

Web Services Performance in a Real World Application

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Operating Systems – Fall 2006



What is a Web Service?

- Any service that:
 - is available over the Internet
 - uses a standardized XML messaging system
 - is not tied to any one operating system or programming language [Cerami 2002]



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Examples

```
SELECT *  
FROM sf0305.users  
WHERE user_id < 100
```

```
SELECT user_name  
FROM sf1104.users a, sf1104.artifact b  
WHERE a.user_id = b.submitted_by AND  
b.artifact_id = 304727
```

SELECT:

FROM:

WHERE:

Separator

- :
- ;
- #
- ,
- XML

Add SQL query to result file?

- yes
- no

News

- The database version has been upgraded. If you notice any errors, please let us know (oss@nd.edu)
- SQL query option added (as an attribute of the root element in XML output, as the first line in text file output).
- Navigation links available in upper right-hand corner.
- [FAQ](#) added.
- Wiki content now up to date through October schema.
- Numbers no longer quoted in XML output.
- November schema (sf1106) now loaded.

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Web Service Protocols

- XML-RPC
 - Lightweight, simple
- SOAP
 - More overhead, but full object-oriented capabilities, unlike XML-RPC
- SOAP with MIME attachments
 - A SOAP message with a MIME attachment (text file) in place of text in SOAP body



What benefits do they provide?

- Less human interaction required
- Queries are now automatable
 - Scripts and list of queries
 - Batch processing
- Query results can be more easily post-processed
- Only drawback – a Web Service client needs to be written or obtained



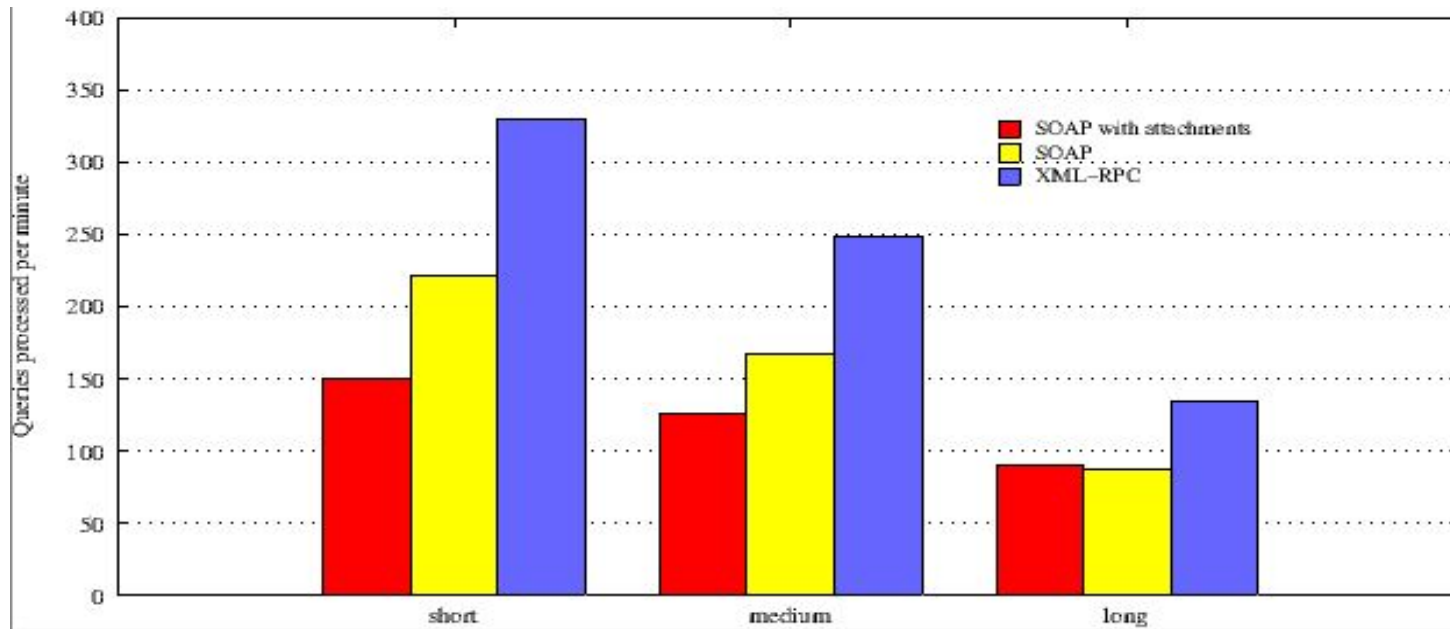
Performance Tests

- 3 SQL queries chosen
 - small result sets
 - varying processing time (short, medium, and long – based on the average query given to this system)
- Which protocol performed best?
- How would processing time affect performance?



Results

- XML-RPC performed best in all cases.
- SOAP with attachments performed poorly in all cases.



More Performance Tests

- How does the amount of data being transferred affect performance?
- Used a SQL query with a “limit” flag to control output size.
- XML-RPC bowed out early
 - Could not handle output files larger than a few kilobytes.



Results

- For files less than about 125KB, SOAP worked quickest.
- Beyond 125KB, SOAP with attachments performed quickest.
- Very large files (e.g. 5MB) saw only marginal slow down for SOAP with attachments while SOAP performance suffered greatly (SOAP was over 6 times slower for 5MB file).



Other Applications

- Repercussions in multiple areas:
 - e-business
 - Grid Services
 - Semantic Web [2]



Conclusions

- Processing time does not greatly affect performance of protocol
- Main factor affecting throughput is output size
- XML-RPC dominates for very small outputs (less than a few kilobytes)
- SOAP with attachments is only feasible option for extremely large outputs



Works Cited

- [1] Cerami, E. Web Services Essentials, 2002.
- [2] Medjahed, B. Semantic Web Enabled Composition of Web Services, 2004.

