Fourth BelleII Italian Collaboration Meeting

A brain storming on BelleII Collaborative Tools

Roma 3: INFN – Department of Physics **December 21st, 2015**

Service providers topology @ KEK

- **KEK-CC:**
  - KEK Computing Center
  - **outsourced**

- **KEK-CRC:**
  - KEK Computing Research Center
  - KEK people

- **KEK-DMZ:**
  - Takanori Hara's **desktop(s)**
  - **non dedicated HW**

BelleII Services & Collaborative Tools: Use Case (1)

- **wide set of services/collaborative tools:**
  available, not needed to be @ KEK, needed but not available

  - **BelleII web site (external site)**: by KEK-DMZ, unprotected
  - **DIRAC:** HW @ KEK-CC, OS&SEC by KEK-CRC, service by Hideki Miyake and Takanori Hara
  - **AMGA** (catalogues): HW @ KEK-CC, OS&SEC by KEK-CRC, service by Hideki Miyake and Takanori Hara
  - **test database server**: HW @ KEK-CC, OS&SEC by KEK-CRC, service by Marko Bracko
  - **twiki** (internal site): HW&OS&SEC by KEK-CC, service by Thomas Kuhr and Manuel Heider
  - **BelleII SW svn:** HW&OS&SEC by KEK-CC, service by Thomas Kuhr
  - **code browser:** HW&OS&SEC by KEK-CC, service by Thomas Kuhr

BelleII Services & Collaborative Tools: Use Case (2)

- **wide set of services/collaborative tools:**
  available, not needed to be @ KEK, needed but not available

  - **ldap:** HW&OS&SEC by KEK-CC, service by Thomas Kuhr and Manuel Heider
  - **monitoring tools** (nagios & ganglia): HW&OS&SEC by KEK-CC, service by Thomas Kuhr
  - **readmine:** HW&OS&SEC by KEK-CC, service by Thomas Kuhr
  - **indico:** by KEK-CRC, all Collaborations
  - **buildbots:** HW by KEK-CC, OS&SEC by KEK-CRC, service by Takanori Hara
  - **invenio** (documentation): @ KEK-DMZ, service by Phillip Urquijo, helped by Wenjing Wu
  - **sympa** (MLM-SW): @ KEK-DMZ, service by Thomas Kuhr and Johhanes Grygier

BelleII Services & Collaborative Tools: Use Case (3)

- **wide set of services/collaborative tools:**
  available, not needed to be @ KEK, needed but not available
  - **BelleII documentation svn**
  - **CAD files repository**
- **services/collaborative hosted outside KEK:**
  - **CVMFS:** @ CERN, service by Thomas Kuhr
- **DR:**
  - **backup of SW svn, twiki, ldap, invenio, sympa:** @ Karlsruhe, service by Thomas Kuhr
  - backup of all the rest: missing

BelleII Collaborative Tools: now...

- **no High Availability (HA) compliance:**
  - one single point of access
  - most services on one single HWs (even Takanori Hara's **desktops**)
  - subject to periodic KEK network shutdowns
  - exposed to single point of attack scenario
- **no Disaster Recovery (DR) compliance:**
  - limited/no redundancy in storage
  - limited (and manual?) backup
  - local backup @ KEK only would be a single point of failure
- **limited supported services:**
  - no official CAD files repository
  - ...
- **limited storage: 1TB**
  - up to 10TB foreseen including CAD files and/or in the next years

BelleII Collaborative Tools: perspectives @ INFN

- **DR ≺ HA:**
  - DR compliance should come first
  - some R&D on HA may come later together with INFN-CNAF, HA not widespread within INFN
  - in a later future, further R&D on DR+HA
- **virtualisation & snapshot approach:**
  - virtuialisation is the key for delocalisation and DR
  - multi-hypervisor: standard APIs
  - contestualisation scripts allow quick instantiation of new VMs
  - snapshots allow for VMs runtime cloning and deployment in a "one master – multiple slaves" service providers scheme
- **smooth path:**
  - standard approach on virtualised MW: creating contestualisation suites
  - adding DR
  - adding HA

Cloud BESIII/BelleII Infrastructures @ INFN-TO

- **BESIII/BelleII infrastructure @ INFN-TO CdC:**
  - **mini-Tier2 GridOnCloud**, production infrastructure (BESIII: operative; BelleII: soon): part of the main INFN-TO infrastructure; 200 cores; 30TB net on shared storage
  - **CloudLab**, BESIII/BelleII testbed for R&D on monitoring and control tools: separate infrastructure; 100 cores; 10TB net storage on stand-alone NAS
  - **micro-CloudLab**, testbed for R&D on DR and HA compliant distributed hybrid cloud architectures, and WNs syncronisation on hybrid clouds: 20 cores; 15TB net (RAID 1+0) on stand-alone NAS

- **used funds:**
  - mini-Tier2 GridOnCloud: 100% CSN1 BESIII/INV 2013
  - CloudLab: 100% CSN1 BESIII/INV 2015
  - micro-CloudLab: 60% CSN1 BESIII/CON(met) 2015, 35% CSN1 BelleII/CON 2015, 5% CSN1 DG1/CON+INV

BelleII Collaborative Tools @ INFN: first steps

- **micro-CloudLab:**
  - 2 WNs, sharing private and public services separately (for security and load balancing)
  - two different (virtualised) nodes, accessing a 10TB prod-volume exported by local NAS
  - every **x** minutes, snapshot cloning is performed on local storage and saved on a separate 5TB bck-volume exported by local NAS
  - separate virtualised LANs for improved security
  - 2 WNs are instantiated on the same metal, syncronised from snapshots, for local quick HA in case of standard downs
  - every **y** minutes, snapshots in bck-volume dumped on CloudLab storage and to slave server providers: Desy, CNAF?; for short term local and distributed DR
  - every **z** hours/days prod-volume dumped locally, at Desy and at CNAF (tapes?) for long term local and distributed DR
  - R&D also on x, y and z

BelleII Collaborative Tools @ INFN: first steps

- **pros (and cons?):**
  - local redundancy of WNs for quick and dirty HA
  - local DR to deals with standard downs
  - periodic deployment of snapshots: distributed DR and quick and dirty HA
  - dealing with physical issues: in case of no PS or network failure, slave providers can manually come online in minutes
  - resilience against cyber attacks:
    - in case of DOS, slave providers can come manually online in minutes
    - in case of more serious attacks, bck-volume can contain months of VMs history

- **future R&D and developments:**
  - adding more elaborate distributed DR on hybrid clouds
  - adding autonomic distributed HA

BelleII Collaborative Tools @ INFN: finance

- **2016:**
  - metal to replace (BESIII) micro-CloudLab infrastructure: 5.5k€
  - storage on INFN-TO CdC cloud infrastructure JBOD: 5-6k€
  - dedicated UPS for metal&NAS: 1k€

- **2017-?:**
  - let's wait for the R&D!

BelleII Collaborative Tools @ INFN: manpower

- **INFN:**
  - provides (hopefully) more robust collaborative tools infrastructure
  - with increasing DR and HA compliance while R&D goes on
  - act as master service provider in cooperation with other slave service providers (in IT, DE, and USA?)
  - perform (interesting) R&D @ INFN-TO and CNAF

- **non-INFN BelleII Institutions:**
  - provide support for services maitenance as nowadays