

# **IT Department Infrastructure and General Services**

DTI Global-Watch Mission

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# IT Department Structure

## Infrastructure and General Services

- **Administrative Information Services (AIS)**
- **Communication Systems (CS)**
- **Databases (DB)**
- **Internet Services (IS)**
- **Product Support (PS)**
- **User and Document Services (UDS)**

## Physics Services

- **Architecture and Data Challenges (ADC)**
- **Controls (CO)**
- **EGEE project (EGE)**
- **Fabric Infrastructure and Operations (FIO)**
- **Grid Deployment (GD)**
- **Grid Middleware (GM)**
- **LHC computing Grid project (LCG)**

# Administrative Information Services

- Speakers: Martens, Mathieson, de Jonghe

## Mandate

- Provide CERN with a set of integrated and reliable Corporate Information Systems
- Ensure coherent, reliable, comprehensive and accurate management information across CERN
- Provide optimal support for all business processes at CERN

## ‘Differences’:

early move to Unix & RDBMS, early use of the web, in-house development of interface layer to corporate applications, early use of workflow, early adoption of Java, J2EE, coding practices

# Approach

- Best of Breed
  - Buy best solution for each business unit
  - Manage the integration & customisation
  - Provide transparent layer for end-users  
E.g. Financials, HR, Payroll, e-recruitment
- Be-spoke development
  - Where market availability doesn't meet CERN needs AND there is a strong business case:  
E.g. Collaborative project management, Workflow, Reporting, Earned Value Management, Contract Management

# Internet Services Group

- Speaker: Pace

## Mandate

- Provide core computing services in three specific areas
  - Windows Desktop Services  
(Desktops, Servers, Core applications)
  - Collaborative Services  
(Mail, Calendar, Mailing lists, Directories, Video Conferencing ...)
  - Web Services  
(Server infrastructure, Authoring Tools)

## 'Differences':

Scale of desktop user community, managed desktop environment?, openness of network to large number of external (on site) visitors, anti spam/ security, automation of web services

# IS - Windows Services

- **Provide a consistent desktop environment to CERN users**
  - Directories, file and home directories storage
  - Standardized desktop computing environment
  - A core set of application software
  - Technical support to all CERN users
- **Windows Server infrastructure**
  - ~ 130 servers
  - ~ 16 TB of disk space, 30 TB raw disks
  - Used also for Web and Mail services
- **Windows Desktop Management**
  - ~ 10000 User Accounts, 23000 Contacts, 1700 Groups
  - ~ 7800 Computer accounts in the domain
  - ~ 5500 Managed desktops (2000 and XP)
- **24x7 Service operation**

# IS - Collaborative Tools

- **Provide a consistent collaborative environment to the CERN users**
  - Including messaging, calendaring and videoconferencing
  - Consisting of both server and client-side services.
- **Electronic Mail**
  - Around 20 servers
  - 14,000 accounts
  - More than 1 million mails / week, 80 % spam
  - More than 3,000 mailing lists
- **Videoconferencing**
  - 7 VC rooms operational, 2 more in project
  - 1,300 registered videoconferences in 2002  
720 in first half 2003

# IS - Web services

- Provide a consistent web hosting and authoring environment to the CERN users
- Roughly 25 Servers:
  - ~ 5500 Sites
  - ~ 1.000.000 HTTP requests/day
- 24x7 Service operation
- Intranet Search Engine Service (Inktomi)





# Welcome to the CERN Web Services

## Search

Search this site:  
Enter keyword and click Search  
 Search

Detailed Search

Explore Web sites:  
Enter site name and click Search  
 Search

Detailed Search

## Services

**View And Change**  
[Explore Web Site Database](#)

**Creation**  
[Create Web Site](#)  
[Rename Web Site](#)  
[Create Alias to Web Site](#)  
[Register External Web Site](#)

**Deletion**  
[Delete Web Site](#)  
[Delete Web Site Alias](#)  
[Unregister External Web Site](#)

**Log Files**  
[View Log Data of Web Site](#)

**Administrative**  
[Internal Documents \(Administrators\)](#)  
[Web Server Status](#)

## Documentation

**Web-User Documentation**  
[Getting Started](#)  
[Web Browsing at CERN](#)  
[Searching CERN Intranet](#)  
[Glossary of WWW Terms](#)

**Web-Author Documentation**  
[Web Authoring Services Overview](#)  
[Web Authoring Tutorial](#)  
[Creating/Deleting a Web Site](#)  
[Editing a Web Site](#)  
[Web Site Naming Rules](#)  
[Addressing Recommendation](#)

**Supported Authoring Tools**  
[FrontPage](#)  
[Netscape Composer](#)  
[Dreamweaver](#)  
[Microsoft Office](#)

## Other Links

**General**  
[Operations](#)

**Related Services**  
[Anti Virus Information](#)  
[Mail Services](#)  
[Win Services](#)

**Assistance**  
[CERN Bookshop](#)  
[Training](#)

**Official Documentation**  
[ASP Help](#)  
[PERL Help](#)  
[CGI Help](#)  
[HTML 4 Specification](#)  
[HTTP Specification](#)  
[WWW Consortium](#)

**Photos**  
[NICE Servers WebCam](#)

# User and Document Services

- Speakers: Draper, Le Meur

## Mandate

- Production, management and diffusion of information in the form of documents, images and multimedia, CERN Document Server CDS and related tools including CDS Agenda. Printing services, specialised graphics printing
- Helpdesk
- PC and Macintosh: procurement /installation of desktop computers, installation of standard CERN software
- Audio-visual services to users of the main CERN meeting rooms. Digital video recording, archiving and webcasting of events
- Provide support to the CERN Scientific Information Service

## ‘Differences’:

Early development of preprint server and subsequently CDS, Indico

# CERN Document Server

CDS is a electronic document archival and retrieval system

- Started in 1994 as CERN Preprint server
- Now,
  - Packaged as GNU Public Library software (**CDSware**)
  - licensed to > 20 external institutes and companies
    - e.g. EPFL (Lausanne) and San Diego Supercomputing Center
  - Contains about 650k metadata records and 350k full texts
  - Each month: 12,000 unique visitors - 120,000 searches

# InDiCo

A system for Integrated Digital Conference management

- Funded by EU as part of FP6
  - Partners were CERN, SISSA & Udine (IT) and univ Amsterdam(NL)
- CERN's contribution will be a complete software package for the planning, management and archival of any type of conference
- Developed from CDS Agenda which is in use at CERN
  - More than 10,000 agenda created
  - More than 70,000 talks (including multimedia material) in the database
  - Year on year growth of about 200%
- Currently in prototype and will be used by CHEP'04 in September

# Computing Support to CERN Library

- Provide database & system administration for the integrated library system (ALEPH500)
- Customize system for introduction of new collections:
  - There are > 400 collections
- Develop automation programmes for CERN librarians:
  - automatically add preprints from the LANL archive into the CERN database
  - Extract authors (>2000 for LHC experiments) from preprints
  - Extract references and publishing information
  - Etc.

# Database Group - DB

- Speaker: Shiers

## Mandate

- Provide support for services, based on the Oracle Database and Application Server across the lab.
- Includes software installation and distribution, consultancy, first line support and database management as well as administration for all of the main databases at CERN.
- Also covers maintaining relations with the supplier and license / contract management.
- Specific areas include support for lab's Administrative Information Services (AIS), Physics community and Technical and Accelerator Sectors.

## 'Differences'

Data volume now GB/TB growing significantly, distributed deployment.  
Long term relationship with Oracle

# DB- Service Overview

- **AIS services:** infrastructure for the development and deployment of the core administrative applications of the lab, consisting of applications developed in-house as well as third party software (together with IT-AIS.)
- **Technical / Accelerator services:** Provide the infrastructure services required for the database applications in these sectors as well as the infrastructure on which CERN's Engineering Data Management Service (EDMS) is run (together with TS-CSE.)
- **Physics services:** Provide database and data management services, including the LCG File Catalog, as well as the Oracle Database and Application Server for physics / detector applications.
- **Persistence Framework Project:** includes both POOL (object persistency) and detector conditions DB (together with PH-SFT / experiments)

# DB - Oracle at CERN

- Originally chosen in LEP construction phase (1983)
- Services have expanded across laboratory:
  - Now used in all areas of the lab's work
    - Accelerator construction, operation, deconstruction (LEP), ...
    - AIS applications (CET, EDH, HRT, ...)
    - Physics related services: Detector construction, calibration, LCG File Catalog, Event Metadata ...
- And from Oracle Database to DB + Application Server + Grid Control
- Total number of services ~100
- Sun Cluster, "single instance" Suns, DiskServers running RHEL, ...
- Total non-physics data: few 100s of GB (400GB alone for AIS...)
- Total physics data (COMPASS): few TB
- Expect to move to Oracle 10g prior to LHC operation
  - Contains numerous features requested by CERN, but of general interest
- Databases will increase in volume to 10-100TB range



# Communication Systems - CS

- Speakers: Martin, Jouanigot

## Mandate

- Provide infrastructure and support operations for the following:
  - Internal Networking (CN)
  - Network Management and Operations (NSO)
  - External Networking (EN)
  - Telephony/GSM/Audio-Visual services (TEL)

## 'Differences'

External network capacity requirements, internal user network dimensions, technical network, grid requirements, cluster communications

# Communication Systems

- **Internal Networking**
  - 33'000 internal network connections
  - 15'000 systems connected
  - 220 star points 300 new network devices/year (routers, switches etc) – 2400 total
  - 1000 work orders (add/move/remove) per month
  - 1200 backbone access points
  - 70 wireless base station installations
- **Telephony**
  - 9000 fixed line phones, 15 VoIP concentrators, 4 PABX exchanges, 600 operator assisted calls/day
  - 2800 active GSM mobiles, 42 base stations
  - GSM and emergency phone installations for the LHC tunnel
  - 16 VHF installations for the firemen
  - 80 Intercom installations for access control
  - 150 phone installations for CERN lifts

# Main Connections to CERN

Mission Oriented &  
World Health Org.

General purpose  
A&R and commodity  
Internet connections  
(Europe/USA/World)

Swiss National  
Research Network



From ~25G (2003)

To ~40G (2004)

Network Research

# Moving towards LHC

- Create the Grid Communications Infrastructure needed.
- Understand the external networking requirements in more detail and work towards building and testing the infrastructure.
  - Involves working with T1's NREN's GEANT and others.
  - Probably need 70-100 Gb/sec aggregate wide-area bandwidth
- Build the high performance farm routing backbone
  - Will require state of the art routing technology to connect more than 8000 systems at 1Gb/sec

# Product Support

- Software Licence Office – assist in negotiations of CERN’s software licences
- Licence Service – fail-safe service for FlexLM and other industry licence tools hosting licences for a range of software such as compilers, development tools, LSF, CATIA, etc
- Installation and product support for a wide range of engineering software (Euclid, CATIA, Autocad, Cadence, and many more)
- Application support for electronics engineering tools such as Cadence and PSpice
- Installation and product support for a range of Software Development tools such as Framemaker, Rational Rose, etc

# Product Support

- Solaris Support
  - Support for the Solaris operating system
  - Support for the Solaris-based SUNDEV cluster
- CVS service
- Print Service
  - Support for the fail-safe central print servers
  - Support for the UNIX print client
- Desktop Support Contract management
- Local Organisation coordination of CHEP '04 conference

Questions/Comments?