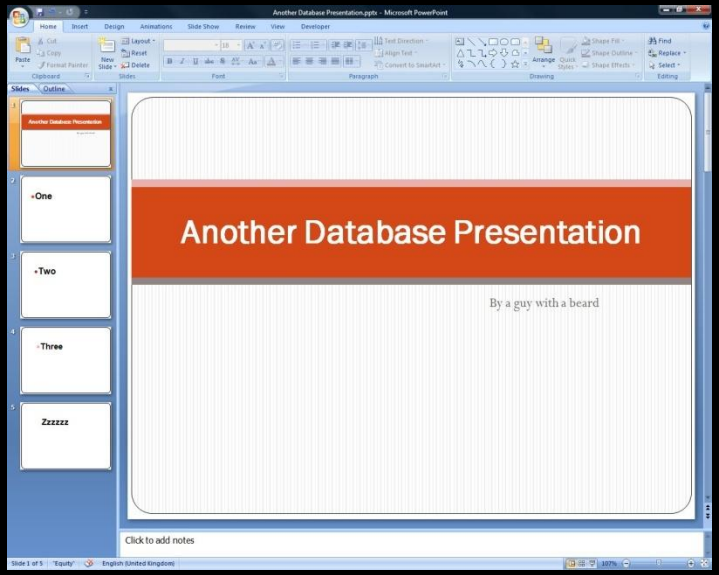
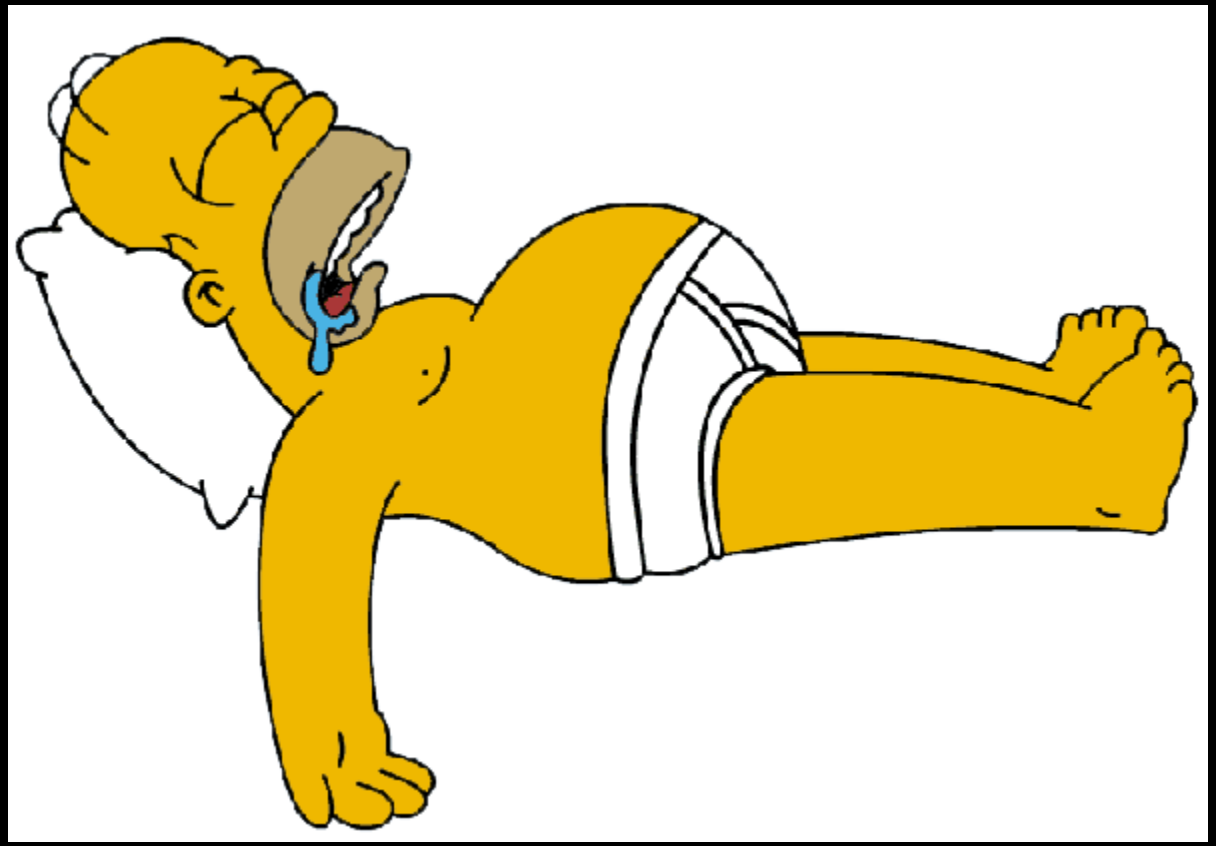
\+ 1 hour

\+


Another Database Presentation.pptx - Microsoft PowerPoint
Another Database Presentation
One
Two
Three
Zzzzzz
Another Database Presentation
By a guy with a beard
Click to add notes

=



something a bit different

no PowerPoint template

# no bullet points

(well, except for that one)

no Arial fonts

just a light hearted overview of the LSA database

Chris Roderick

@CERN for > 6 years

me without
the disguise


# AB-CO-DM
# (data management)

**Apology:**

gratuitous insertion of
a photo of section members
into a presentation

started working with the LSA team in March 2005

## Objective:

## Evolution and consolidation of existing LSA database design*

(* originally conceived by Mike

Several years

and

47 documented iterations later...

...responsible for the LSA
database design

modelling new requirements

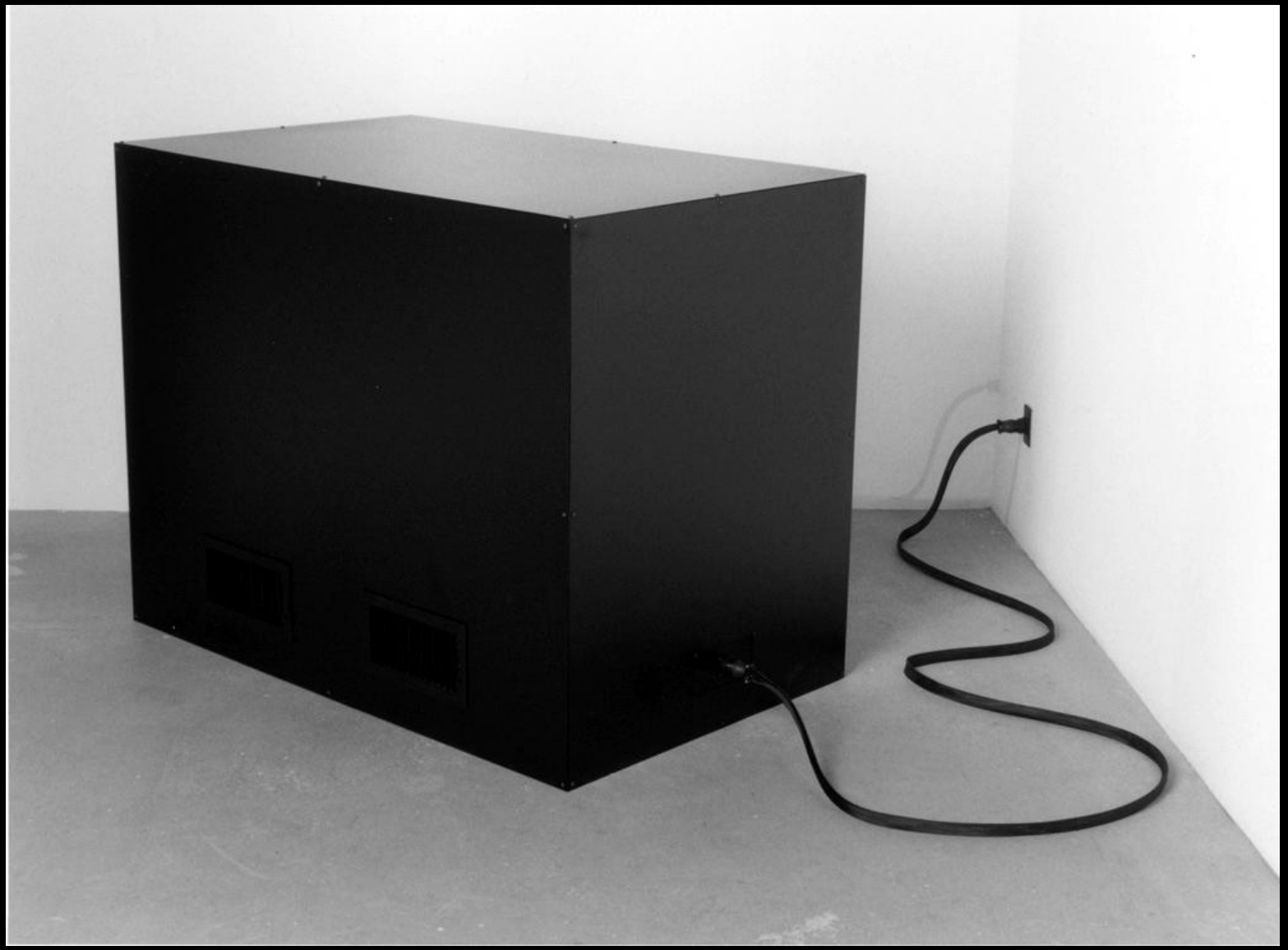
collaborating with java
developers to optimize data i/o

and providing integration
with external systems
and data providers

## Clarification:

**What is a database really?**

Not a data dump



Not a black box

## A database is for:

storing data about the objects in a domain in an organized and efficient manner

describing the relationships
between those objects

and enforcing the rules

that govern the relationships
between objects and their data

One of the most important assets
in any scientific
or business environment

Applications come and go,
but data lives on forever

T. Kyte

## LSA database:

necessary online

for accelerator operation

# database performance

ultimate database performance
comes from good design

but having top hardware goes a long way...

LSA database design

represents the accelerator domain

structured to give answers
to the most common questions*
as quickly as possible

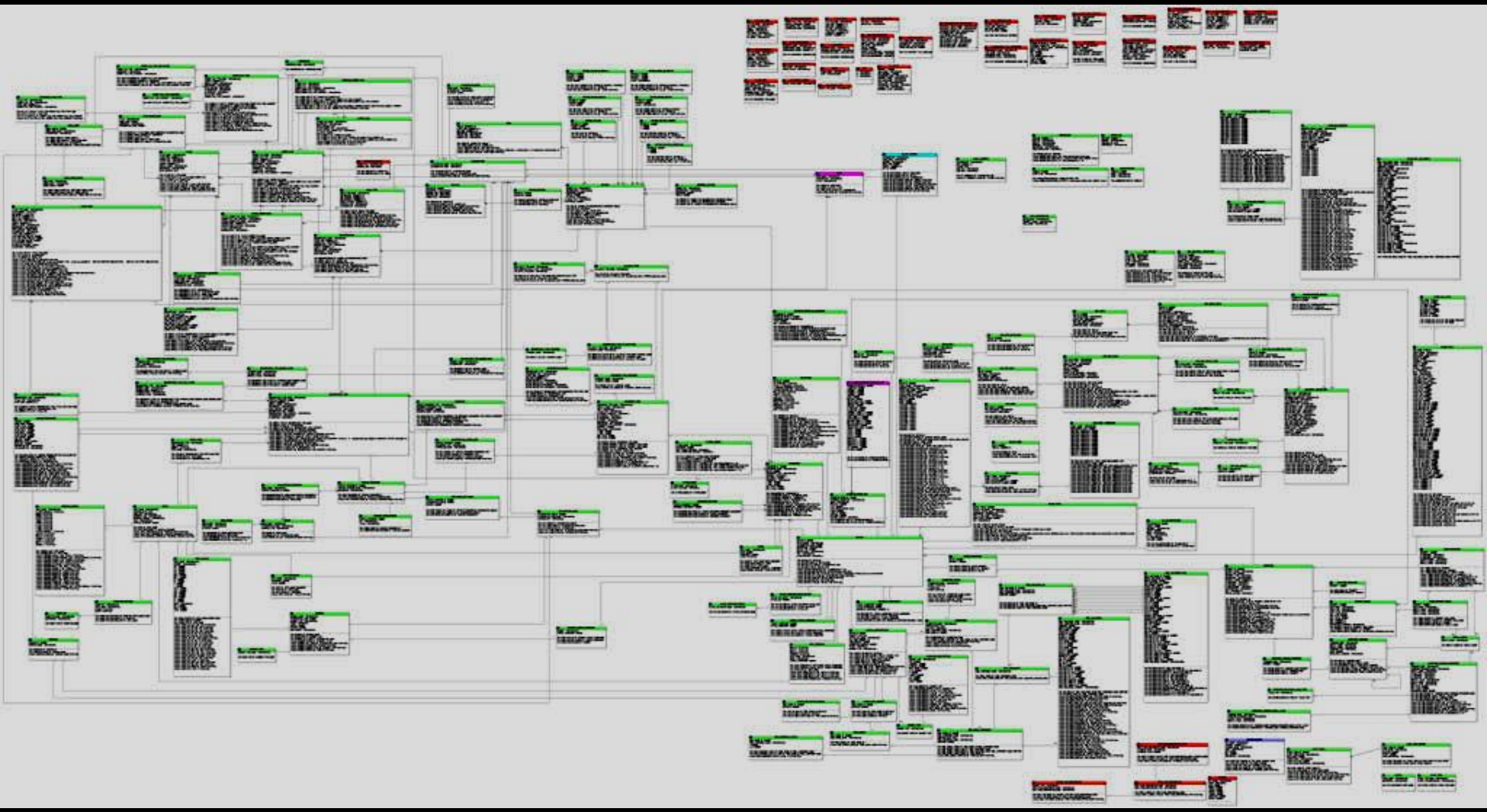
(* e.g. show me the history of settings for the parameters
of system X for beam process Y during the last 3 months)

close collaboration
between all involved parties:

application developers,
db developers,
domain experts*

(* operators and equipment specialists)

What does
the LSA database
look like?



# complicated data model

representing a complicated domain

162 tables

331 indexes

935 constraints

45 program units

4502 lines of code

huh, parlez vous anglais?

3,182,685 settings

current and historical (‘trims’)

spread over 1,512 beam processes
and 150 supercycles

for 7,930 parameters

belonging to 30,575 devices*

(28,144 physical Vs 2,431 logical)

(* not all devices have parameters defined)

located in 6 accelerators

(PSB, PS, AD, LEIR, LHC, SPS, & transfer lines)

configured for 20 particle transfers

MAD, twiss, optics,
make rules, generation

## equipment specifics:

(BLM, RF, collimators,
power converters etc.)

HWC specific functionality:

sequencer configuration,

and

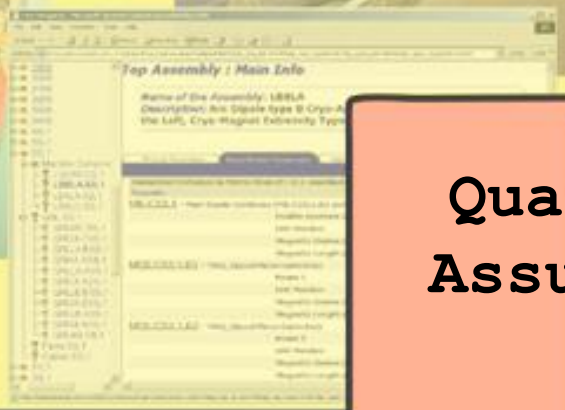
electrical circuit test definitions

LSA database

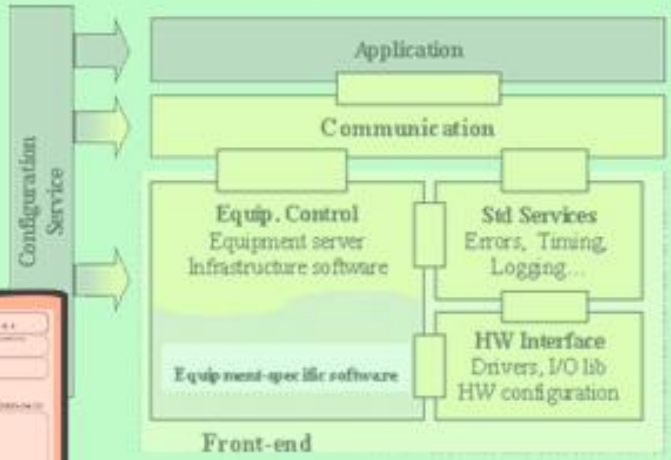
does not exist in isolation


# AB-CO-DM
# (data management)

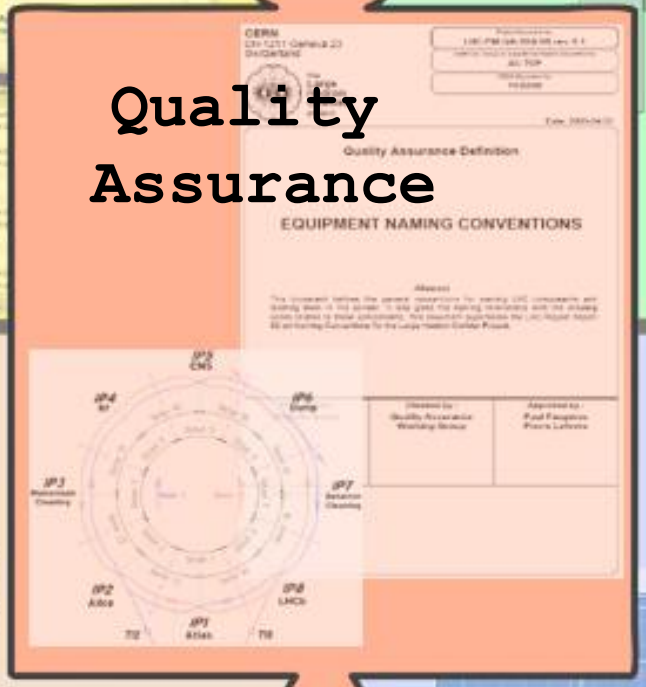
# LHC Layouts




# Controls Configuration



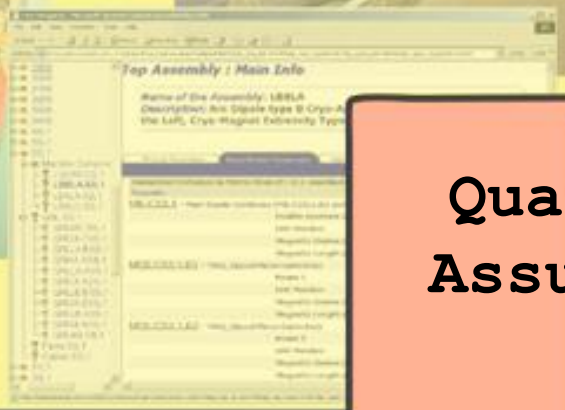

# Quality Assurance



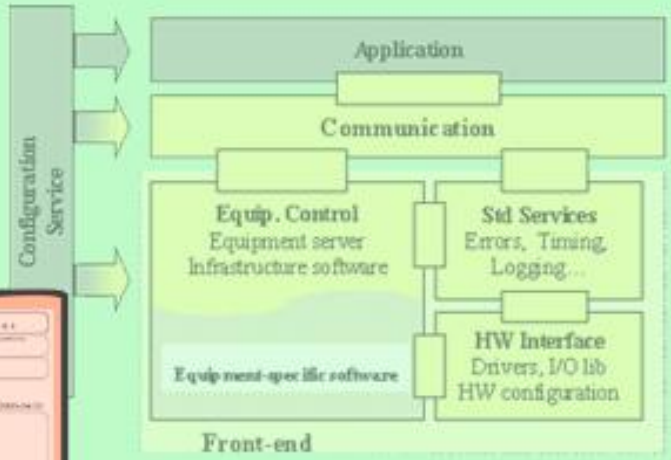

# Assets Management


# Operational Data

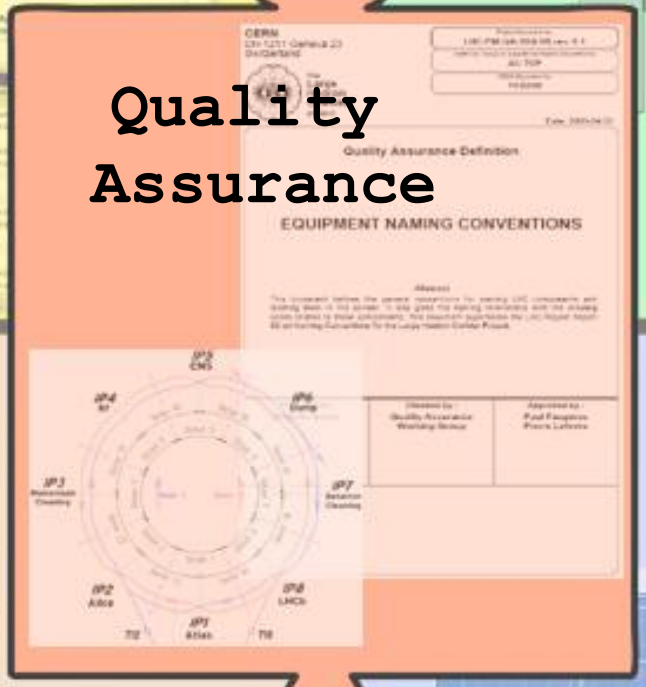

LHC Layouts




Controls Configuration




Quality Assurance




Assets Management


Operational Data


LSA goes here

automatic logging configuration

in Measurement database

for active HWC circuit tests

import of power converters, circuits, MAD sequences*

from the LHC Layout database

(* under development)

import of circuit test definitions
from the MTF database

import of FESA devices
and properties
from the
Controls Configuration database

custom data upload and modification mechanisms in place for data experts

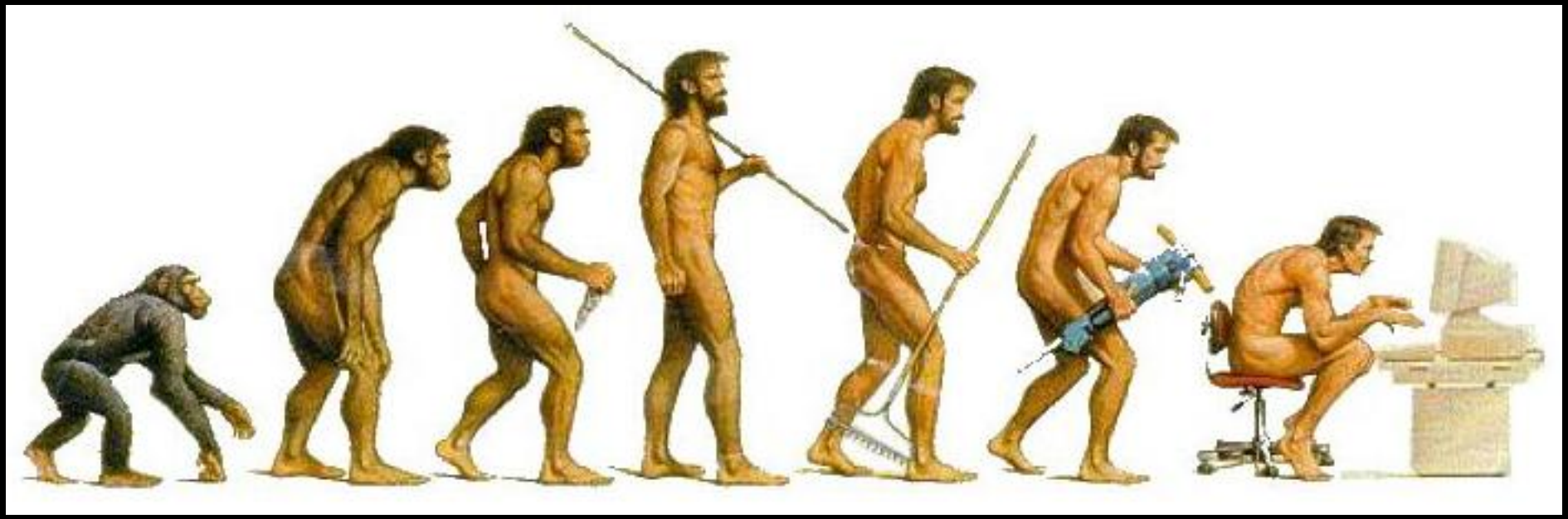
BLM, FIDEL, collimators

databases @CERN =

dev-test-pro environments

# What comes next?

continued database design evolution:

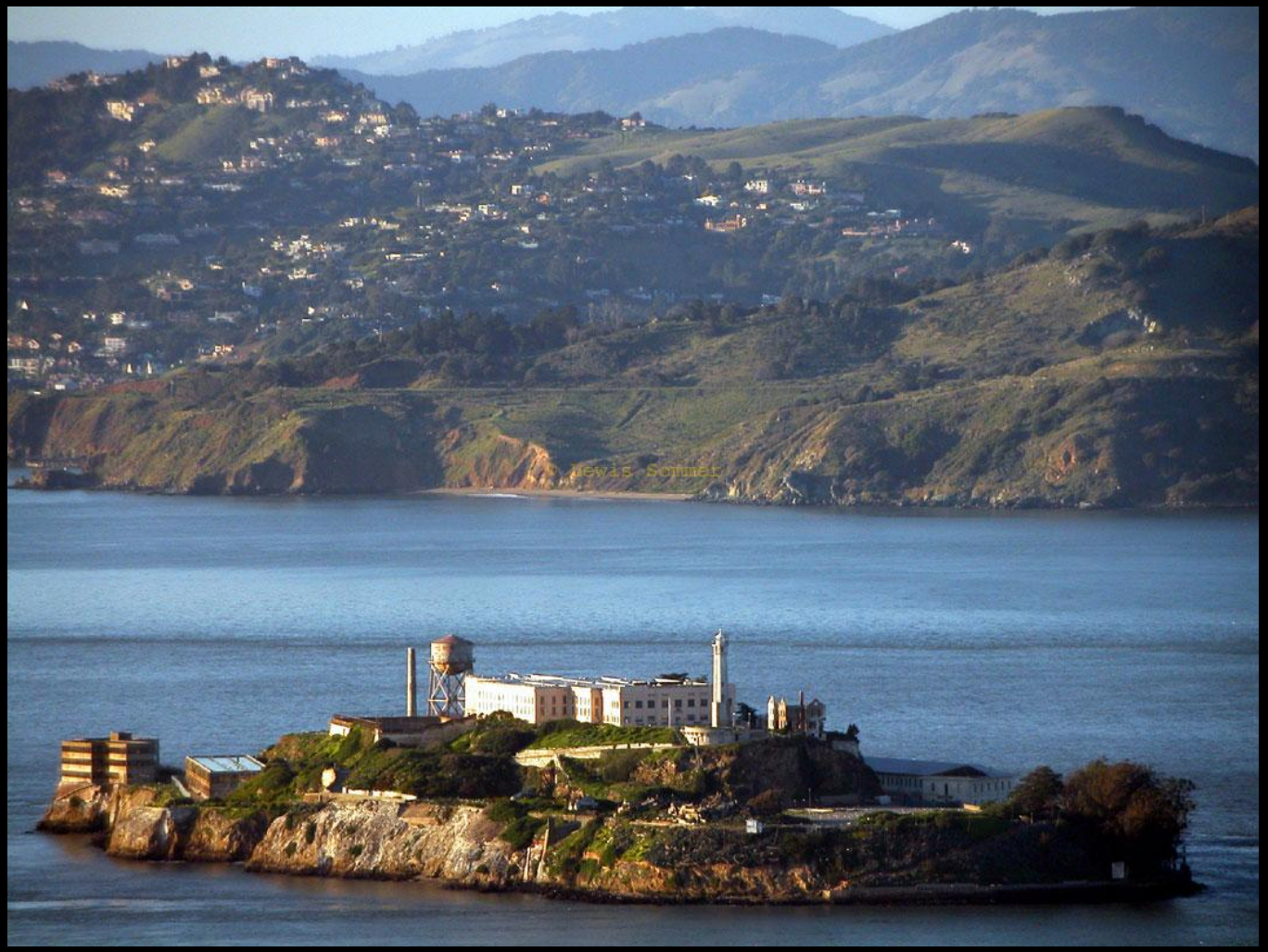


account for

additional LHC equipment specifics

# improve integration with FESA:

FESA versioning
& related settings management




improve security:

row level security
integrated with RBAC

database server access

restricted by IP address

no more direct
'pro' database account access

password to become...

scalability:

sharing server with
Measurement & Logging databases

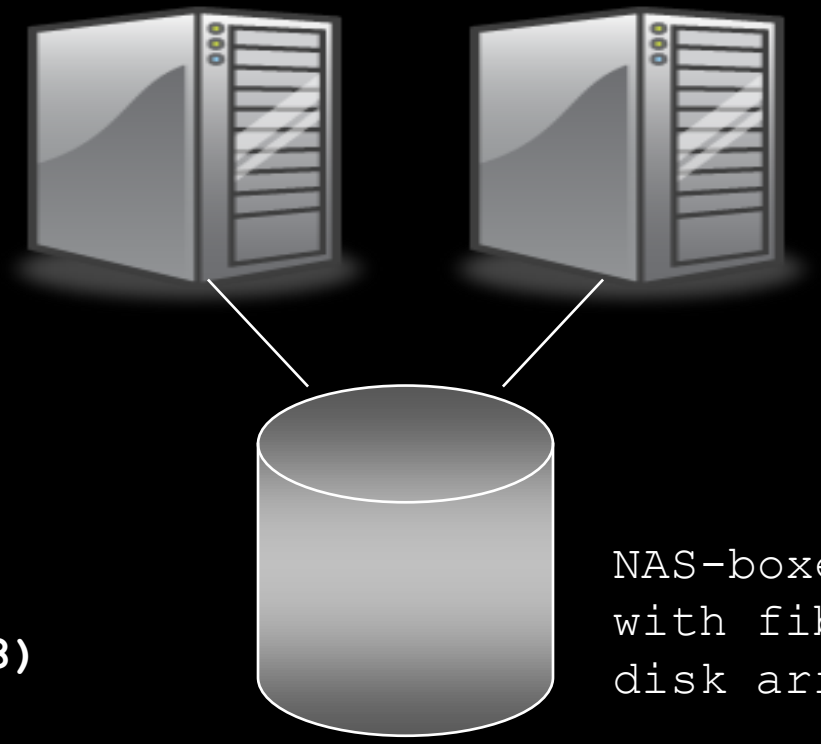

Logging
Measurements
LSA


**dedicated server for**

**LHC commissioning and operations**

# high availability server*
# with scalable architecture

2x quad-core
2.8GHz CPU
8GB RAM



NAS-boxes
with fiber channel
disk arrays (14x 146GB)

**(* due ~March 2008)**

in summary...


So far, so good...

...we are preparing
to move to the **next level**

Congratulations!

you have just survived 79 slides