# The GEOSS User Requirement Registry: Providing the Means for a Gap Analysis

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# The GEOSS User Requirement Registry: Providing the Means for a Gap Analysis

- A User-Driven System of Systems
- GEOSS and Its Users
- GEOSS Registries and URR
- The URR
- Data Model
- Exploring Interdependencies
- Gap Analyses Using the URR
- Concept of Operation
- Populating the URR

# A User-Driven System of Systems

10 Year Implementation Plan for the Global Earth Observing System of Systems (GEOSS):

- build GEOSS as a user-driven system of systems;
- develop a User Requirement Registry;
- frequently review the user needs as a basis for gap analysis.

# A User-Driven System of Systems

User Requirement Registry (URR) development started in 2006:
- extensive discussions on the data model;
- specification of the functionality.

In parallel, a review of user requirements was carried out;
based on published documents.

Implementation of the URR started in 2009;
made significant progress in 2010.

First experience with populating the URR;
using experts and the result of the review.

Concept of Operation (CoO) was developed in 2011:
specifies the final functionality of the URR.

Finalization of the URR according to the CoO planned for 2012.

# A User-Driven System of Systems

*The experience over the last years made clear:*

Collecting information on user needs and translating them into requirements for the observing system is not a straight-forward task.

The process for collecting user needs and requirements and the registry need to:

- reach out to global users;
- enable users to express their needs;
- be flexible, adaptable, proactive, versatile, comprehensive;
- allow for frequent (gap) analysis.

# GEOSS and Its Users

Workshop:
Building a User-Driven GEOSS: Methods to Capture, Analyze, and Prioritize User Needs; Sydney, Australia, April 10, 2011

*Recommendations:*

Translation of user needs into requirements

Variety of methods for the collection of user needs

Discovery of unknown user groups

Diversity in terminology

Learning from Social Media

Identification of themes

# GEOSS and Its Users

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*Recommendations:*

Translation of user needs into requirements

Recognizing that users express needs that often imply more than observational requirements, it is recommended that GEOSS develops the methodology to translate user needs into requirements for observations, products, infrastructure, services, and knowledge.

Variety of methods for the collection of user needs

Discovery of unknown user groups

Diversity in terminology

Learning from Social Media

Identification of themes

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*Recommendations:*

Translation of user needs into requirements

Variety of methods for the collection of user needs

Recognizing that the collection of information on user needs and requirements for observations, infrastructure, products and services requires a variety of methods, it is recommended to maintain an ensemble approach to this task, including at a minimum continuous crowd sourcing, frequent analyses of published reports, and comprehensive harvesting of relevant registries.

Discovery of unknown user groups

Diversity in terminology

Learning from Social Media

Identification of themes

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*Recommendations:*

Translation of user needs into requirements

Variety of methods for the collection of user needs

Discovery of unknown user groups

Recognizing that there may be potentially large unknown user groups of Earth observations and derived information, it is recommended that an attempt be made to identify these groups through an analysis of web usage and other processes as appropriate.

Diversity in terminology

Learning from Social Media

Identification of themes

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*Recommendations:*

Translation of user needs into requirements

Variety of methods for the collection of user needs

Discovery of unknown user groups

Diversity in terminology

Recognizing that user groups use their own, group and/or field specific terminology to express their needs, and realizing that it will not be possible to educate users to use a common, GEOSS-wide ontology, it is recommended that GEOSS respects the diversity in user terminologies and develops tools that allow to map the user needs into requirements expressed in a common GEOSS ontology.

Learning from Social Media

Identification of themes

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Learning from Social Media

Considering that users consistently express a need for GEOSS as a social media, and recognizing that initiatives such as the Supersite initiative draw more contributions and usage than the GEOSS registries, it is recommended that GEO makes a dedicated effort to learn from social media and to add a strong social media component to GEOSS.

Identification of themes

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*Recommendations:*

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Discovery of unknown user groups

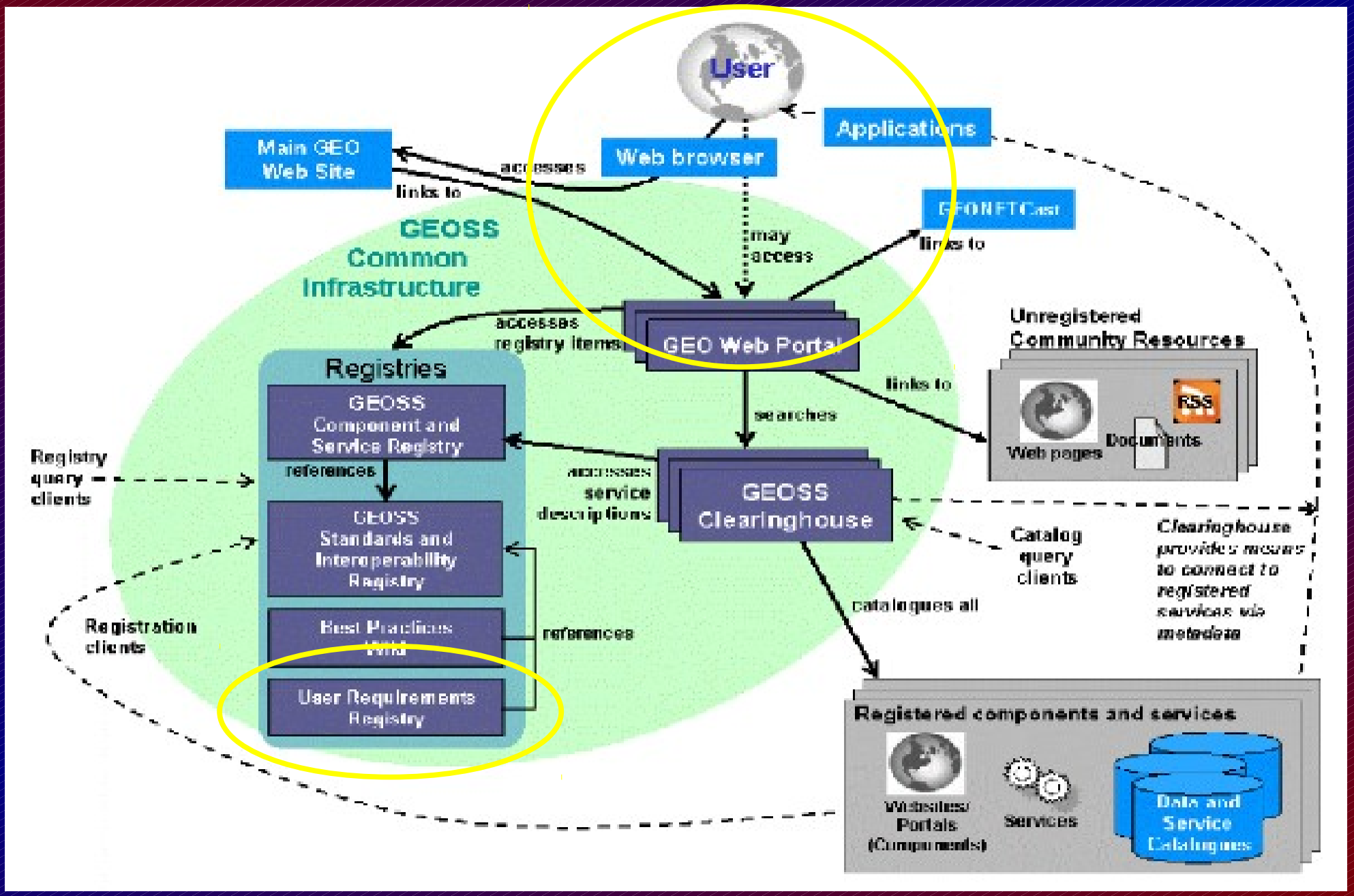
Diversity in terminology

Learning from Social Media

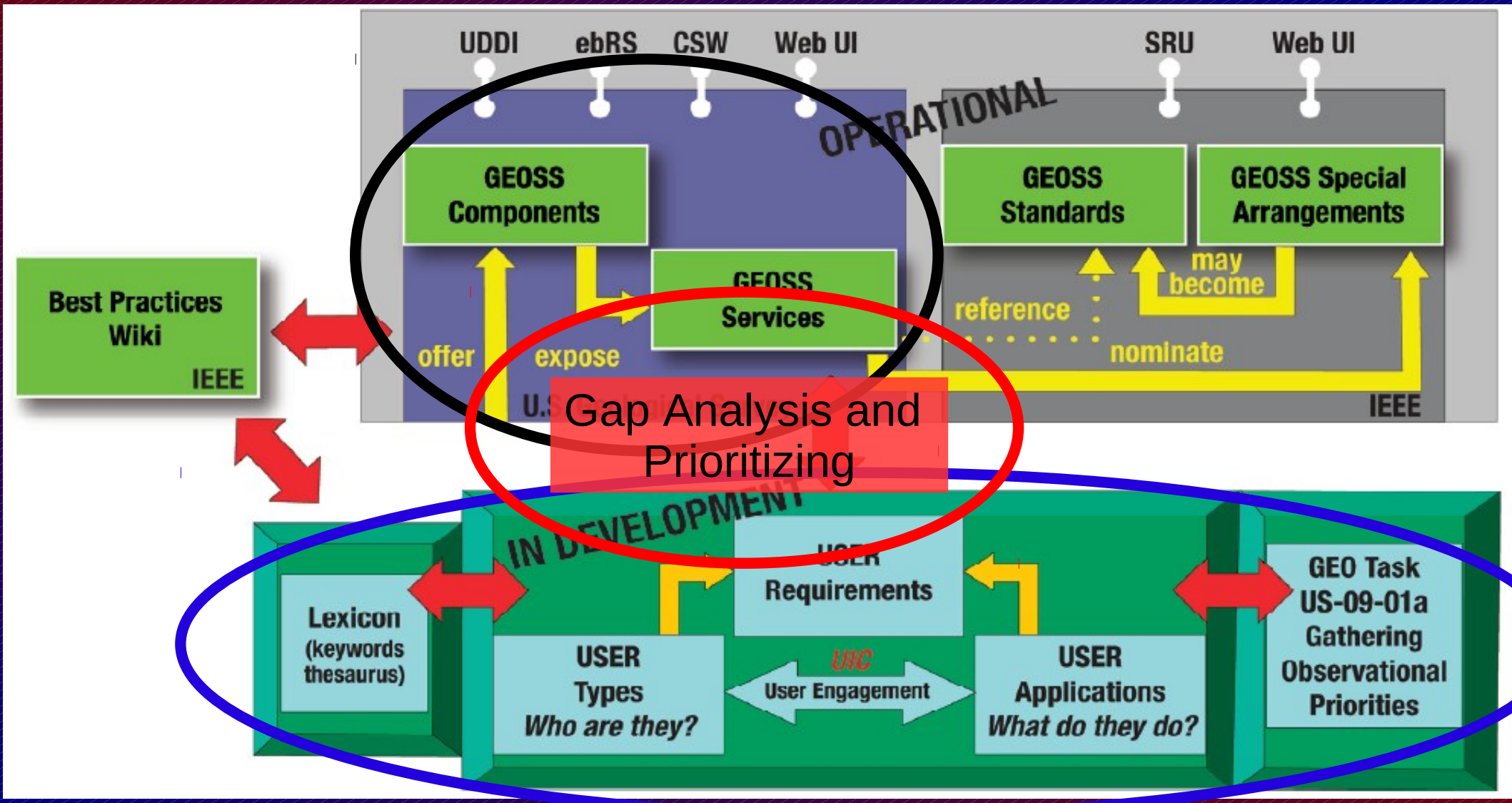
Identification of themes

Understanding that many outreach activities to user groups require a thematic focus, and realizing that a thematic approach often overlaps with several GEO Communities of Practice, it is recommended that themes be identified for which several CoPs should coordinate and work together in order to reach to the users within these themes.

# GEOSS Registries and User Requirement Registry



# GEOSS Registries and User Requirement Registry



USER REQUIREMENTS REGISTRY



# Home

The intergovernmental Group on Earth Observations (GEO) is implementing the Global Earth Observation System of Systems (GEOSS) and developing tools to help users better understand earth observation data to a variety of societal areas. A suite of GEOSS Registries is at the core of these tools. These registries provide the means to register GEOSS components, services, data sets, and other relevant information resources. They are designed to enable users of Earth observations to access, list, search, and use the data and services available through GEOSS.

GEO is building GEOSS as a user-driven system. The GEO User Requirements Registry (URR), which is part of the GEOSS Registries, allows users to publish their needs in terms of Earth information, and it enables users and providers to analyze the value chains from Earth observations to end users. In order to collect and update information on user needs, GEO has established several processes to engage users depending directly or indirectly on Earth observations The URR is one of the principal user engagement mechanisms in GEOSS. The core of the URR is a comprehensive database with information on user types, applications, and requirements as well as their inter-connectivity.

A key innovative feature of the URR is its capacity to generate and analyze links between the different types of functions-User Types, Applications, Requirements, Research Needs, Technology Needs, Infrastructure Needs, and Capacity Building Needs. Creating these connections allows publishers (those entering data) and readers (those viewing data) to understand the interconnected nature of the various functions. Relationships between functions can be viewed in the URR Links page and illustrated graphically within each URR form. Figure 1 illustrates a representative Links visualization, showing a "User Type" (Aerobiologist; yellow circle) linked to an "Application" (Land-use management; blue circle) that is in turn related to various "Requirements" (e.g., Biogeochemical assessment and Ecosystem health assessment; green circles). Selecting other elements in the image will then display a new network of links originating from the selected entity. Documenting links between these different elements demonstrate the unique URR relationship capability and should help URR users make more informed decisions.

Population of the URR is based on peer contribution similar to the Wikipedia system. Moreover, relevant information from the reports produced by the GEO Work Plan Task US-09-01a has been extracted and entered into the URR. Engineers, scientists and policy makers world-wide who contributed the US-09-01a reports are being asked to assist in populating the URR. As far as possible, information is also harvested from other databases with information on user needs. But the biggest contribution will have to come from individual users who publish their needs. Please view this recent URR publication for more information.

You are invited to visit and search the URR for information related to user needs, applications, and observational requirements. If you have information on these items, you are invited to

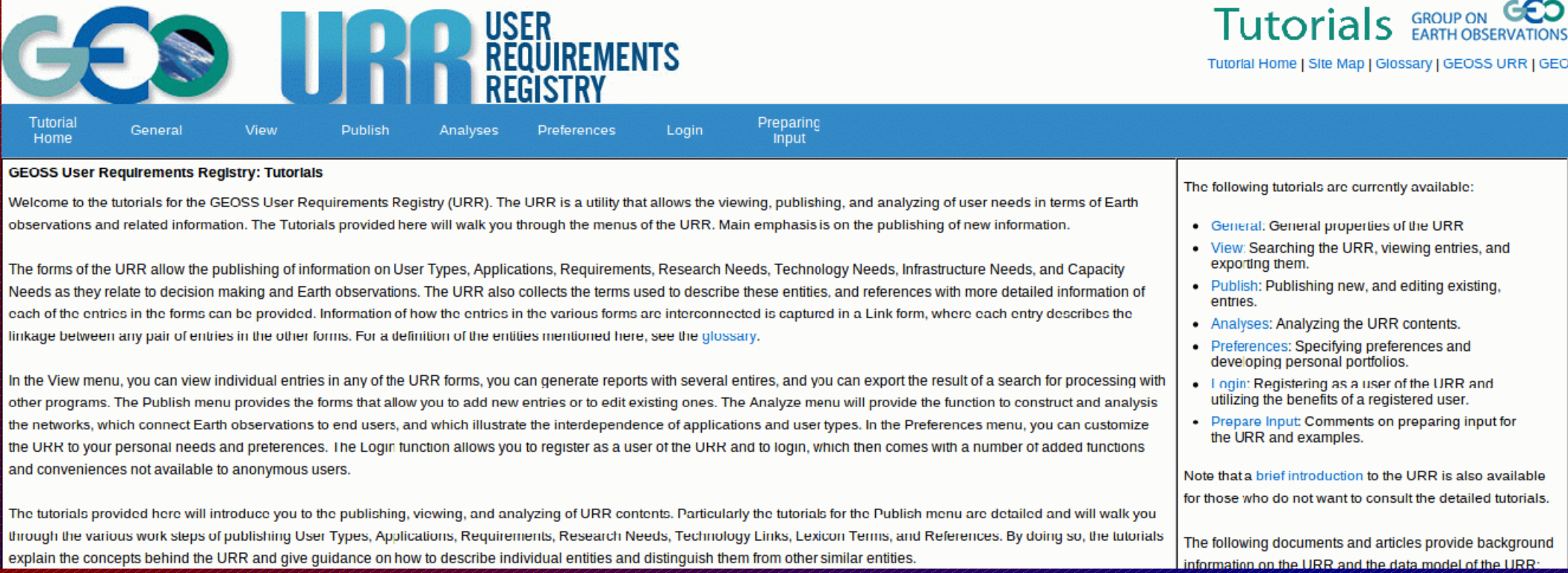
## User Information Questions

1. How would you classify yourself professionally?
   - ◯ Earth observation data and/or service provider
   - ◯ Scientist/Researcher
   - ◯ Technology and data product developer
   - ◯ Governmental agency employee
   - ◯ Private company employee
   - ◯ Policy maker or support team member
   - ◯ Public or private media person
   - ◯ Academic representative
   - ◯ Other–Please explain.

2. In what area(s) do you have experience with Earth observations? Mark all that apply
   - ☐ Raw data processing and product generation
   - ☐ Use of Earth observation products and services
   - ☐ Integration of different Earth observation products
   - ☐ Use of Earth observation products for GIS applications
   - ☐ Data/product assimilation in models and analysis
   - ☐ None
   - ☐ Other–Please explain.

3. What best describes your level of experience in using Earth observation?
   - ◯ Top-level experience
   - ◯ Somewhat experienced
   - ◯ Little experience
   - ◯ No experience

4. Identify the GEO Societal Benefit Area(s) that most closely represents your area of interest
   - ☐ Disaster
   - ☐ Health




* General: General properties of the URR
* View: Searching the URR, viewing entries, and exporting them.
* Publish: Publishing new, and editing existing, entries.
* Analyses: Analyzing the URR contents.
* Preferences: Specifying preferences and developing personal portfolios.
* Login: Registering as a user of the URR and utilizing the benefits of a registered user.
* Prepare Input: Comments on preparing input for the URR and examples.

# Site Map


- tutorial home — Tutorial home page
- General — Introduction of features common to all parts of the tutorials, including user feedback function, documentation, the data model, and help function.
  - Starting — Getting started with the URR; overview of the main common functions and the different menus.
  - Data Model — Introduction to the data model of the URR.
  - Documentation — Overview of available URR documentation.
  - Feedback — Options for feedback on the URR as a whole.
  - Help — Description of the URR help function.
- View — Tutorials on viewing and searching the URR and generating of reports
  - Introduction — Overview of the View menu. Note that the view functions are rather similar for all URR relations.
  - User Type — Detailed explanation of the view menu functions for user types.
  - Applications — Brief explanation of the view functions for applications.
  - Requirements — Brief explanation of the view functions for requirements.
  - Research Needs — Brief explanation of the view functions for research needs.
  - Technology Needs — Brief explanation of the view functions for technology needs.
  - Infrastructure Needs — Brief explanation of the view functions for infrastructure needs.
  - Capacity Building Needs — Brief explanation of the view functions for capacity building needs.
  - Links — Brief explanation of the view functions for links needs.
  - Lexicon — Brief explanation of the view functions for lexicon needs.
  - Search — Description of the use of the search function for viewing URR entries.
- Publish — Tutorials on publishing new entries and editing existing ones.
  - Introduction — Overview of the Publish menu.
  - General — Description of the functions common to all sub-menus of Publish.
    - Comments — Adding comments to existing entries.
    - References — Adding references to related documents to existing entries.
    - Edit-Functions — Overview of the edit functions available for all forms.
    - NEW — Publishing a new entry.
    - EDIT — Editing an existing entry.

# Publish

Welcome to the publishing section of the URR.

The URR provides extensive in-line help functions with each publishing form. Each input field comes with a ? symbol. Clicking on this symbol opens a window with helpful information on the type of input asked for and, if applicable, general and practical constraints and other considerations to be taken into account.

The URR aims to capture information that is as far as possible generic and not specialized to individual users or applications, or selected countries or regions. Therefore, the language used should be general enough to be applicable in all parts of the world, taking into account that terminology may have some geographical variations. The resolution of the entries should be chosen carefully in order not to over or under-sample the different entities. It is important to keep in mind that the goal of the URR is to capture user needs related to, and in support of, their decision making in terms of Earth observations or derived information.

# The URR Data Model

**Applications:** processes and activities that use Earth observations or derived information to produce new information, arrive at decisions, or execute decisions.

**User Types:** generic users who are involved in applications, benefit from these, or contribute to them.

**Requirements:** specifications of observations or derived products.

**Research Needs:** research tasks to be performed in order to enable applications that are currently not possible due to a lack of knowledge.

**Technology Needs:** description of preferably observational requirements that cannot be met because the necessary technology to carry out the observations is not available and a description of what this technology would be.

**Infrastructure Needs:** description of requirements that cannot be met or applications that can not take place because of the lack of infrastructure and a description of the infrastructure necessary to enable the applications.

**Capacity Needs:** description of problems that in parts or globally cannot be solved today because of a lack of capacity in terms of organizational or human resources and a description of the necessary capacity building that would enable applications addressing these problems.

# The URR Data Model

Capturing Interconnectivity:

**Links:** connect a source and target entries in two different or the same form.

Auxiliary registries:

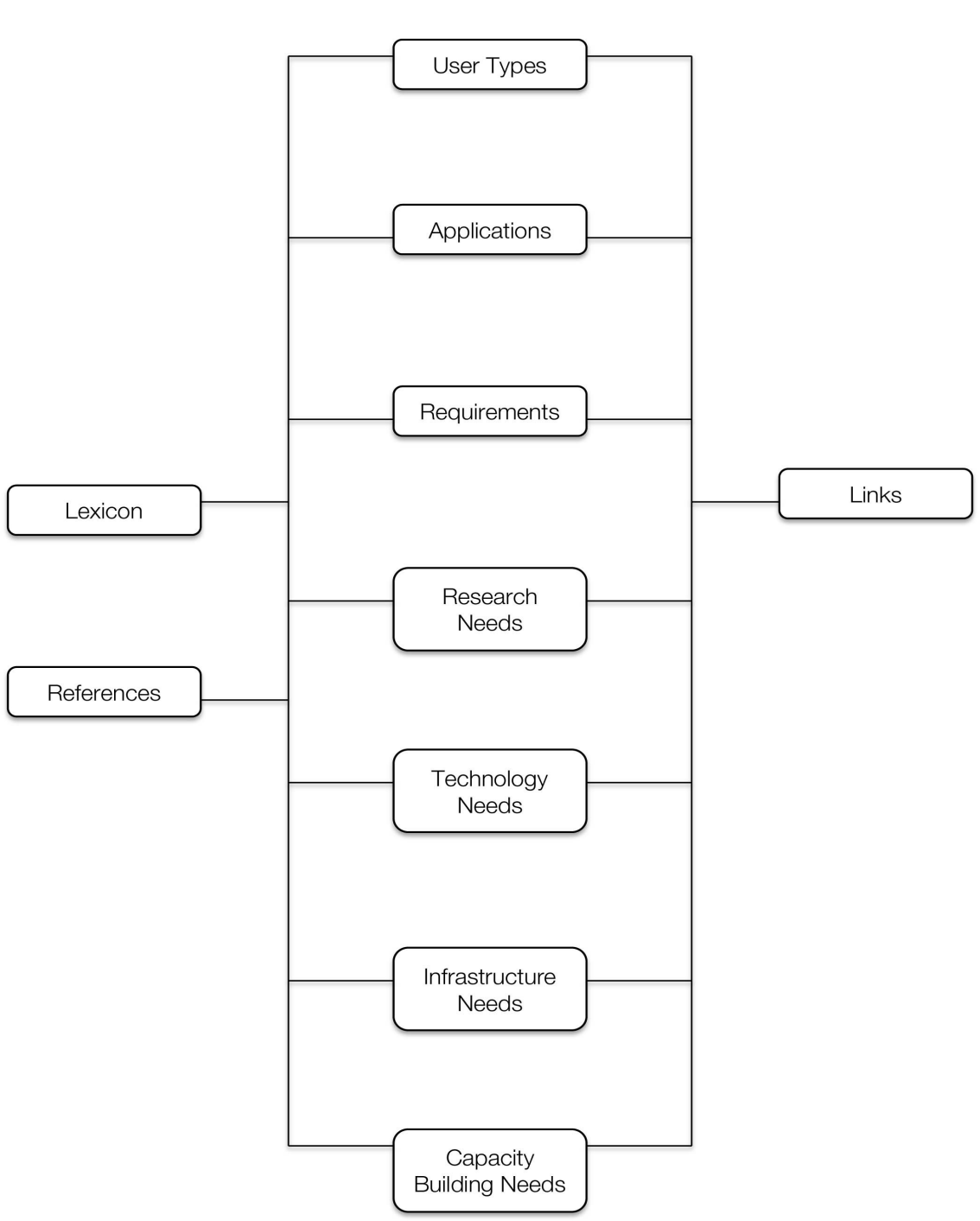
**References:** collects all references to documents (publications, reports, web pages, etc.) that are used to link entries to more detailed background information.

**Lexicon:** collects all terms used in the URR.

**Controlled Vocabularies**

- definition of acronyms and abbreviations;
- keywords;
- Earth observation parameters;
- units of observation parameters or other quantities;
- media;
- attributes of observations.

# The URR Data Model

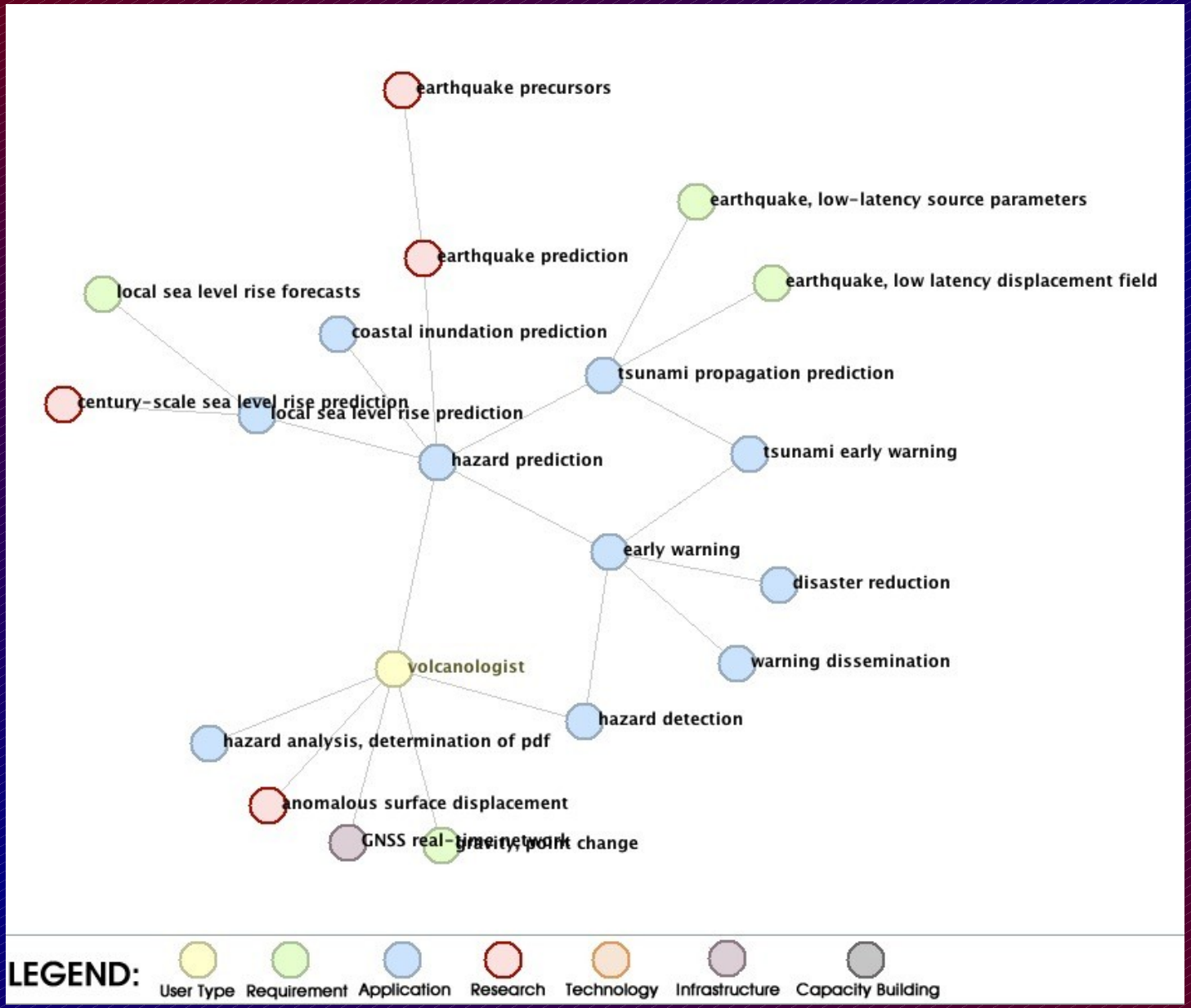


# The URR Data Model

Link concept turned out to be very powerful to capture connectivity between different elements.

Allows the construction of value chains and networks of value chains from Earth observations to end users.

# Exploring Interdependencies



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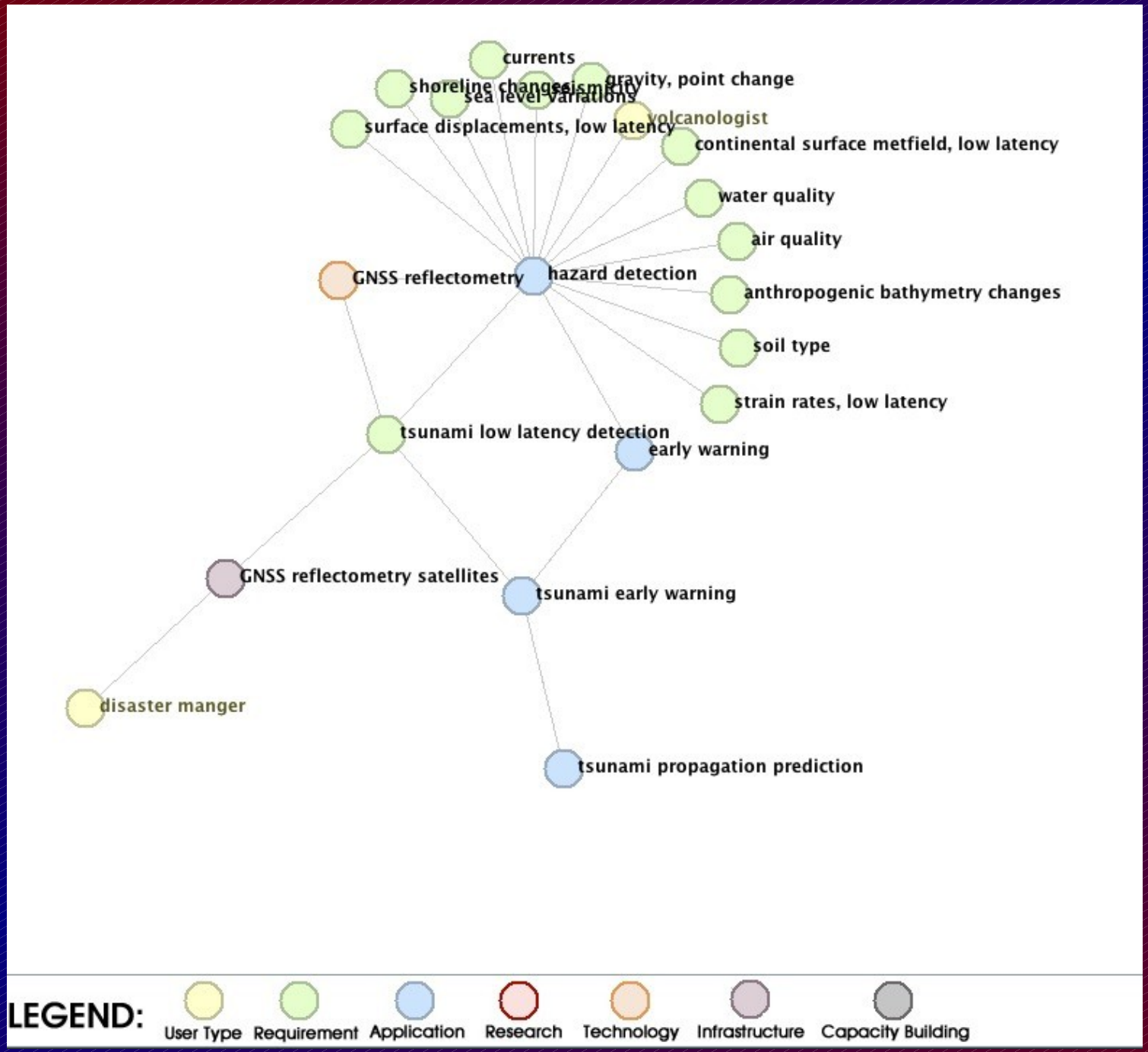

# Gap Analyses Using the URR

Analysis goals: Answer questions like:

**URR internal:**
- What user types and applications depend on this requirement?
- What data products are needed for this application?
- What research is needed to enable this application?

**URR and GEOSS Component and Services Registriy (GCSR):**
- Who is using my data for what?
- Are there data products that would meet my needs?
- What are the (most important) requirements that are not met?

**What is needed?**
- Link URR and the GEOSS Components and Services Registries
- Map ontologies onto the URR Lexicon and controled vocabularies

# Concept of Operation

Concept of Operation Document:
Describes the anticipated functionality, design, and administration of the URR by the end of 2012.

Goals:
- All menus fully implemented
- Login required for publishing
- Login optional for all other actions
- Preferences available for customizing the URR
- Advanced graphical interface available
- More SBAs published
- Gap analysis possible
- Editing procedure established
    - *What level of editing is needed?*
    - *Who should be involved as editors?*

# Approach to Populating the URR

Approach has four elements:

(1) Assessment Reports (e.g., US-09-01a)
(2) Open peer contributions (Wikipedia approach)
(3) Harvesting existing registries
(4) Interviews

For (1) and (2) considerable issues in understanding Applications, User Types, Requirements, Links emerged

Reaction: On-line Tutorials; WebEx tutorials. What else?

Large difference in the quality of the entries

## Conclusion:

## There is a need for reviewing and editing of entries.

# Approach to Populating the URR

Challenge:
Spam: Between 28 September and 10 October five entries were visibly overwritten.

Response:
Require login for publishers.

Challenge:
URR data model differs from most published documents and existing data bases.

Response:
Requires analysis of an area prior to publishing