A REST server for IRMIS3

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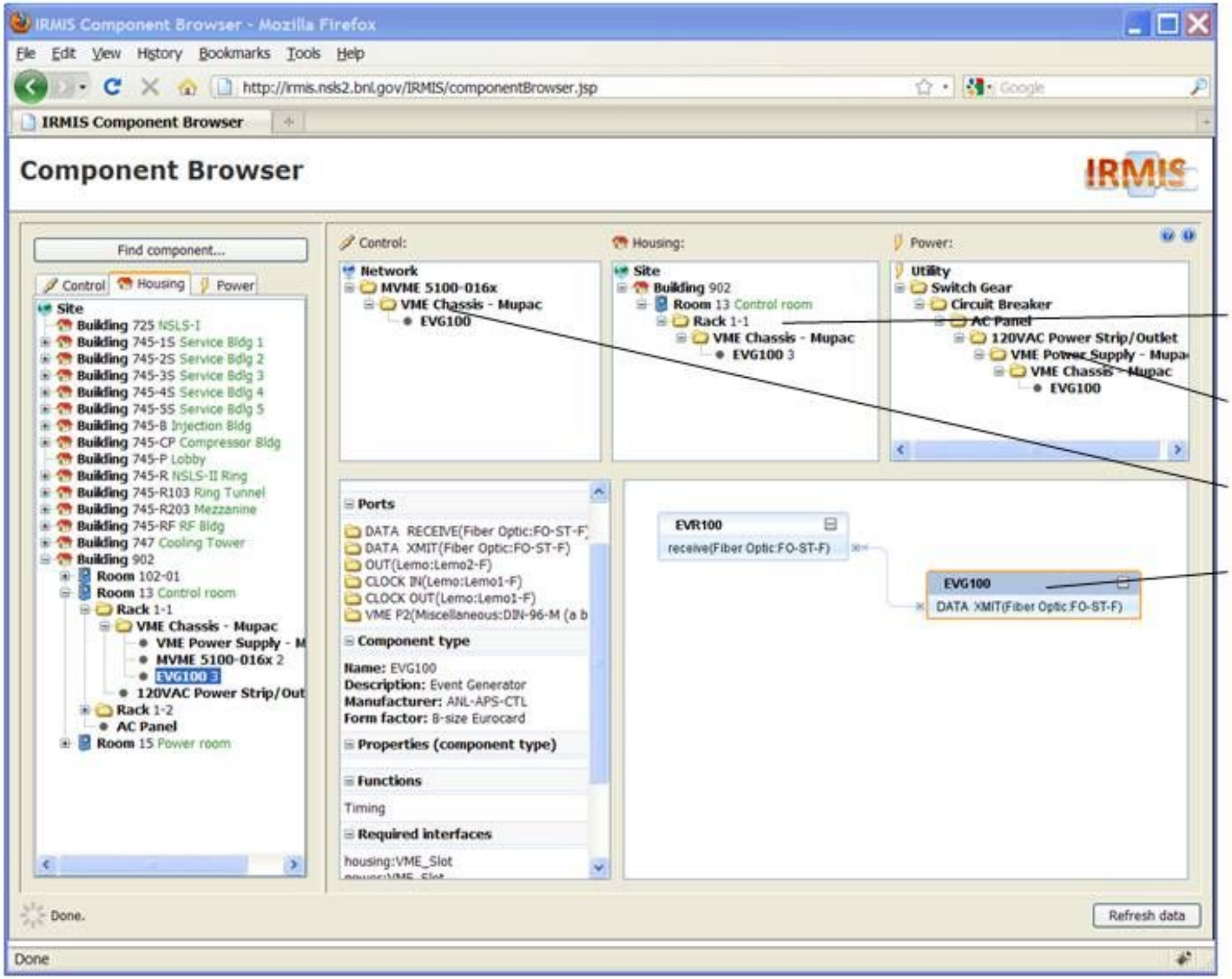
Summary

- What is IRMIS?
- IRMIS3 architecture
- Getting data
- Writing data
- Implementation
- Performance

What is IRMIS?



DB and tools
to keep track of
accelerator parts
and their
relationships

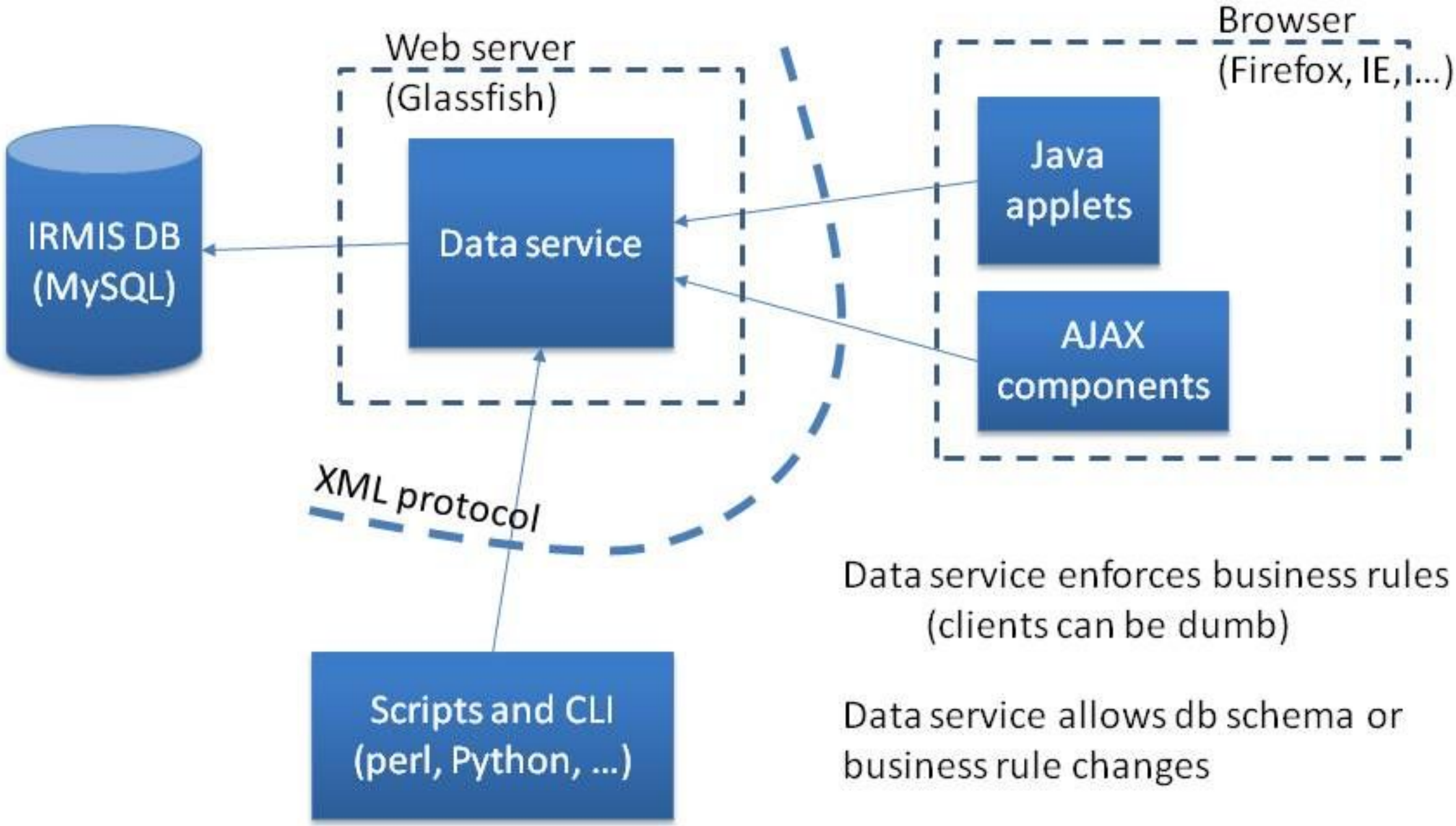
Where is it?

How is it powered?

How is it controlled?

How is it connected?

IRMIS3 architecture



Data service enforces business rules
(clients can be dumb)

Data service allows db schema or
business rule changes

Data service provides a good abstraction
layer on which to integrate

Getting data

```
<componentType id="90" description="Oscilloscope: 4 Channel @ 500MS/s; 500MHz BW" name="HP54540A">
  <manufacturer id="5" name="Agilent (HP)"/>
  <formFactor id="5" description="Freestanding"/>
  <functions>
    <function id="46" description="CCMS"/>
    <function id="8" description="Instrument"/>
  </functions>
  <requires>
    <interface id="143" description="GPIB_Slave" relType="control"/>
    <interface id="5" description="Freestanding" relType="housing"/>
    <interface id="78" description="120VAC" relType="power"/>
  </requires>
  <presents>
    <interface id="234" description="Port" relType="control"/>
  </presents>
  <ports>
    <port name="Chnl 1">
      <portType id="13" name="BNC-F" group="RF Connectors">
        <pinDesignator id="303" name="1"/>
      </portType>
      <pin usage="Chnl 1" pinDesignatorId="303">
        <signalType id="1" direction="IN"/>
      </pin>
    </port>
    <port name="Chnl 2">...</port>
    <port name="Chnl 3">...</port>
    <port name="Chnl 4">...</port>
    <port name="RS232">...</port>
    ...
  </ports>
</componentType>
```

XML returned

REST style (data service)

De-normalized data

Id references

This is an example of what the data service might deliver

Writing data

XML describing a transaction sent through a POST

```
<transaction  xmlns:xsi='http://www.w3.org/2001/XMLSchema-instance'
   xmlns='http://xml.bnl.gov/schema/irmis'
   xsi:schemaLocation='http://xml.bnl.gov/schema/irmis irmis.xsd'>
    <create>
        <manufacturer name="Acopian"/>
    </create>
    <update>
        <componentType id="2" name="Site" description="Overall facility. Root of housing hierarchy.">
            <manufacturer id="1" name="None"/>
            <formFactor id="1" description="Virtual"/>
            <properties/>
            <functions/>
            <requires/>
            <presents/>
            <ports/>
        </componentType>
    </update>
    <delete>
        <formFactor id="4" description="IndustryPack"/>
    </delete>
    <connect>
        <cable color="blue" label="AA" portAId="123" portBId="321"/>
        <conductor pinAId="123" pinBId="321"/>
        <conductor pinAId="124" pinBId="322"/>
    </connect>
</transaction>
```

different independent “commands”

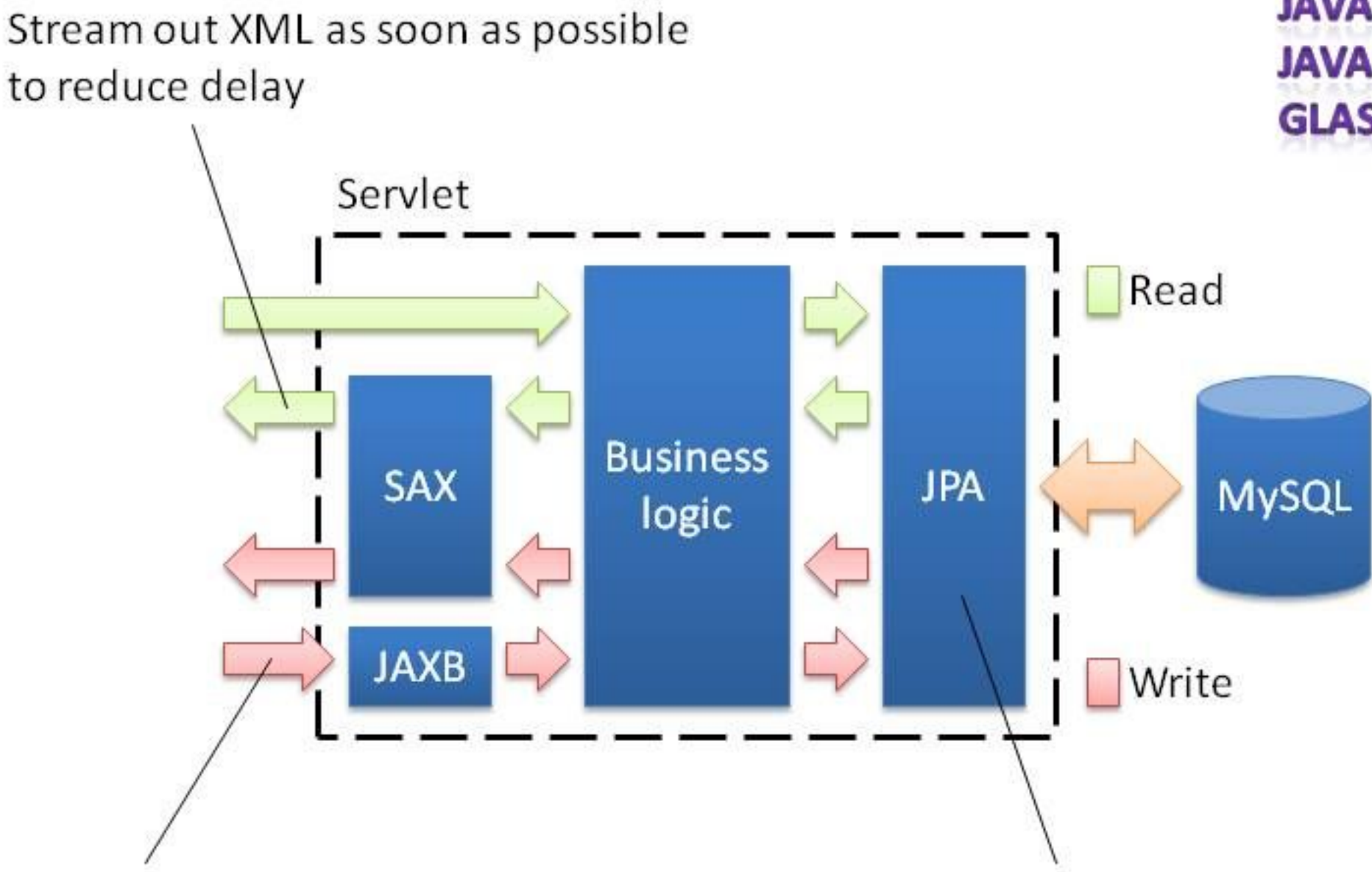
no lock “FOR UPDATE”

idempotent actions (error or same result)

allows remote/disconnected work

Implementation

JAVA SE 6
JAVA EE 5
GLASSFISH 2.X



Performance

- Dell Precision M4300 laptop, Intel Core Duo T7500, 2.20 GHz - APS dataset
  - Entire component data set streamed in about 5 seconds (31338 components, 63911 relationships)
  - Most other queries under 100 ms (manufacturers 88ms, interfaces 95ms)
- Roughly half of the time is spent in DB access and half in XML generation
  - Streaming starts right after DB access
- Only tuning done is on the database query (was "good enough")
  - Other areas: hardware/os tuning, xml generation improvements, profiling, caching, …

Conclusion

- 12 releases, 6 database schema changes within a year
- Interests from other sites
  - NSLC (Michigan State University) contributed a php API
  - Developed a small inventory management on top

- Consider services in front of your databases
  - Easier to evolve, encapsulate business logic
- Use REST for data and SOAP/XML-RPC for RPC