State of Storage

Vladimir Sapunenko

Report for CdG

31/01/2018

Recovery progress

- SAN - **3 switch FC damaged**
  - 1 Brocade 48000 (384 ports) – recovered (repaired power distribution board)
  - 2 Brocade 5300 (2x96 ports) – recovered (replaced power supplies units)
- Storage
  - 6 DDN S2A9900 (5.7 PB) – recovered (repaired 6 controllers, replaced ~30 disks, data preserved)
  - 1 DDN SFA 10000 (2.5 PB) – waiting for new storage to migrate data
  - 3 DDN SFA 12000 (11.7 PB) – waiting for spare parts
  - 2 DELL MD3860 (1.1 PB) – recovered (replaced 2 enclosures and 48 disks, data preserved)
  - 1 Huawei 6800 (3 PB) – waiting for spare parts
- Servers - **15 servers damaged**
  - 1 recovered
  - 8 to be replaced (waiting for delivery)
  - 6 replaced by dismissed ones
- Tape library – see ITM report on library recovery

Common storage and services

- Hosted by DotHill storage system – on-line
  - User's home
  - LSF shared storage
  - Experiment's software
- 2 VM clusters (12 Hypevisors) – on-line
  - StoRM servers
  - Various auxiliary
- TSM service storage (DB, Logs) – on-line
  - Migrated from VNX (actually at CNR site) to local server

New storage installation

- All HW installed after layout revision
  - The first layout required fiber IB cables (>3 m)
  - Delivery time for fiber cables ~30 days
  - 1 week to redo HW installation to place all IB components within 3 m
- All cabling (except 100 Gb Ethernet) to be completed tomorrow
- 100 Gb cabling – waiting for delivery

LHC experiments: ALICE

	Storage	metadata servers	IO servers	Remote Access	Storage Management	HSM
ALICE	DDN-10 DDN-11		ds-801 ds-802 ds-901 ds-902			
	MD-05 MD-06	Md-alice1 Md-alice2				
	DDN-01		ds-101 ds-102 ds-103 ds-104			Tsm-hsm-8 Tsm-hsm-9

LHC experiments: ATLAS

	Storage	metadata servers	IO servers	Remote Access	Storage Management	HSM
ATLAS	DDN-10 DDN-11		ds-803 ds-804 ds-805 ds-903 ds-904 ds-905	ds-808 ds-908	Storm-atlas Storm-fe-atlas	
	MD-05 MD-06	Md-atlas1 Md-atlas2				
	DDN-05 DDN-06		ds-111 ds-112 ds-407 ds-408			
	DDN-01		ds-105 ds-106			Tsm-hsm-6 Tsm-hsm-7

LHC experiments: CMS

	Storage	metadata servers	IO servers	Remote Access	Storage Management	HSM
CMS	DDN_09		ds-503	ds-117 ds-118 ds-219 ds-220	Storm-cms	Tsm-hsm-1 Tsm-hsm-2
			ds-504			
			ds-505			
			ds-506			
			ds-507			
			ds-508			
			ds-509			
			ds-510			
			ds-517			
			ds-518			
			ds-519			
			ds-520			
			ds-521			
			ds-522			
			ds-523			
			ds-524			
			ds-525			
			ds-526			
	MD-04		ds-604			
			ds-605			
			ds-606			
	MD-05 MD-06	Md-cms1 Md-cms2				

LHC experiments: LHCb

	Storage	metadata servers	IO servers	Remote Access	Storage Management	HSM
LHCb	MD-05 MD-06	Md-lhcb1 Md-lhcb2		ds-403 ds-404	Storm-lhcb	Tsm-hsm-4 Tsm-hsm-5
	DDN-08		ds-003			
			ds-004			
			ds-005			
			ds-201			
			ds-202			
			ds-211			
			ds-212			
			ds-221			
			ds-303			
			ds-304			
			ds-405			
			ds-406			
	DDN-02 DDN-04		ds-008			
			ds-009			
			ds-010			
			ds-011			

Non-LHC experiments

Argo
Belle2
Borexino
Cta
Cuore
Cupid
Dampe
Enubet
Famu
Geant4
Gear
Gerda
Glast
Juno
Km3
LHAASO
Lhcf
Limadou
Magic
Opera
Pamela
Panda
Theophys
Xenon

Archive

	Storage	metadata servers	IO servers	Remote Access	Storage Management	HSM
VIRGO DARKSIDE	MD-05	ds-401				
	MD-06	ds-402				
	MD-01		ds-701			
			ds-702			
			ds-703	ds-607		
	MD-02		ds-704	ds-707		
			ds-705			
			ds-706			
	MD-03		ds-601			
			ds-602			
			ds-603			
AUGER DATA	OCEANS1	ds-513			Storm-archive	
		ds-514				
			ds-811			Tsm-hsm-10
			ds-812			Tsm-hsm-11
			ds-813			
			ds-911			
			ds-912			
			ds-913			
KLOE			ds-814	ds-815		
			ds-914	ds-915		
CDF			ds-816			
			ds-916			
AMS	DDN-10		ds-806		Storm-ams	
	DDN-11		ds-807			
			ds-906			
			ds-907			

Latest updates

- Replacement of damaged parts for DDN systems will take place on 5-6 of February
  - The shipment awaits custom clearance in MPX
- Delivery of 8 servers is expected this week
  - The first delivery arrived last Monday but in wrong configuration
- There are some unexpected problems with start-up of Huawei storage after replacement of flooded JBODs
  - Replacement of JBODs was done on Friday last week
  - Startup sequence failed
    - Seems to be a HW configuration (or FW) problem on new JBODs
  - Huawei wants to recreate this conditions in their Lab.

Some remarks

- Repair of FC switches, servers and old DDN systems have been performed by Tier1 staff (very hard work)

- Failure rate of recovered flooded HDDs:
  - 0 failure on SAS disks (out of 48)
  - 30 failed SATA disks (out of 300)

- Error rate on flooded tapes is the same as on unused ones (from a sample of 20 tapes analyzed in the lab)