

QuakeML

XML representation of seismological data
& a new concept for a
metadata infrastructure

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QuakeML – Design Principles

- Intended to cover a broad range of seismological fields
- Support real-time data transfer of seismic events
- Designed as data exchange format, independent of further persistent storage
- Modular approach:
 - Basic event data
 - Moment tensor
 - Metadata infrastructure
 - ...
- Written from scratch, no adaption of existing (DB-) schema, uses full XML flexibility
- Community-driven development of standards
 - Documents are first discussed in working group, then subjected to **Request for Comments** process
 - Sequence of document maturity levels: Working Draft, Proposed Recommendation, Recommendation

QuakeML – Development Roadmap

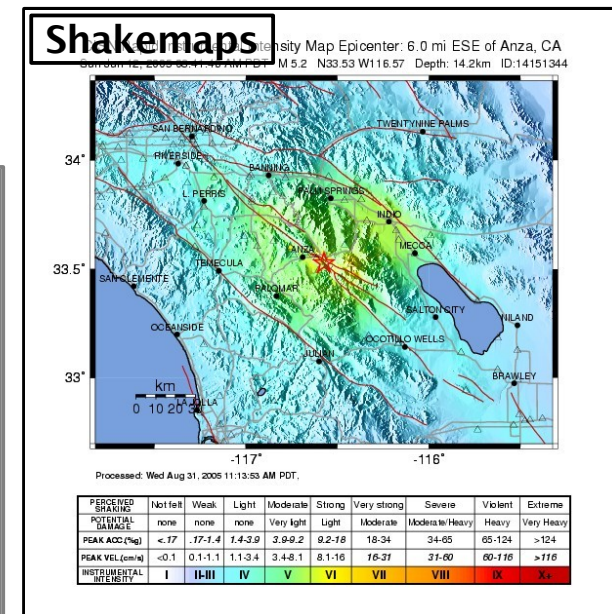
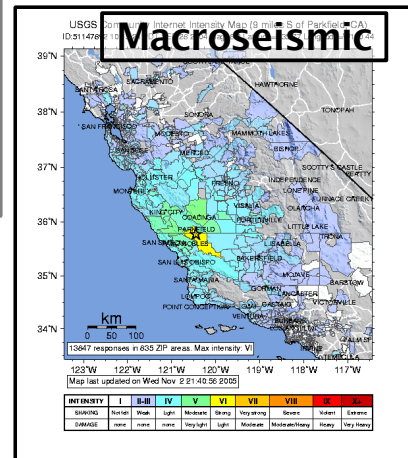
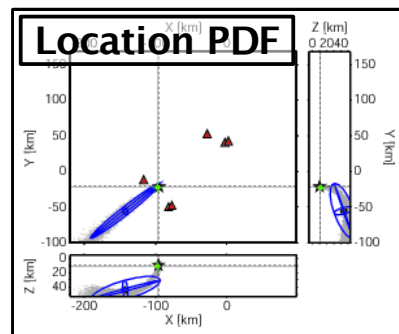
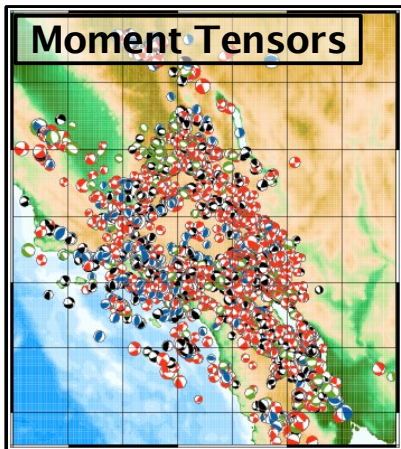
QuakeML development roadmap

Basic event description
 Moment tensors
 Metadata infrastructure
 Inventory

RFC starts March 2007
 RFC starts April 2007
 RFC starts May 2007
 RFC starts June 2007

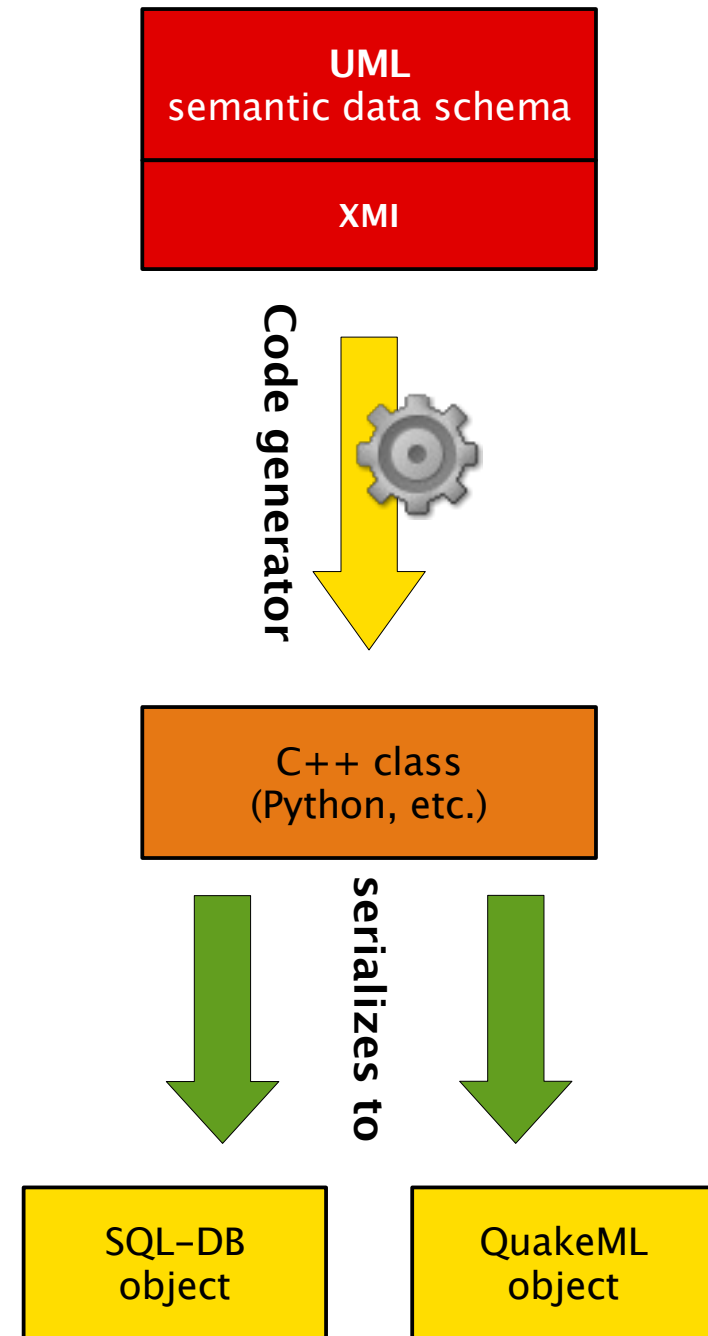
Further development: location PDF, macroseismic information, slip distribution, shakemaps, ...

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QuakeML – Tools and Services

- QuakeML data model available as UML class diagram (and XMI)
- We will maintain and distribute a software library for QuakeML:
 - Use XMI for automated code generation
 - Library native in C++, can be used from other object-oriented languages (Python, Java) using wrappers
 - Objects can be serialized as XML (QuakeML) or SQL



Unique Resource Identifiers

Requirements for seismological information exchange in a global network

- unambiguous, persistent **identifiers** of networked resources
- rich standardized metadata description (RDF – Dublin Core)
- resource discovery by standardized query gateways
- information retrieval using standardized services and protocols

smi://<authority-id>/<resource-key>[#<local-id>]

URI schema **smi://** stands for **seismological meta-information**

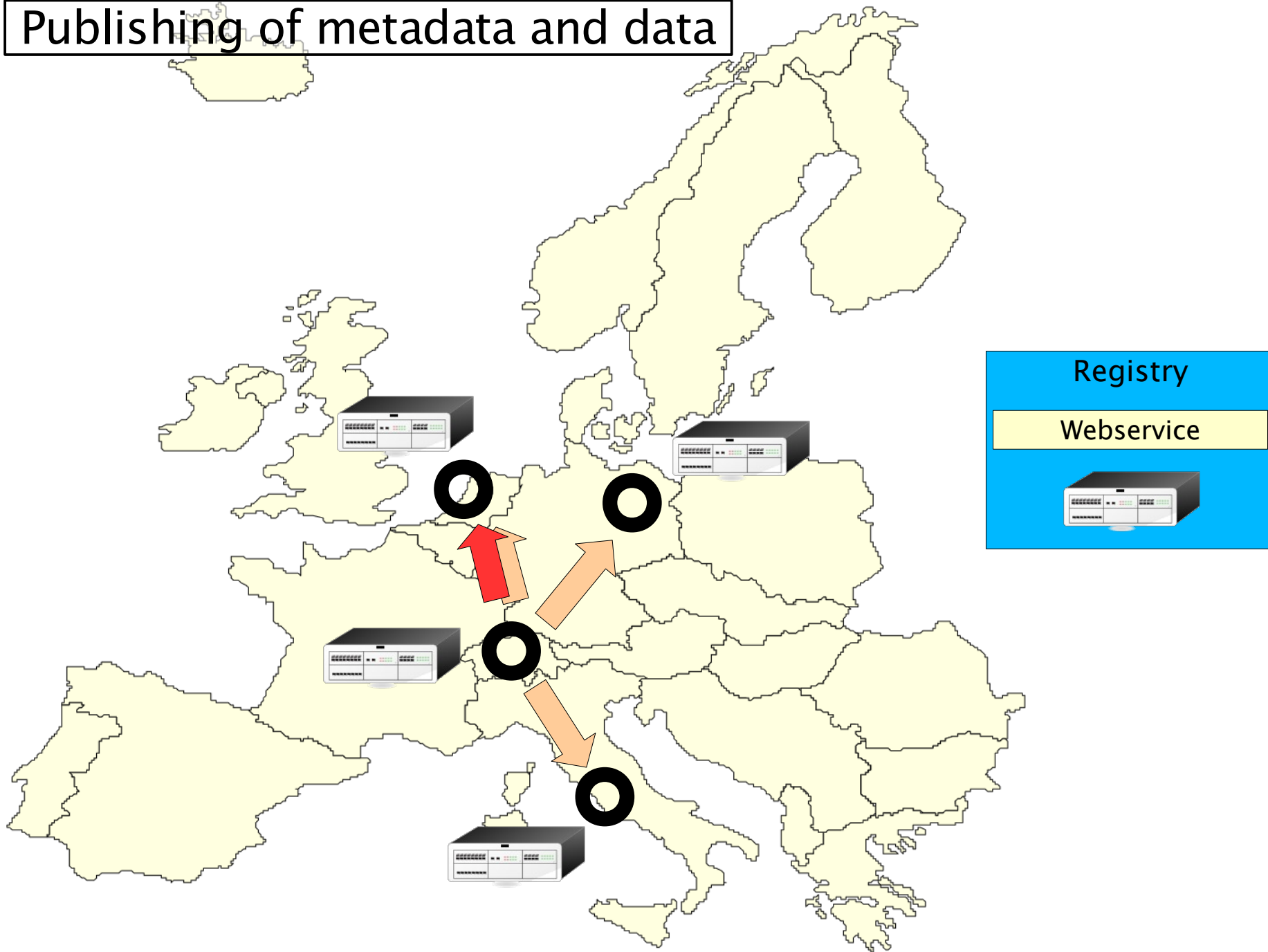
Example: SED autopicker

`smi://ch.ethz.sed/Software/Picker#Autopicker-6.0.5`

The **RDF metadata** contain information on how to retrieve the **resource data**, e.g., URLs, pointers to Web Service descriptions (WSDL), etc.

Metadata and Data Exchange

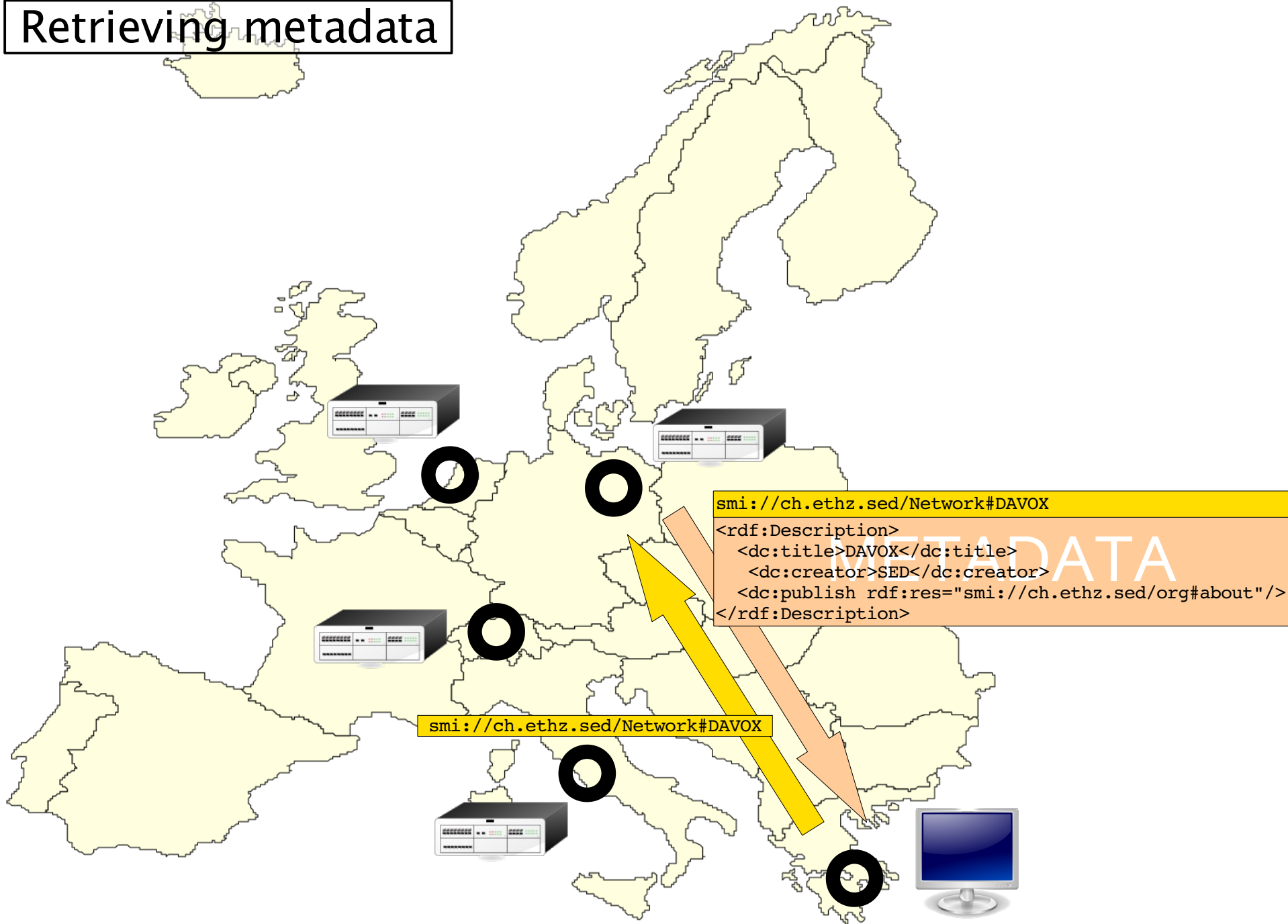
Publishing of metadata and data



Metadata and Data Exchange

Retrieving metadata

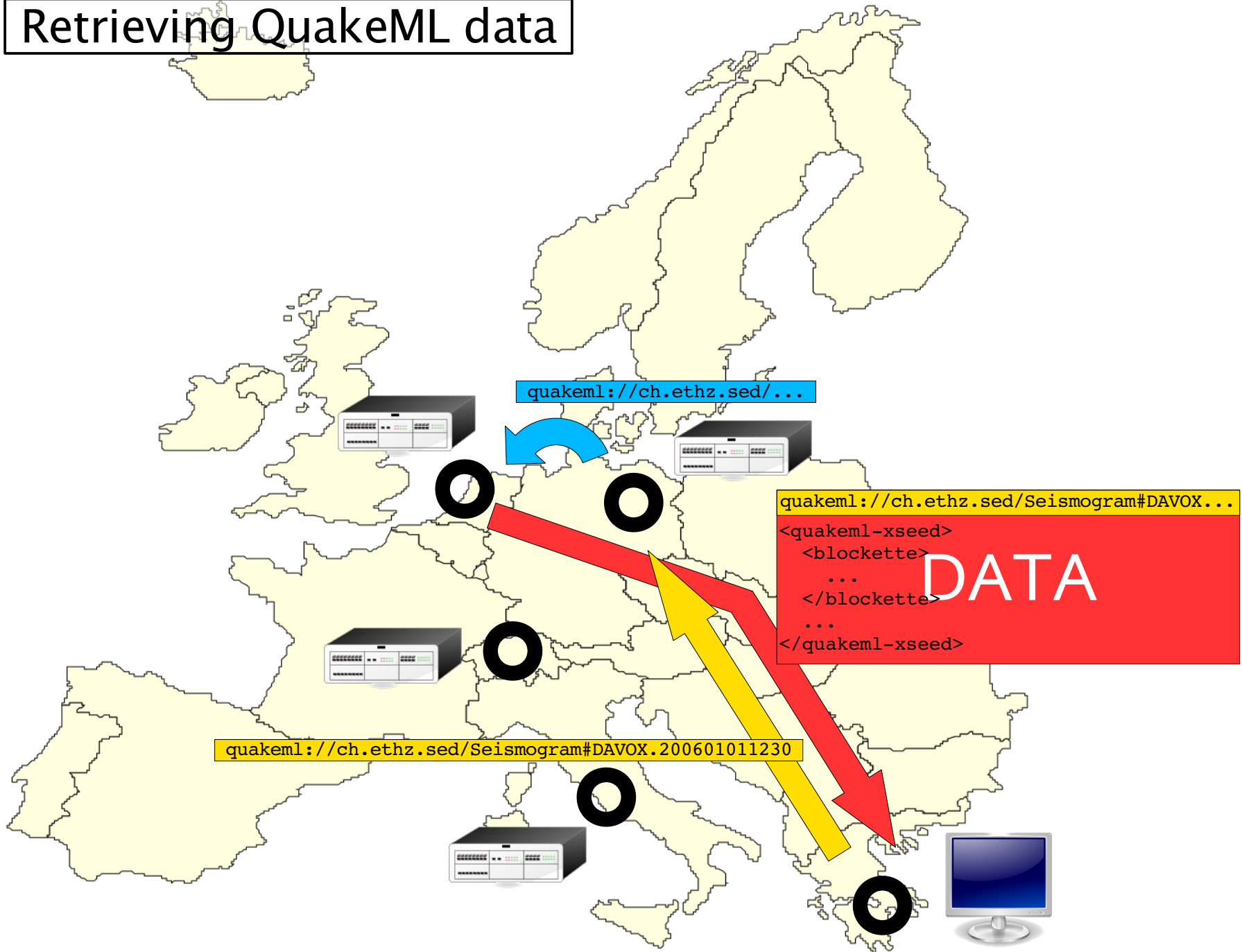
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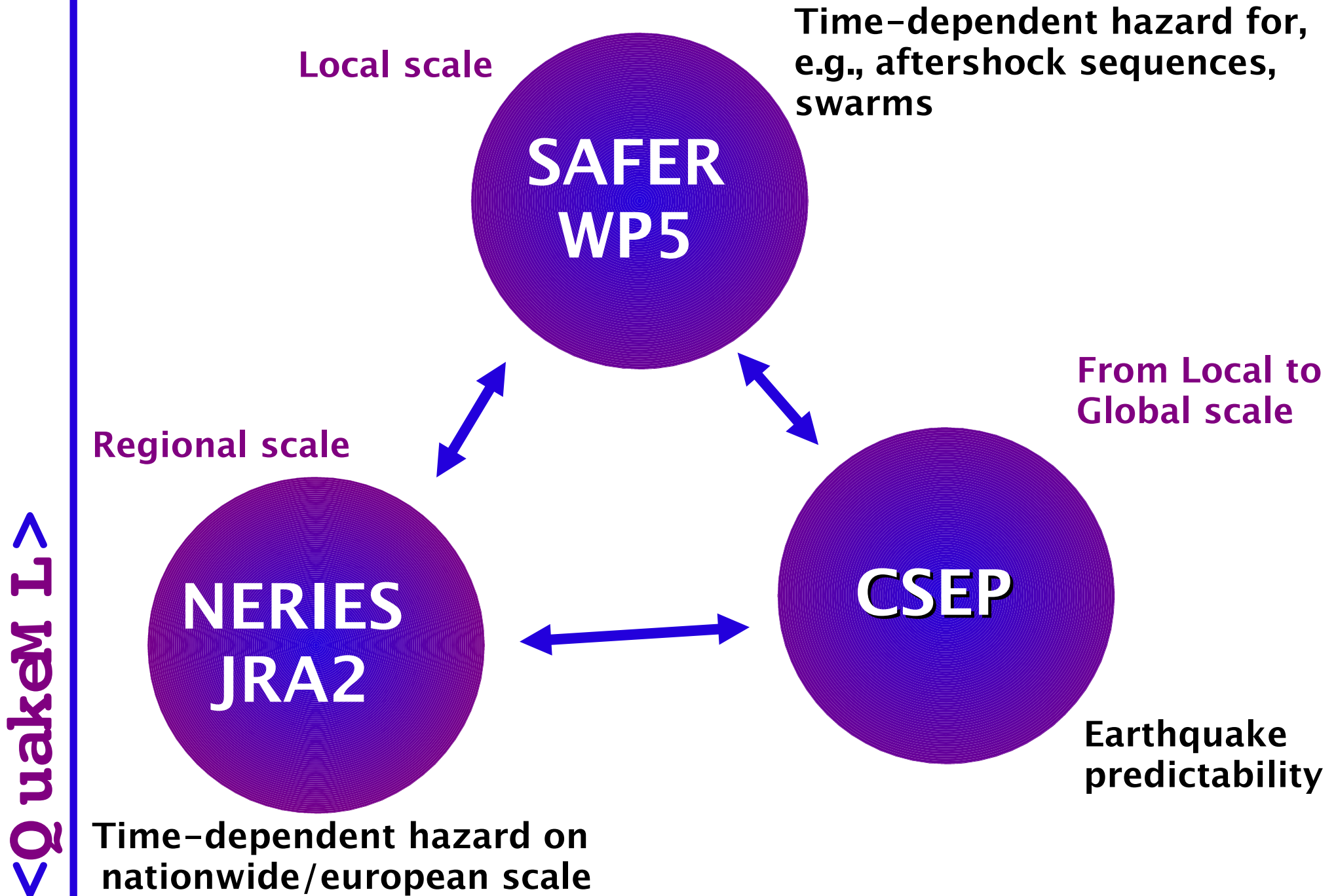
Metadata and Data Exchange

Retrieving QuakeML data

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QuakeML – In International Projects



QuakeML for CSEP

- Using data preparation tools written for new ZMAP
 - Filtering
 - Declustering
 - Catalog Retrieval
- Storing metadata of results (system & software configuration using resource identifiers `smi://`)
- Data exchange with current European Projects for the EU Testing Center
- Easy conversion of data products into SVG or for GoogleEarth (KML)

XML meeting at EMSC, 15/16 January 2007

- Merge ANSS–EQ–XML format into QuakeML (encouraged by European and U.S. participants)
- Ray Buland (USGS) and Linus Kamb (IRIS–DMC) became member of the QuakeML core team
- ANSS–EQ–XML already provides a representation of moment tensors which will be adopted for QuakeML
- Resource identifier/metadata concept of QuakeML was agreed to address issue so far not considered
- Community–driven approach of QuakeML (upcoming request for comments process) was encouraged by participants

Contact Us

- Check our upcoming website

<http://www.quakeml.org>

- Write us

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- for participating in the request for comments process: Send us your email-address and you will receive the RFC documents
- for questions
- for suggestions