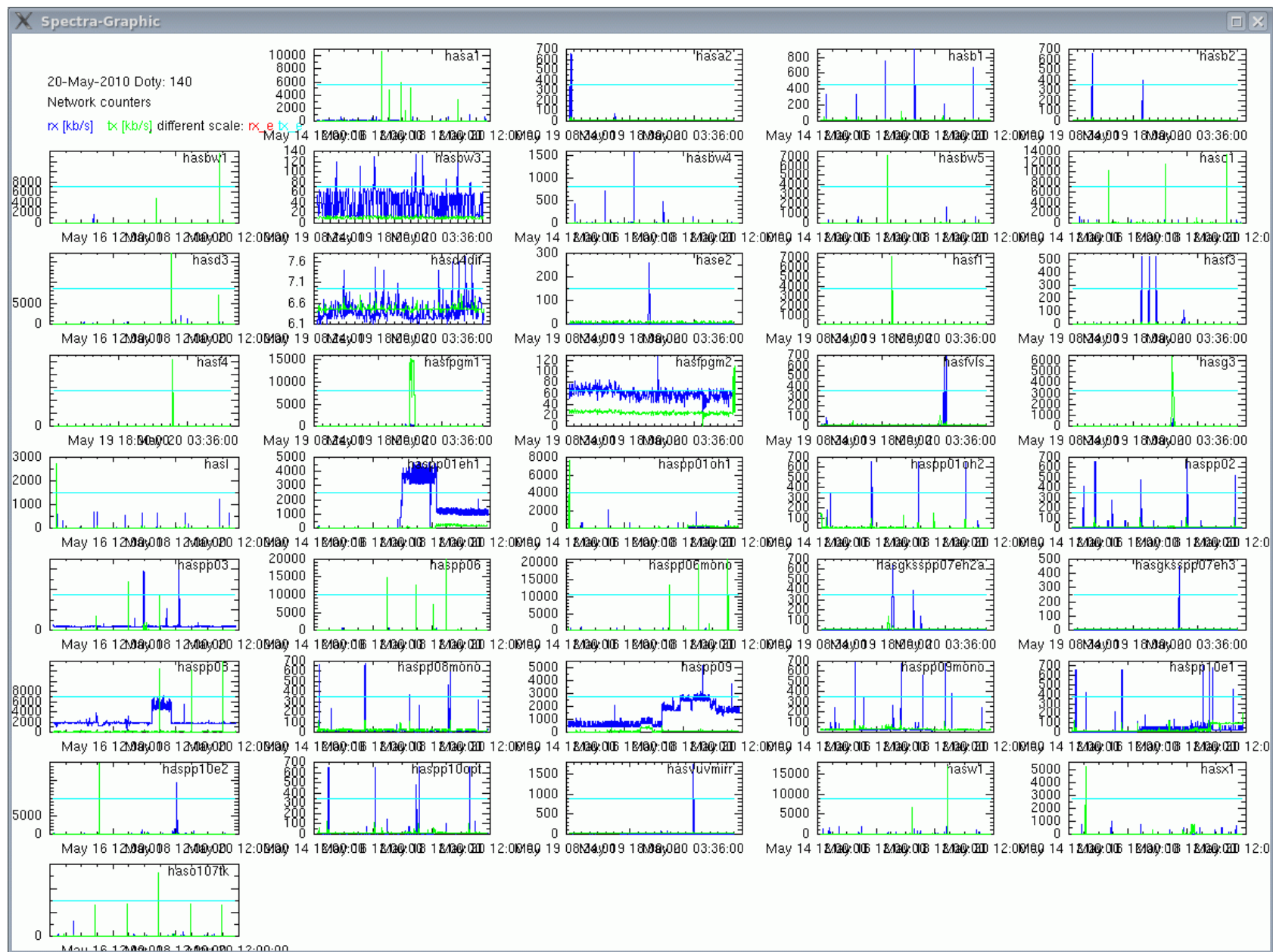
- PC crashes

- Frequency: after 2-3 days
- Type I: Linux & Windows PCs affected: network or power
- Type II: Spectra image exit





# Online Computing at PETRA III: Crashes





- Bugs

- Tango servers
- Newly installed hardware, base address selection
- Encoder operation, homing
- Request tracker installed

- PC crashes

- Frequency: after 2-3 days
- Type I: Linux & Windows PCs affected, network: 1 GE reduced to 100 Mb/s for 2 PCs
- Type II: Spectra image exit, caused by NI ENET GPIB (?)



# Computing at PETRA III: IT Infrastructure

- Demanding experiments
  - P03, Micro SAXS-WAXS
  - P06, Micro/Nano probe
  - P10, Coherent x-ray diffraction
  - P11, MX-diffraction, biological imaging
  - 10 GE lines
- Data storage and data processing
  - Disc space: 176 TB RAID 6 (140 TB 20% snapshot)
  - Long term storage: tapes
  - WGS: 16 blades, each 2x 2.26 GHz QuadCore, 24 GB



DESY Computer Center

# PNI High Data Rate Initiative (HDRI)

A collaborative effort of the PNI centers to cope with high data rates

## Challenges

- New detectors
- Online quality assurance
- Combine data from different facilities (also P-N)
- Portals to storage/compute servers
- Archives

HDRI: organize activities inside and outside PNI



# WP-1 Data Management



- Standard data format
  - Complete description of the experiment
  - MAHID, NeXus WSS
- Data access strategies
  - Web portals to data
  - Remote computing
  - Authentication, authorization
- Data lifetime policy
  - what kind of data should be kept
  - how long

# WP-2 Real-time Data Processing



- Data processing with dedicated hardware
  - FPGA, DSP, GPU
- Real-time data assessment with parallel computing
  - CPU cluster, GPU
  - Library: API for data streams and platforms, parallel primitives for images processing and numerical computation
- Analysis methods and applications
  - (Protein) Crystallography
  - Tomography
  - ...

- Architecture for simplified data analysis
  - Data treatment
  - Data visualization
  - Simulations
  - Modelling/analysis
  - Real space visualization
- Prototyping and scientific examples
  - GISSAS



# HDRI Coordination

- Steering committee
- Web site
- Workshops
- Collaboration with non-PNI partners
- Milestones



# Future Developments

- Server production
  - New detector implementation
- Standard data format
  - HDRI activity
- Data storage
  - Organization: directories, ownership
- Sardana/Spock
  - Need to reach a mature state before roll-out

