The WWW: As Emerged
Hmmm……..

- Where is the excess computational power?
- Where does the data sit? (Careful!)
- Where do the preferences live? Where are the choices made?
- What’s going on in Google Maps? Google Earth? Mashups? JavaScript?
- Could we have foreseen all this?
Technical Triad of the WWW

URLs
- URLs name information resources
- HTTP defines exchanges between clients and servers

For distinguishing multiple representations

Metadata
- What happens if we “generalize”?

Protocol
Triad for Computational Web

For examining and describing computations

URLs

- URLs name computation resources
- Customizable asynch P2P

Meta-programming

Asynchronous Protocol
Demo

- A dynamic, customizable news reader
### CREST computations

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<th>Sham (HTTP/1.1 server)</th>
<th>CREST computations</th>
<th>Imposter (HTTP/1.1 client)</th>
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<tr>
<td>Apache HC (HTTP components)</td>
<td>SISC Scheme Interpreter</td>
<td>(Optional PlugIns)</td>
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<td>Java Virtual Machine</td>
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### CREST (weak) computations

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<th>Dojo Framework</th>
<th>JavaScript Interpreter</th>
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Demo FAQ’s

- What’s going on in the browser?
  - “Just graphical rendering” Dojo and Javascript for drawing **only**
- What are those visible widgets?
  - (1) Artists (2) Highly restricted CREST computations on restricted peers
- What’s being transported across the network?
  - HTML and JSON as weak CREST *expressions* describing state changes in the underlying computations
- What’s the transport protocol? HTTP/1.1
- How many CREST computations were there? ≈12
- How many nodes/servers were active? 2 laptops, 2 phones, Mac mini
- How was time fudged? Mini had stored one month of RSS feed data
- What kind of compatibility w/ existing infrastructure?
  - Completely backwards compatible with all WWW browsers & servers
The Demo, redux

- Analysis of the essential architectural decisions of the WWW, followed by generalization, opens up an entirely new space of decentralized, Internet-based applications based on computations as the fundamental entity.

- “Judicious choices” in the design of the infrastructure open up the possibility for (more) emergent behavior.
Interacting Peers

A running computation

Continuation transfer

E: Language of the execution environment

URL of the Peer

B: Binding environment
Where to from Here?

- Infrastructure development and assessment
  - security
- Exploration/exploitation of
  - URL-specific interpreters+binding environments
  - spawning computations (URLs)
- Demanding applications
  - Electric power management
  - Scientific data processing
  - E-commerce
CREST Credits

- Justin Erenkrantz
- Michael Gorlick
- Demo support:
  - Yongjie Zheng
  - Alegria Baquero
Thank you!

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