Configuring Push-Based Web Services

Lars Brenna

Joint work with Dag Johansen

Department of Computer Science
University of Tromsø
Norway
Outline

- Traditional Internet usage pattern inappropriate in some situations.

- Experience with new architectures based on Web Service technologies.

- Generalizations of our findings.
A Pull-based Infrastructure

1..n: request

Internet Service

pull API

1..n: reply
The Pull-based Web

- Traditional Internet is pull-based:
  - Client/Server model.
  - Web browsing, web services, RPC etc.

- Pull does not scale for dynamic information:
  - Short-lived and urgent.
  - Non-predictable update frequency.
  - High pull-frequency strains network resources.
  - Client-side evaluation required.
Extending the Pull-based Web

- Place subscription-based filters close to existing information sources.
- Extend pull-based sources with a push API.
- Reduce strains on sources, network and users.
- New applications possible.
A Push-based Infrastructure
Push-based Wrappers

- Proxy wrapper for pull-based sources.
  - Push-API.
  - Subscription-handling.
  - Filtering.
  - Event correlation.

- Web Services’ rich pull-API easy to extend.
Example: NASDAQ Stock Quotes
Example: NASDAQ Stock Quotes
Configuring Push-based Web Services

- **Upstream evaluation by wrapping.**
  - Subscription-based, personalized filters.
  - Client-specific delivery timing.

- **Significant gains possible.**
  - Experiments show more than 97 % reduction message volume (for stock data).
  - Reduces network strain and client disturbance.
Wide Area Information Filtering

- Computer interaction patterns are changing.

- Continuous computing on users behalf.
  - Personal Overlay Network Systems (PONS).

- Push communication on many levels.
  - Fine-grained file system events.
  - Collaborative filtering and recommendations.
  - User environment migration.
Questions?

http://www.waif.cs.uit.no
A Push-based Infrastructure

1: subscribe
1..n: notify

forward()

1: subscribe

Internet Service

push API
pull API
Alternatives to Frequent Pulling

- Upstream evaluation.
  - Subscription-based filtering.
  - Delivery by (in-frequent) pull or push.
  - High precision.
  - Better timeliness.

- Wide Area Information Filtering (WAIF)
  - Push-based filtering networks.
A Pull-based Infrastructure

1: Request (query)

2. Reply (response)
A Push-based Infrastructure

1: subscribe (query)

N-M: notify (response)

X-Y: Push

Web Service

Pull API

Push API