



IT Needs of and Vision for Photon / Neutron Community

The user community I

☐ *Photon facilities*

- ✓ Synchrotrons and Free Electron Lasers (FELs)
- ✓ Light of highest brightness
- ✓ Typical range from infra-red to Xrays
- ✓ Facility size hundreds of meters
- ✓ About 15 synchrotrons in EU (ESRF + national)

☐ *FELs, even 10^3 to 10^6 times brighter*

- ✓ SLAC/Stanford, DESY/Hamburg, FEL/Spring-8/Japan, PSI/Villigen
- ✓ Membrane proteins; microscopic movies of chemical reactions

☐ *Neutron facilities*

- ✓ Complementary
- ✓ Similar user community

☐ *Small teams, visit for*

- ✓ Few hours (structural biology) to
- ✓ Few weeks (superconductivity, nano investigations)

The user community II

- ❑ ***In EU >> 30'000 visiting users /y***
 - ✓ Large overbooking ($\geq 3:1$), low chance to be accepted
 - ✓ Important to minimize administrative load (Local user offices)
- ❑ ***On-site visits***
 - ✓ Short duration
 - ✓ In part spontaneous (keep that attraction)
 - ✓ Part-time users
- ❑ ***Decentralized structure (compare e.g. to CERN)***
 - ✓ Manifold research fields
 - ✓ Many data sources facilities
 - ✓ National character of facilities, report to own governments
- ❑ ***Zoo of research areas***
 - ✓ Archaeology, chemistry, materials + analytical sciences, life sciences
 - ✓ Physics is minority
 - ✓ **Linking element is common use of large facilities (not science field) !**

What are the IT requests?

- ❑ **Huge datasets**
 - ✓ Novel 2D detectors, quantum leap in data quality, but also data volumes
 - ✓ multi-image techniques (tomography, lens-less imaging)
 - ✓ molecular movies at FELs
 - ✓ 'Petabyte' 'normal' unity; time over for 'hard-disk in the trouser pocket'
- ❑ **Trans-facility experiments**
 - ✓ Standardize proposal procedures on EU scale
- ❑ **Remote data access**
 - ✓ analyze data remotely at facility
 - ✓ combine datasets taken at different facilities
 - ✓ clouds (commercial, community-based)
 - ✓ respect confidentiality restrictions
- ❑ **Remote experiment access**
 - ✓ basic: passive online access to measured data
 - ✓ advanced: active control
- ❑ **PR Issues**
 - ✓ Improve corporate identity
 - ✓ Improve public lobbying

Vision, Solution Characteristics

- ❑ ***Incorporate confidentiality aspects***
 - ✓ High competition, especially structural biology
 - ✓ Time-window structured access to experiments and data
- ❑ ***Rely on existing local user office structure***
 - ✓ Great experience
 - ✓ DIY (Do It Yourself) operation
 - Users: manage their personal entries
 - User offices: supervising; manage authorizations
- ❑ ***Base system on professional authentication standard***
 - ✓ Shibboleth, federated Single-Sign-On System (SAML), widely used
 - ✓ special photon / neutron user federation
 - ✓ only one identity provider
 - ✓ supervising by local User Offices
- ❑ ***Umbrella prototype concept***
 - ✓ ->

Umbrella as Prototype

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- ❑ ***Concept***
 - ✓ Unique user identification on EU scale
 - ✓ Hybrid information storage
 - ✓ No automatic cross-facility information exchange
 - ✓ Multi-level identification (maximum autonomy to facilities)
 - ✓ Waterproof but slim data protection system

Use case: Remote data access

- ❑ ***Embargo vs. post-embargo period***
 - ✓ Embargo (first 3y): confidentiality, access to own team only
 - ✓ Post-embargo: free access, possibly via registration
- ❑ ***Standardized / automatized access rights***
 - ✓ manual central authorization impossible
 - ✓ 1'000s of experiments, 10'000s of users
- ❑ ***Identity by Umbrella***
 - ✓ Unique, EU-wide user authentication
- ❑ ***Keep Role of proposal as organizing element***
 - ✓ Users convene for a short time slot for performing an experiment
 - ✓ Principal investigator / main proposer
 - ✓ Who participates in experiment, has access right to data
 - ✓ Proposal officially accepted by facility, PI is official contact
 - ✓ PI defines experiment participants (practically existing WUO tool)

The Umbrella Concept

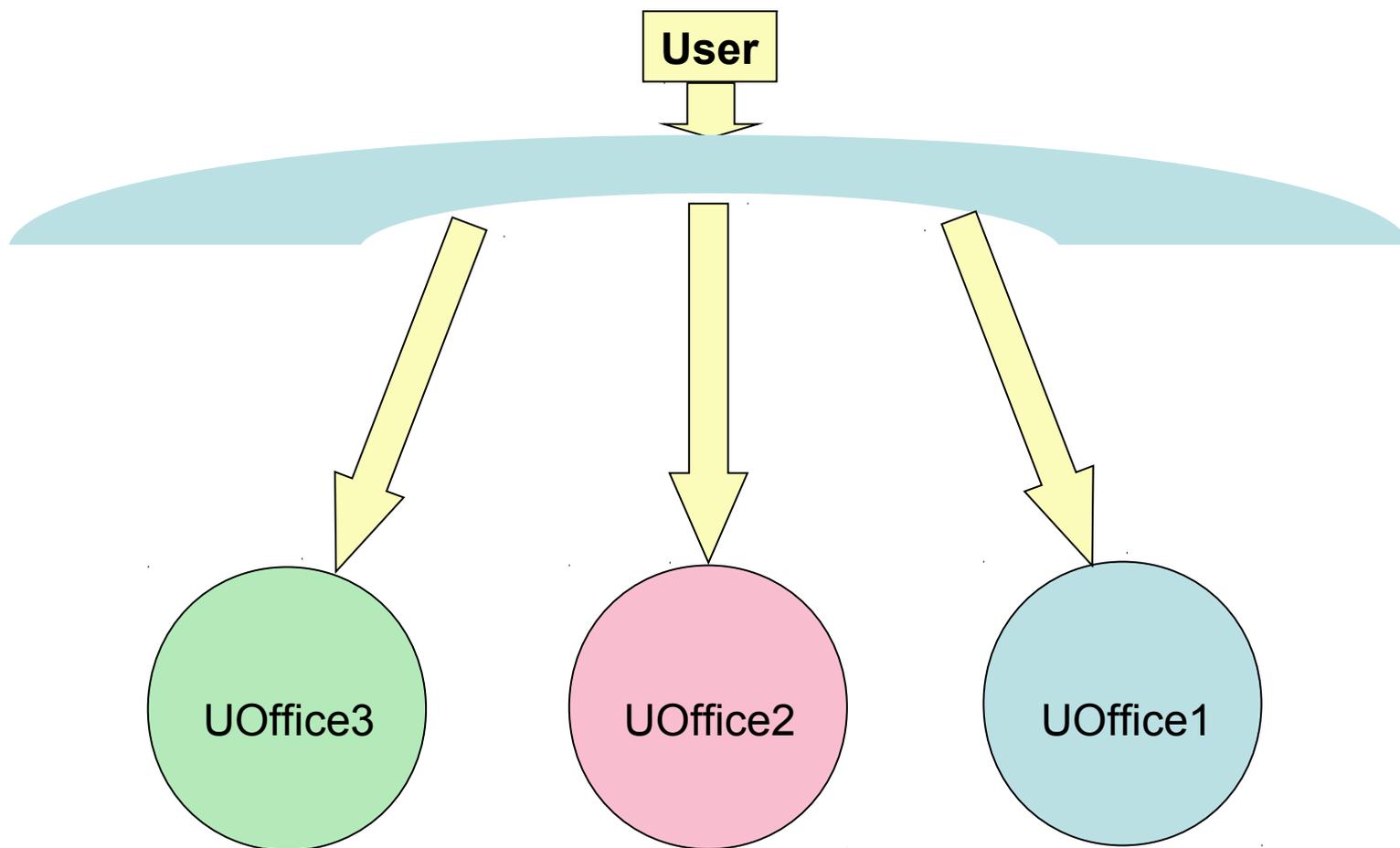
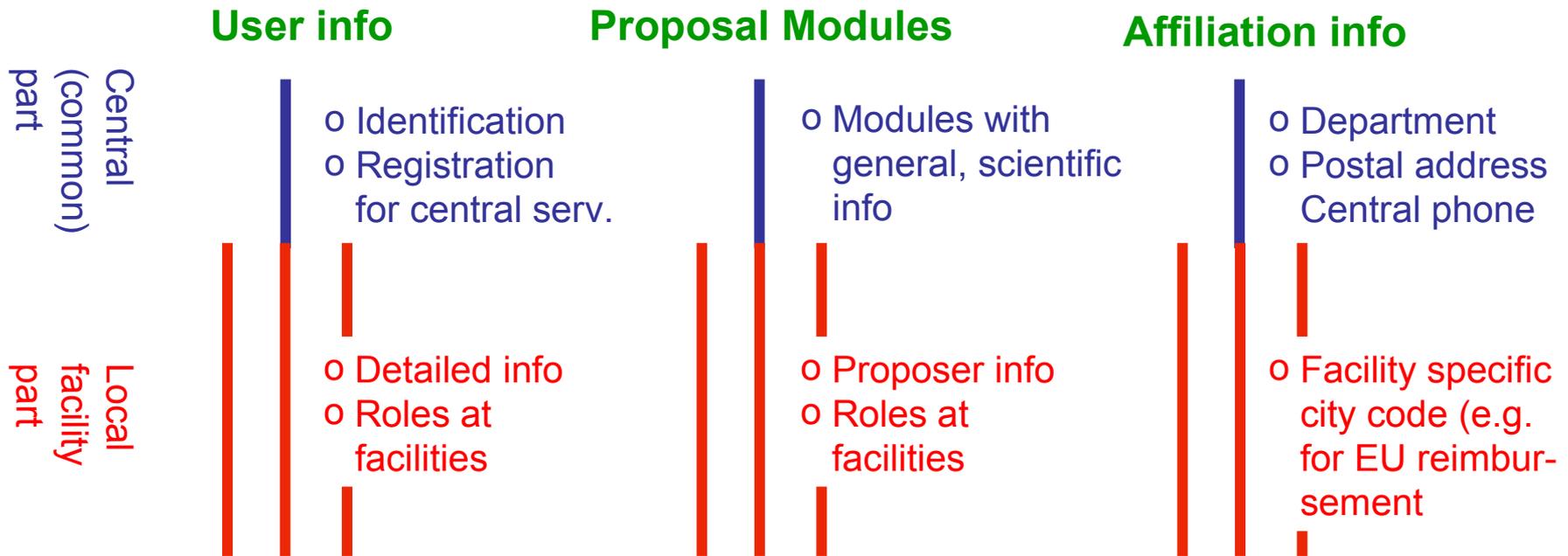


Fig.1

Hybrid concept (central and federated)

Answer to conflicting requests:

- Efficient technology
- Confidentiality
- Consequent distinction of authentication and authorisation



EPH characteristics

- ❑ ***Present situation:***
 - ✓ heavy administrative load on users
 - ✓ no synchronization in call for proposals
 - ✓ no EU proposal standard
 - ✓ start always from scratch in spite of iterative character

- ❑ ***Umbrella answer: subdivision into different parts***
 - ✓ Statistical
 - ✓ Facility
 - ✓ General (science)

- ❑ ***Umbrella solution characteristics***
 - ✓ Federated proposal storage at facilities
 - ✓ Compatibility with existing proposal handling
 - ✓ Federated hybrid user database
 - ✓ No Cross / trans-facility actions
 - ✓ User: significant reduction of administrative load
 - ✓ Facilities: no change in proposal handling work flow
 - ✓ Proposals are key elements for remote data access

Friendly user phase

Applications to test

- ❖ EAA: registration, mutation
- ❖ European Proposal Handling (EPH)
- ❖ Remote Data Access (iCat as possibility)
- ❖ Remote Experiment Access (Moonshot as possibility)
- ❖ Standard Affiliation Database?

❑ Environment offered

- ❖ Prototype of central web site
- ❖ Umbrella + WUO test versions (DESY, PSI, ESRF, ??)

❑ System users

- ❖ External expert users (ESUO, ETH, BioStruct, ??)
- ❖ Local facility experts (DESY)

Umbrella road map

❑ **till January, 31: Umbrella preparation**

- ❖ Definition of active participants
- ❖ Definition of elements to offer to users
- ❖ Definition of web portal
- ❖ Documentation
- ❖ Final developments

❑ **from February 1, Friendly user phase**

- ❖ Contact of users
- ❖ Umbrella + WUO test versions (DESY, PSI, ESRF, ??)

❑ **from May 31**

- ❖ Workshop with all participants
- ❖ Concluding feedback document
- ❖ Implementation of feedback

❑ **from September 1, Implementation**

Umbrella collaborators

❑ DESY

❖ Frank Schluenzen, Rolf Treusch, Jan-Peter Kurz, Ulrike Lindemann

❑ Fermi/Elettra

❖ Ornella Degiacomo, Giorgio Paolucci

❑ ESRF

❖ Rudolf Dimper, Dominique Porte, Stefan Schulze

❑ European XFEL

❖ Krzysztof Wrona

❑ HZB

❖ Thomas Gutberlet, Dietmar Herrendoerfer, Olaf Schwarzkopf

❑ IPJ (Poland)

❖ Robert Nietubic

❑ MaxLAB

❖ Ulf Johansson

❑ PSI

❖ Bjoern Abt, Stephan Egli, Stefan Janssen, Markus Knecht, Mirjam van Daalen, Heinz J Weyer

❑ Soleil

❖ Frederique Fraissard

❑ STFC

❖ Anthony Gleeson, Bill Pulford

Conclusion

- ❑ **Demands at large photon / neutron facilities very clear to IT responsables**
 - ❖ Unique user ID
 - ❖ Remote data and experiment access
 - ❖ Need for user and facility friendliness
 - ❖ Very large number of visiting scientists: Need slim and efficient system

- ❑ **Reduced excitement on management (and user?) side**
 - ❖ Resources
 - ❖ Confidentiality
 - ❖ Scientific competition

- ❑ **Overlapping IT communities**
 - ❖ Large facilities and universities (educational sector)
 - ❖ Large facilities and university labs

- ❑ **Umbrella as prototype**
 - ❖ common web portal
 - ❖ Slim solution, no top down organization, self service elements
 - ❖ Build on existing infrastructure, clear topology, no double worlds