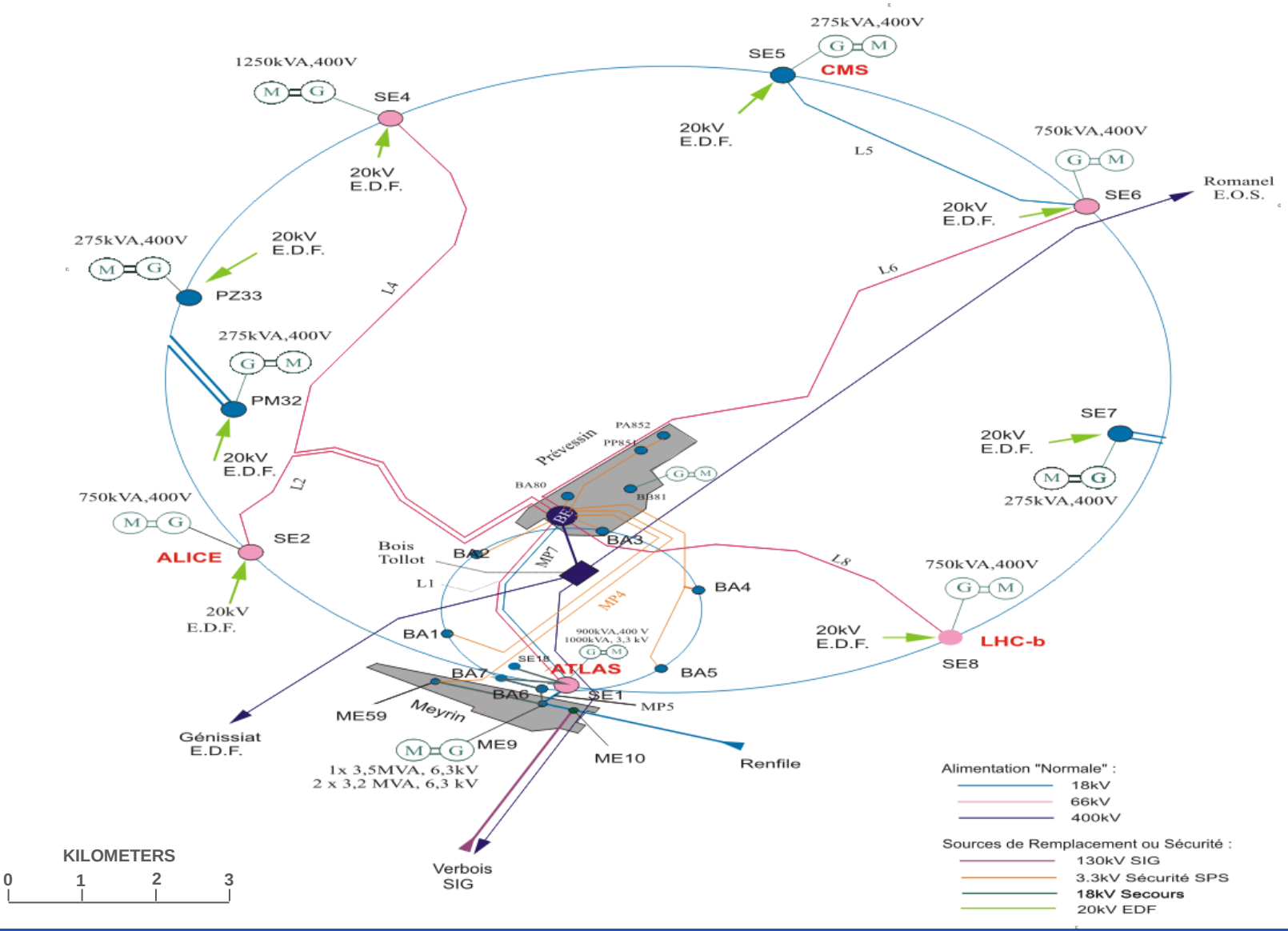
A New Supervision System for the CERN Electrical Network

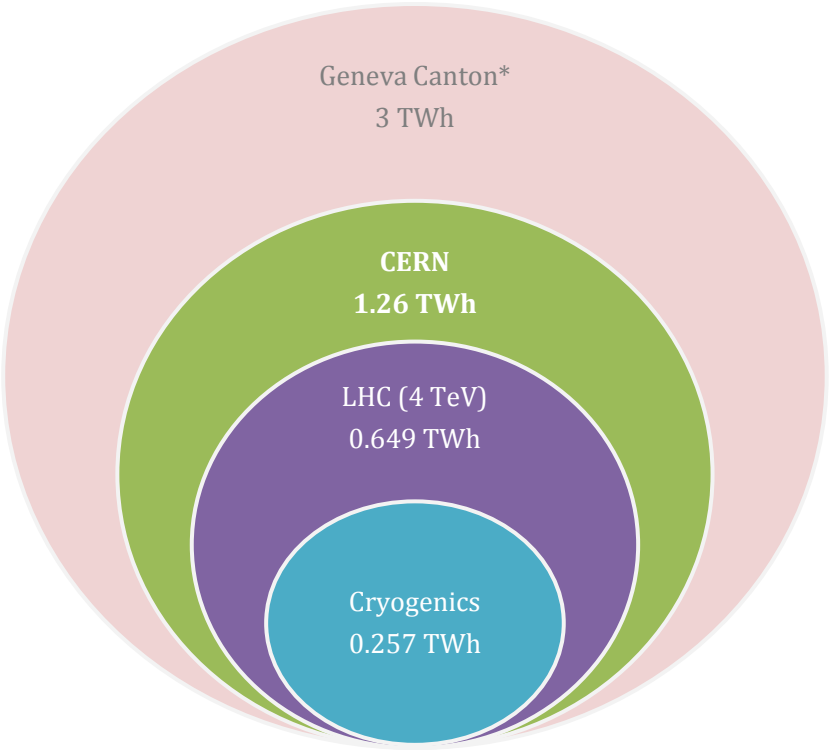
Jean-Charles Tournier, Manuel Gonzalez-Berges,
Piotr Kozlowski, Fernando Varela Rodriguez,
Sonia Infante, Anargyros Kiourkos, Georges Burdet

ICALECPS 2013
Session Integrating Complex or Diverse Systems
Paper MOCOBAB01

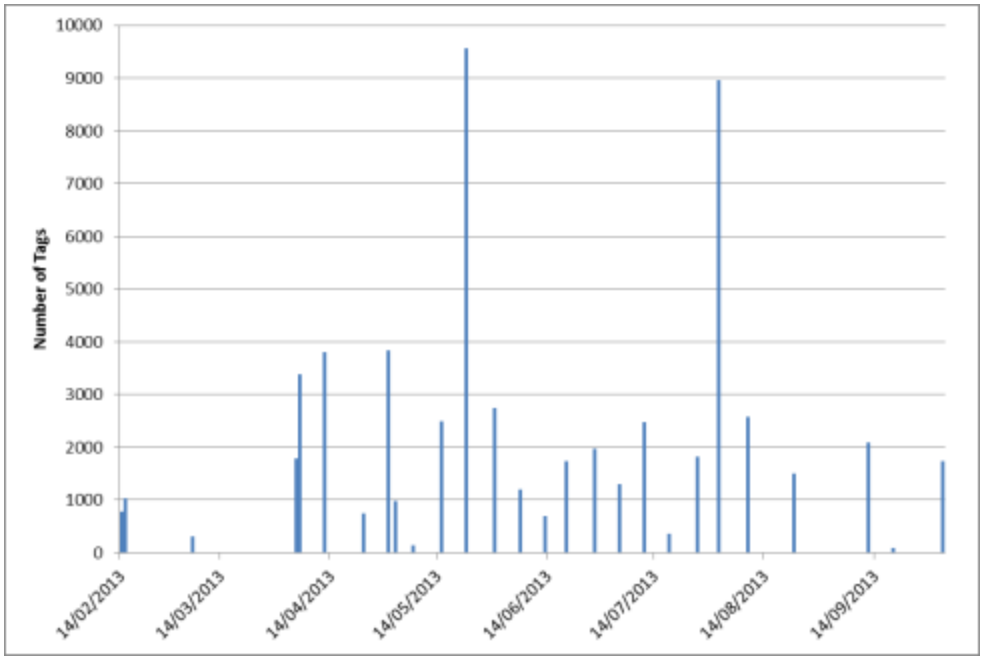
The CERN Electrical Network



A Large and Constantly Evolving Network…



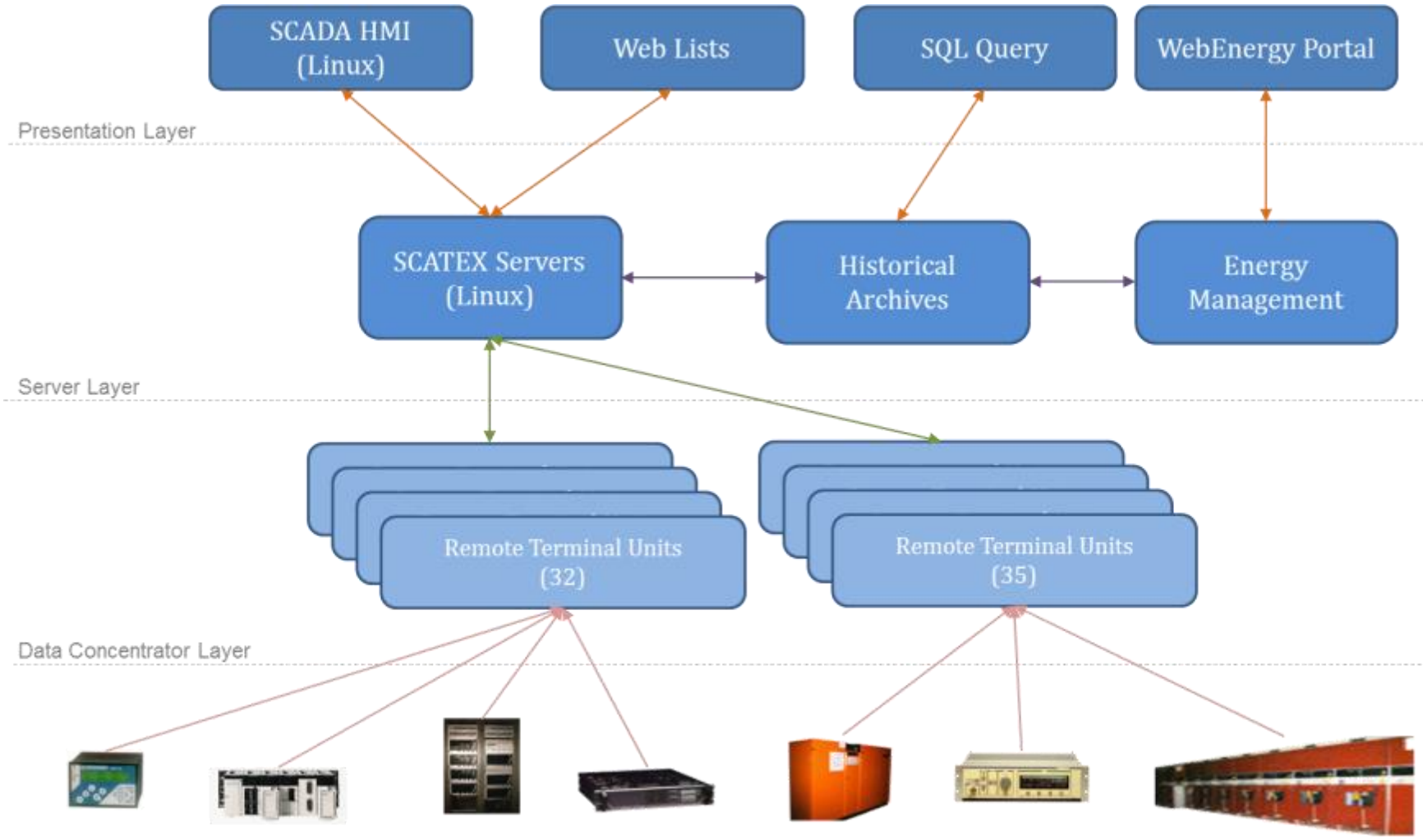
2012 Yearly Consumption



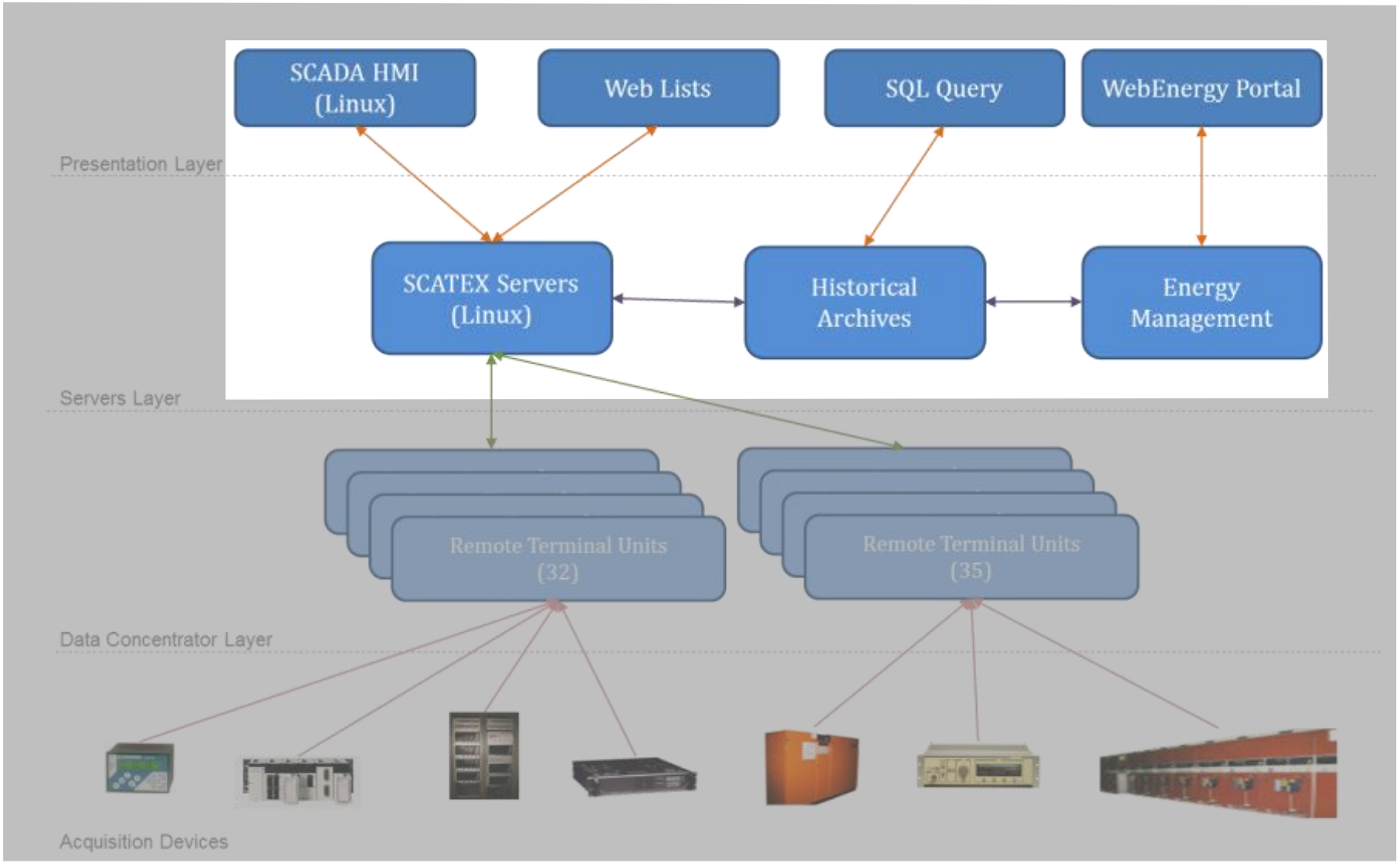
Number of tags inserted/deleted/modified per week to the supervision system

** EDF (http://energie.edf.com/nucleaire/carte-des-centrales-nucleaires/publications-45870.html)*
** Geneva Canton has c.a. 500,000 inhabitants*

Current Supervision System



Project's Scope



Requirements for the New Supervision System

Engineering

- Migration from SCATEX
  - *Data*
  - *Settings*
  - *SLD*
- Common Eng.
  - *SCADA*
  - *RTU*
- Simultaneous Eng.
- Constant Eng.

Generic SCADA Functionalities

- Integration to CERN Environment
- Alarms, Events
- Lists, Finders, Explorers
- Network Coloring
- Event Replay

Domain Specific Functionalities

- State Estimation
- Power Flow
- Simulation
- Contingency Analysis

Gillam-FEI
FREQUENCY, ELECTRONICS & TELECOMMUNICATIONS

rittmeyer
BRUGG

ABB

etm
Professional Control
WinCC OA
(ex PVSS)

Atos

LARSEN & TOUBRO
It's all about Imagineering

efacec

Schneider Electric

SIEMENS

ETM WinCC OA Choice - Rationales

Operators

- Homogeneous SCADA
  - Cryogenics
  - C&V
  - Gas
  - Etc.
- Tailored to operator's needs
- Direct feedback and improvement

Development Maintenance

- CERN Expertise
- Reuse of existing frameworks
  - JCOP
  - UNICOS
- Minimized development of custom code
- Integration to the CERN EN/ICE support duties

Finance

- Initial Cost
  - Manpower
  - WinCC OA Licenses
  - Power Factory License
- Maintenance Cost
  - Mutualized with others CERN WinCC OA-based SCADA

Overview of the New Supervision System

Engineering

- ENSDM
  - *Centralized Engineering (c.f. Poster Session)*
  - *Migration from SCATEX*
- Synoptic View Migration
  - *Pattern recognition based on Open-CV*
- Test Installation

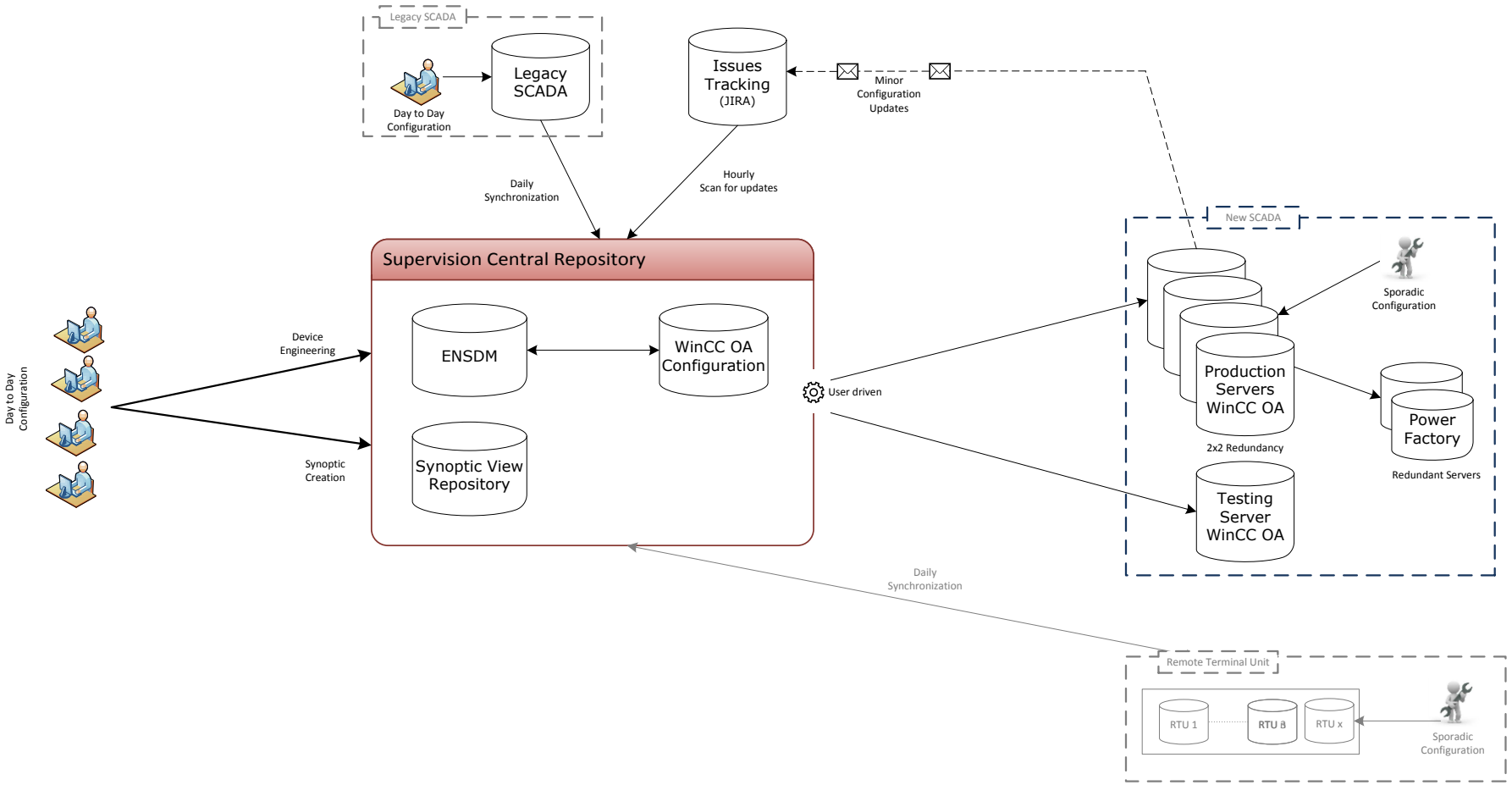
Generic SCADA Functionalities

- WinCC OA-based
  - *JCOP*
  - *UNICOS*
  - *New Generic Components*
  - *Custom Components*

Domain Specific Functionalities

- DigSilent PowerFactory
  - *Network Study Engine*
  - *Blackbox behavior*
  - *Inputs from field through WinCC OA*
  - *Outputs displayed in WinCC OA*

Engineering Process

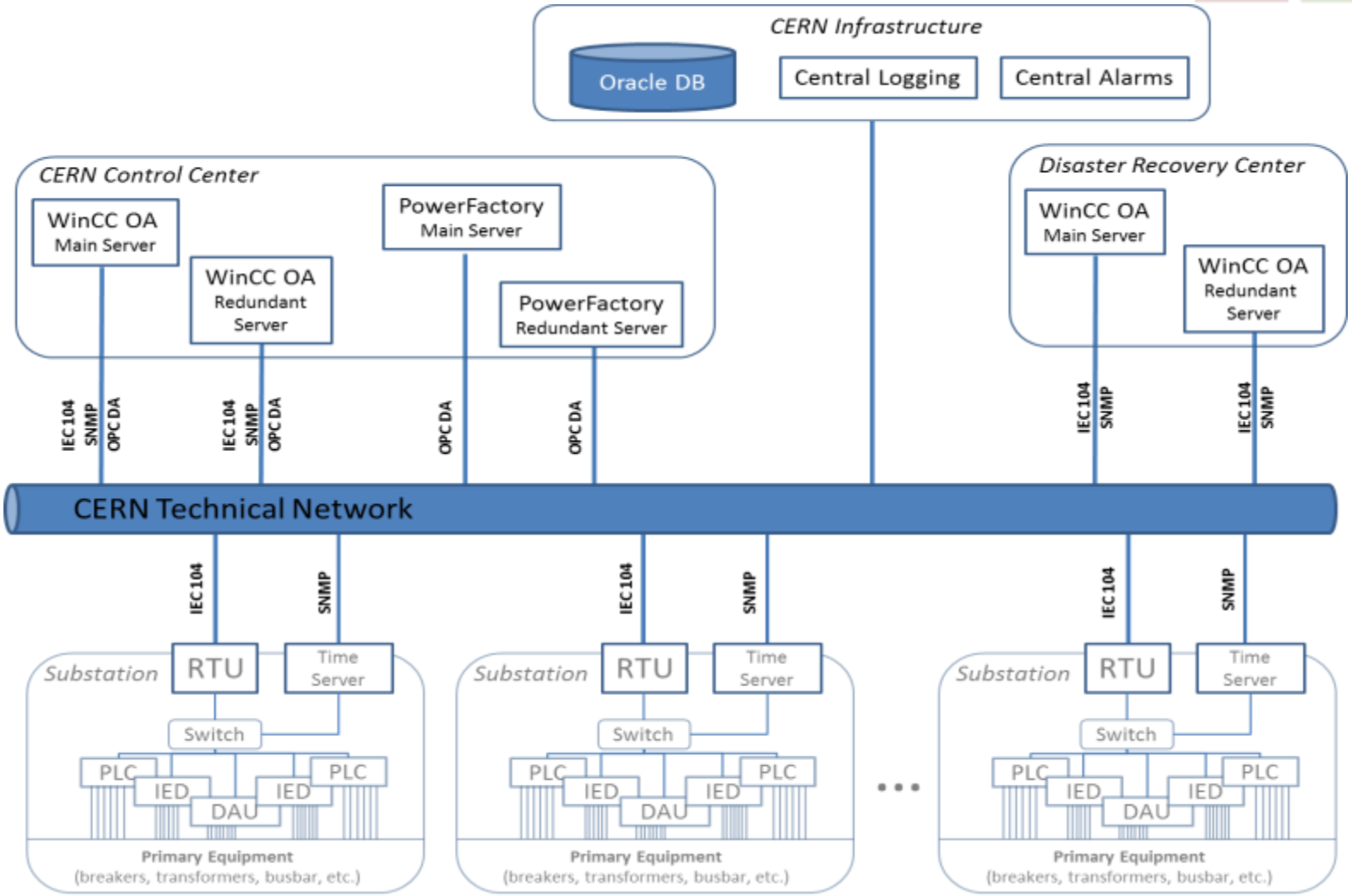


Centralized Data Engineering for the Monitoring of the CERN Electrical Network
Poster Session – Monday, October 7th 2013 from 16h45 to 18h15

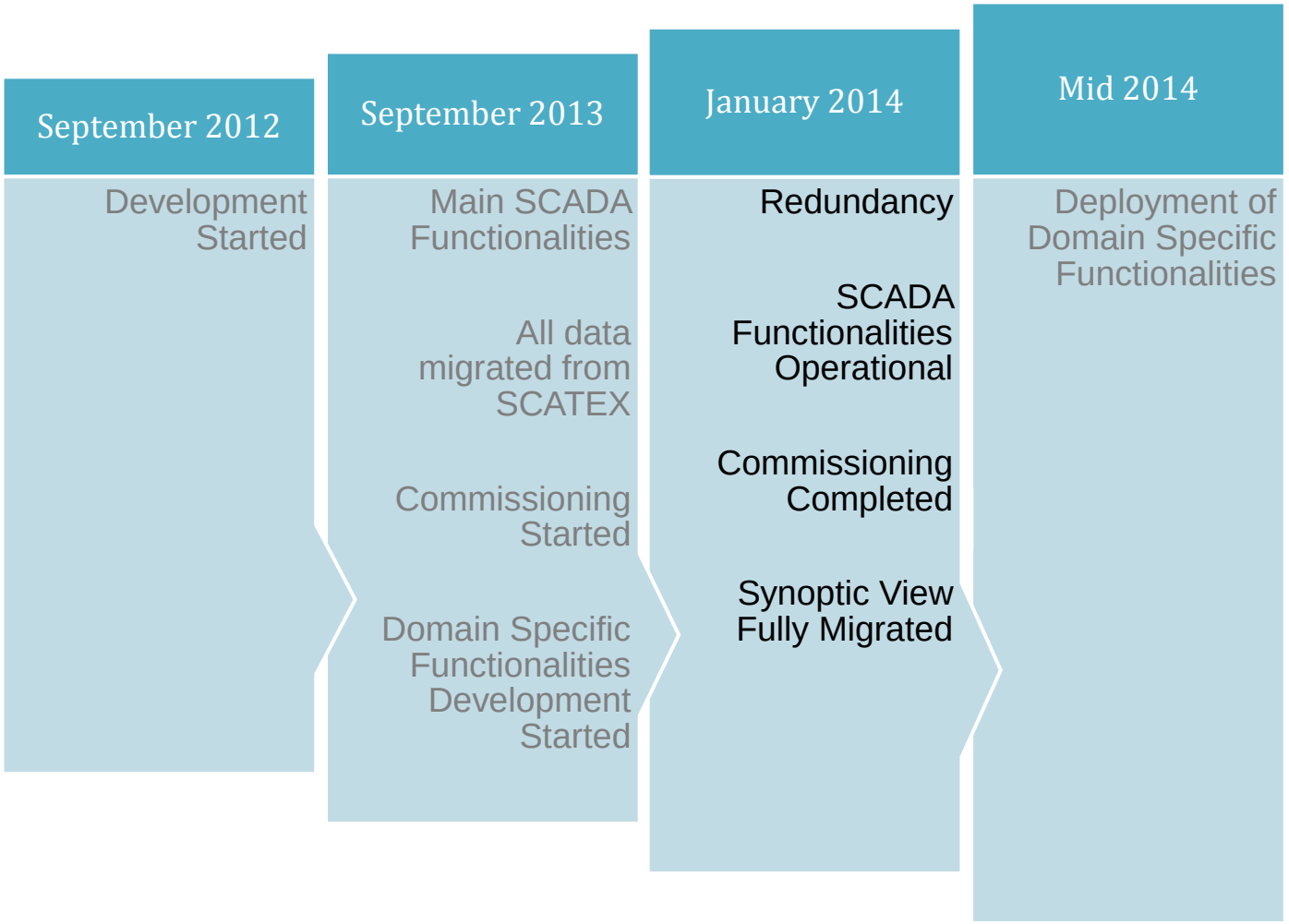
WinCC OA Development

Re-Use of Existing Components	New Generic Components	Custom Components
• Device Definition • Configuration DB • Access Control • Trending • CERN Middlewares • HMI • Etc.	• Alarm Inhibition • Delayed Alarms • Network Coloring • Symbol Library	• Alarm Presentation • Event Presentation • Lists/Explorers

Architecture of the New Supervision System



Project's Status and Milestones



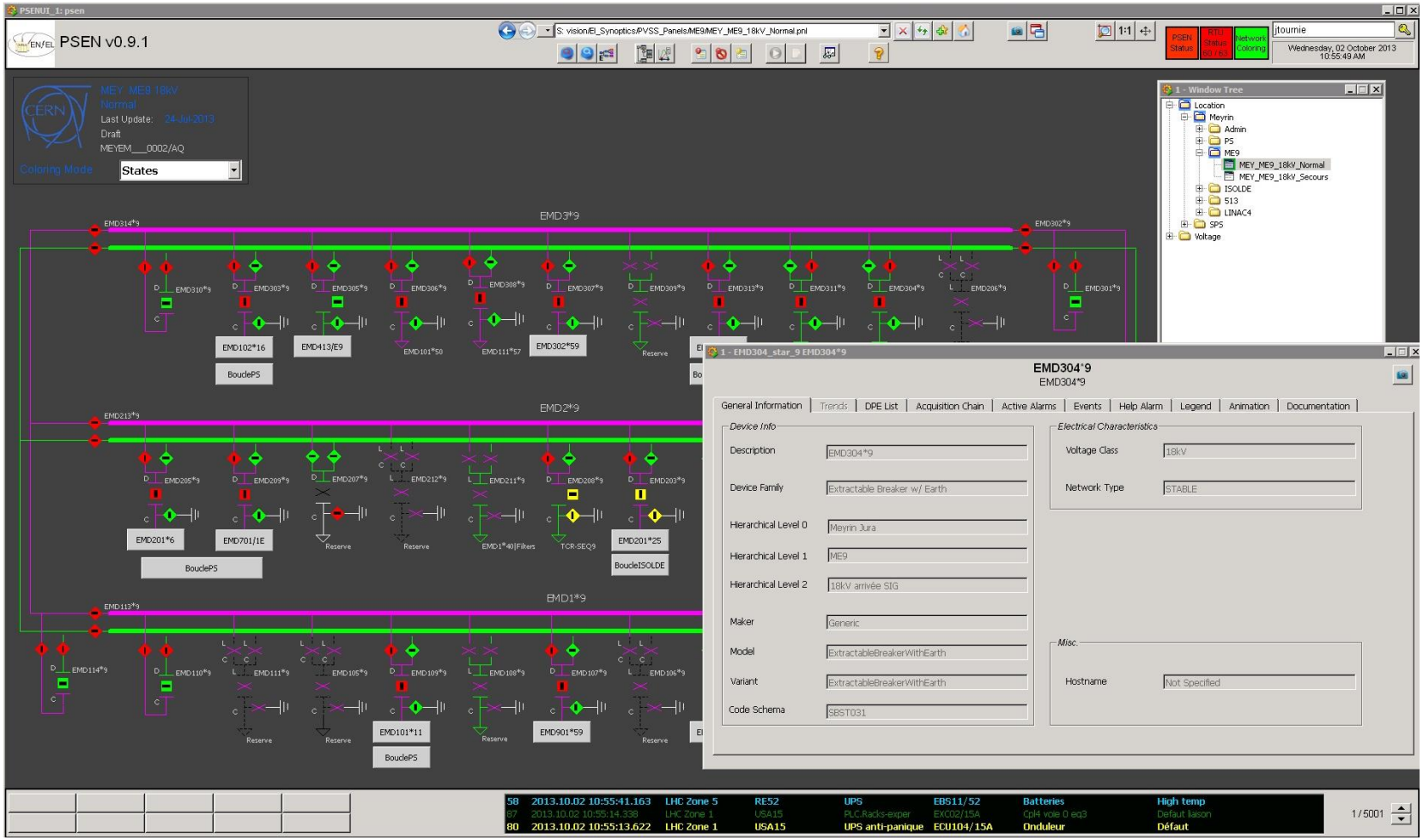
Conclusion

- New Supervision System for the CERN Electrical Network
- Homogenization of CERN Industrial Controls Systems

- Maximize the re-using of previous development
- Minimize custom development
  - Based on WinCC OA, a CERN de facto Standard
  - And DigSilent PowerFactory for the power system analysis

- Future Works
  - Replacement of Data Concentrators
  - Migration to all IP communication in the substations

Questions?


PSEN v0.9.1
MEY_ME9 18kV
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Last Update: 24-Jul-2013
Draft
MEYEM___0002/AQ
Coloring Mode
States
EMD3*9
EMD2*9
EMD1*9
EMD304*9
EMD304*9
General Information
Trends
DPE List
Acquisition Chain
Active Alarms
Events
Help Alarm
Legend
Animation
Documentation
Device Info
Description
EMD304*9
Device Family
Extractable Breaker w/ Earth
Hierarchical Level 0
Meyrin Jura
Hierarchical Level 1
ME9
Hierarchical Level 2
18kV arrivée SIG
Maker
Generic
Model
ExtractableBreakerWithEarth
Variant
ExtractableBreakerWithEarth
Code Schema
SBST031
Electrical Characteristics
Voltage Class
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Network Type
STABLE
Misc.
Hostname
Not Specified
1 - Window Tree
Location
Meyrin
Admin
PS
ME9
MEY_ME9_18kV_Normal
MEY_ME9_18kV_Secours
ISOLDE
513
LINAC4
SPS
Voltage

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