\<Libe Washburn, UC Santa Barbara\> Current Situation and CI Requirements

OOI CyberInfrastructure
Science User Requirements Workshop:
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Intent of this template

- This slide set is a template for participants of the OOI CI requirements workshop in San Diego, January 2008
  - For presentations during the workshop
  - To capture relevant information in a structured way
- Goals of this exercise are
  - To capture as many CI relevant details as possible before the workshop
  - To capture structured, relevant information for use during and after the workshop
  - To enable quick information access for domain modeling during the workshop
  - To provide you some ideas about the expected outcome and materials covered during the workshop from a perspective of the CI design team
- We ask you to please fill it out to the degree possible/applicable. Please try to provide answers to as many (relevant) questions as you can
- You can use this template as you like. You can modify it, take only parts of it, add own slides, copy/paste out of it, use it to structure own text/spreadsheed/slideset documents ...

General goals for the Requirements Analysis

- Analyze the Current Situation
  - Definition of basic terms: model, data, etc.
  - Tools, technologies, processes, data used and/or available
  - Organizational details (e.g. responsibilities, roles in team, workflows, policies)
  - Current shortcomings for whatever reason
- Determine Short-Term Improvements
  - What would make every-day modeling tasks easier and more effective?
  - Which shortcomings should be eliminated most urgently?
- Identify CI Transformative Vision and Requirements
  - Assumed there is a transformative community CI in place, what are the expectations to an "ideal CI"?
  - Capabilities, interfaces, necessary guarantees, resources provided, etc.
- Scope
  - As relevant to the OOI CyberInfrastructure
  - From a viewpoint of your community primarily, numerical modelers

Current situation and expected changes

- **What capabilities and properties do you require from a cyber-infrastructure that supports your current work? Please rank.**

1. Access to interdisciplinary oceanographic data sets from local servers for projects such as Partnership for Interdisciplinary Studies of Coastal Oceans (PISCO), Santa Barbara Coastal- & Moorea Coral Reef- Long Term Ecological Research programs

2. Access to various oceanographic and meteorological data sets from remote servers (e.g. National Data Buoy Center)

3. Support real-time data acquisition and data download capability from remote sensors in the ocean via the Internet

Current situation and expected changes – cont'd

What capabilities and properties do you expect from a transformative cyber-infrastructure in the oceanographic domain that would benefit you and the community in the next decade? Please rank.

1. The ability to acquire data from remote sensor networks for real-time display and downloading. These sensors would be located above and below the water. The underwater sensors would ideally have wireless (e.g. acoustic, laser?, other?) connectivity to remote laboratories via the internet or whatever might replace it. Some of the sensors might be mobile (e.g. autonomous underwater vehicles).

2. Improved capacity to integrate disparate data sets (e.g. data sets in differing formats) for analysis and synthesis.

3. Improved access to remote sensing (e.g. satellite) data sets. This includes automated processing sufficient to deliver data products based on simple user queries. This already exists to a certain extent, but the overall process of acquiring data products from various satellite archives needs to be much more "user-friendly".

Current situation and expected changes – cont'd

What works particularly well in your domain? Exemplary standards, tools, platforms, portals, technologies, etc?

- Analysis tools such as MATLAB, Excel (really!), JUMP, SAS, PRIMER are widely used applications. LabVIEW is used for access/communications to remote sensors. PHP and Java are frequently used for web-programming.

- Where available, Evolution-Data Optimized (EVDO) seems to work well for communication with remote sensor network in Southern California.

Current situation and expected changes – cont'd

Please list the biggest impediments that currently exist for your work and/or the community. Please rank and explain.

1. Limited capability to acquire real-time data from remote oceanographic sensor networks constrains the ability to conduct certain types of interdisciplinary process studies (e.g. internal wave delivery of particles and nutrients to coral reefs and kelp forests).

2. Limited ability to acquire oceanographic sensor data and water samples under many ocean and weather conditions. Ships scheduling constraints make sampling many processes difficult. Better and cheaper platforms and related CI needed (e.g. AUV's & gliders).

3. Lack of standards and inadequate data description complicates integration of data sets.

Models

- **Which models do you currently use and/or develop? Please explain some important specifics of these models and any related tools.**

- The following models are in use at UCSB (There are more):

 Regional Ocean Modeling System (ROMS) for ocean dynamics, HydroLight for radiative transfer, SB DART for radiative transfer, MM5 for mesoscale atmospheric dynamics

- Please describe a typical every-day scenario developing and/or using your models, tools and data sources. Example data files, configuration files, documentation etc. are always helpful. Please attach, if available.

- What would make your modeling/analysis work more effective?

Data

- **Which data sources, data formats and meta-data formats do you use? Which format transformations and data processing operations do you perform and how?**

 - data sources: numerous oceanographic archives including: NOAA National Data Buoy Center (NDBC), Coastal Data Information Program (CDIP)

- data formats: ascii, binary, OPeNDAP

- meta-data format: XML, EML

- **How do you find data sources of appropriate format, accuracy, meta-data annotation and availability for your work?**

 - data sources located through a number of sites such as Long Term Ecological Research (LTER) Network, various NOAA & NASA sites

- How do you store, visualize and publish your modeling results?

Interfaces

- What application interfaces, user interfaces and visualization support do you envision and/or require of an effective and easy to use community cyber-infrastructure?

 - Improved support for 3-D data analysis and visualization would be helpful.

 - I find that many web sites have cryptic and confusing websites for accessing data and related data descriptions. I think there is much room for improvement in this area.

Security, Privacy, Policy

- Please explain the relevant security and policy guarantees that you and/or your organization require. This includes authentication mechanisms, authorization (access control) and resource access policy strategies, privacy needs, intellectual property issues, etc.

Operation and Maintenance

- **How do operation and maintenance requirements affect the functioning of observing infrastructure and your daily work? What importance does this topic have in your overall work?**

- Problems with software & overall computer reliability at remote sites is a significant problem. Improved CI for maintaining computers at these sites could significantly reduce maintenance costs and improve overall system reliability.

- It would be helpful to have CI to diagnosis problems and automatically log events (e.g. outages, equipment failures, etc.) at remote sites

Education and Outreach

- **How do education and outreach concerns affect your research and the presentation of the results? How do you make research results available for education and outreach purposes?**

- I use research results frequently in my teaching and public outreach.

- Materials obtained via the Internet are now an essential part of my education and outreach (E&O) efforts. I also deliver educational materials to students and the public via the Internet.

- I think there is a great need to improve institutional (i.e. university and agency) web sites to make research results more accessible to the public.

- **What would make these tasks easier?**

 - Better wireless connectivity to the Internet would make my E&O tasks easier.

Comments, Expectations, Suggestions

- What do you expect from the upcoming OOI CI requirements workshop?

I hope to learn:

  - more about CI developments in support of sensor networks and related technologies;

  - more about different

- What topics do you think are relevant and should not be missed by the organizers?

Additional reading materials, References

- Are there any similar projects/communities that you like and/or that are technology-wise exemplary?

- Are there standards, other national or international efforts that the OOI design team should consider/evaluate?

- Anything you think is relevant that you want to add to this questionnaire?

- Further reading materials

- References

Thanks!

Thanks a lot for your important contributions
and your time and efforts!