TA Office Hours
- At SAL 211
- From 4-5PM on Mondays and Tuesdays
Next Generation Climate Architecture

- Comparison of
  - Climate model outputs
  - Remote sensing data
Next Generation Climate Architecture

- Comparison of climate models & remote sensing data
- To inform decision makers and government stakeholders who make policy decisions involving weather, climate, etc.

Compare

Climate Models
- Temporal
- Spatial
- Global
- Regional
- Last Decade (EOS era)

Remote Sensing
- Temporal
- Spatial
- Over land
- Swath data
- Over sea
- Forecast
- Hindcast
Why So Difficult?

- Implementing the NGCA is not simple
- Integrating a variety of sources, interfaces, data formats, etc.
- Various statistical means may be necessary – computation- & data-intensive
- Potentially many stakeholders involved in the development

<table>
<thead>
<tr>
<th></th>
<th>Climate model output</th>
<th>Remote Sensing Data</th>
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</thead>
<tbody>
<tr>
<td>Location</td>
<td>ESGF</td>
<td>JPL PO.DAAC</td>
</tr>
<tr>
<td>Protocol</td>
<td>HTTP/REST OPeNDAP</td>
<td>FTP</td>
</tr>
<tr>
<td>File format</td>
<td>NetCDF</td>
<td>HDF version 5</td>
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<tr>
<td>Metadata</td>
<td>CF</td>
<td>HDF-EOS</td>
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<tr>
<td>Data type</td>
<td>Continuous</td>
<td>Discrete</td>
</tr>
<tr>
<td>Temporal Range</td>
<td>2000-2010</td>
<td>From 2008</td>
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</table>
NGCA Level 0

- Combining climate model output alongside remotely sensed observations
- Created for the graduate-level Software Architecture class at USC
- Loosely based on a real system
Layers of NGCA

- Integrated Development Environment
- Productivity Tools
- Application Service Layer
- Data Management Layer
- Data Access Layer
- Shared Infrastructure Support
- Education
Assignment #1

- We will challenge the NGCA design!
- Due February 13th
- Read the disseminated homework description
- What it’s about – architectural styles
  - Decomposing requirements into components and connectors
  - Selecting and leveraging architectural styles
  - Comparing pros and cons of the styles
Design NGCA Level 1

- **Create the “Level 1” architecture**
  - Components (database, high-level service)
  - Connectors
  - Protocols

- **Please specify what design activity you chose to do**
  - Brainstorming
  - Drawing from other domains
  - By analogy
  - Via literature searching
  - Etc.
Architectural Styles

• Pick 2 architectural styles
  ○ The ones you think the most appropriate for NGCA
  ○ e.g. Client-Server, Pub-Sub, Event-based, etc.

• Describe the rationale behind

• Describe the constraints of the style
  ○ What the properties of the style are
  ○ Which components and connectors adhere the constraints
For Each Style ...

- Produce a diagram for each style you chose
  - Components
  - Connectors
  - Associations between those

- For each component and connector
  - Name
  - General description
  - Key functionalities

- A bulleted list or a table
Requirements & Architectural Challenges

- Per-chosen-style

- From the NGCA doc, find 2 NGCA requirements
  - How a subset of your components and connectors satisfy them

- Think of 2 key architectural challenges
  - Again, describe how particular components and connectors work together to complete the challenge
Use-case Scenarios

- Per-chosen-style

- Come up with 1 use-case scenario that
  - Describes how your chosen style does or does not address a key challenge or a requirement you came up with
  - Show what components and connectors are involved in the use-case
  - Illustrate the steps with graphics and text
Deliverables

- One PDF file, via email

- Convention helps TA and grader / Thanks! =)

- Email title convention
  - Format: HW1, Mattmann, USCID, FullName
  - E.g.: HW1, Mattmann, 1234567890, Jae young Bang

- File name convention
  - Format: lastname_firstname_csci578_mattmann_spring2014_HW1.pdf
  - E.g.: Bang_Jae_csci578_mattmann_spring2014_HW1.pdf

- Refer to the homework description
Tips

- There is no “one and only” right answer

- Try to be specific while keeping the length reasonable (max. 3 pages – except diagrams)

- Make sure you thoroughly read the docs
  - The NGCA document
  - The homework description