A Java API for HL7 Version 3 RIM

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"Write once, run anywhere"
Useful abbreviations

- **HL7** = Health Level Seven, Inc. [www.hl7.org](http://www.hl7.org)
- **SIG** = Special Interest Group
- **V3** = Version 3
- **RIM** = Reference Information Model
- **RMIM** = Refined Message Information Model
- **HMD** = Hierarchical Message Definition
- **HIMSS** = Health Information Management Systems Society [www.himss.org](http://www.himss.org)
- **ebXML** = Electronic Business XML [www.ebxml.org](http://www.ebxml.org)
- **W3C** = World Wide Web Consortium [www.w3.org](http://www.w3.org)
- **OASIS** = Organization for the Advancement of Structured Information Standards [www.oasis-open.org](http://www.oasis-open.org)
Sun's HL7 work

- Evangelize ebXML framework for electronic business
- Co-chair HL7 Java SIG
- Represent Java SIG in HL7 Interoperability events (e.g., HIMSS 2003)
- Support Java SIG code development by recruiting volunteers and funding work by experts under contract with Sun
Background: XML at HL7

- Prior to 1996, HL7 developed EDI formats for healthcare information interchange
- SGML/XML SIG chartered in 1997 with three working groups
  - Documents: Patient Record Architecture
  - Messaging: Message encoding in XML
  - Education: Teaching HL7 about XML
- Foundation for HL7 Version 3, the XML-based standard (to be balloted this year)
HL7 Java SIG

- Sponsored by HL7 Control/Query TC
- Chartered to develop Java API to HL7 V3 RIM, which uses XML
- Supported by
  - Sun Microsystems
  - Oracle
  - McKesson
  - US Veterans Administration
  - Regenstrief Institute (University of Indiana)
Goals of HL7 Java SIG

• Encourage adoption of HL7 V3
• Foster HL7 V3 application interoperability
• Provide universal HL7 API for full range of healthcare applications
• Provide sample implementations for developers
• Encourage HL7 V3 API development for other popular programming languages
HL7 Java SIG chronology

• Approved by HL7 Technical Steering Committee and HL7 Board, May 2002
• Approved basic API design in July 2002, started development
• Accepted role in HL7 interoperability demo for HIMSS conference, October 2002
• Completed and showed API demo code at HIMSS, February 2003
The HL7 V3 Java API

- Java classes for HL7 RIM objects
- Java classes for HL7 data types
- Tools:
  - Message builder
  - Message parser
API design principles

• Minimal interpretation
  – Classes reflect V3 specifications as directly as possible
• Universal, not specific
  – Classes enable *any* message type, not specific message types
• Intelligent use of HL7 V3 specifications and resources (e.g., HMDs)
• Adaptable, "scalable"
  – New message types don't require new classes
API components (1)

Java classes for RIM objects

- "Getters" and "setters" for in-memory message structures
- Create, read instances of HL7 V3 RMIMs
API components (2)

Java classes for HL7 V3 RIM data types

- 29 specific datatypes
- Many data types contain rich methods
- Specific data type handlers support API tools
API components (3)

Message builder

- Creates V3-compliant XML message from in-memory RMIM instance
- Uses HMD to build XML message with correct elements in correct order with appropriate attributes
- May also use XML message templates (under discussion)
API components (4)

Message parser

- Creates in-memory RMIM instance from V3-compliant XML message
- Uses HMD to establish correct data structure suggested by XML elements
- Uses data type-specific handlers to evaluate data in XML message
Creating V3 XML messages

<?xml version="1.0" encoding="utf-8"?>
<Message xmlns="urn:hl7-org:v3"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="urn:hl7-org:v3 ./schemas/MCCI_MT000101.xsd">
  <id root="2.16.840.1.113883.9876.349" extension="347782"/>
  <creationTime value="20021006170600"/>
  <sender>
    <servedBy>
      <id root="2.16.840.1.113883.9876.349" extension="EpicCare"/>
      <name>EpicCare Patient Medical Records</name>
    </servedBy>
  </sender>
  <receiver>
    <servedBy>
      <id root="2.16.840.1.113883.9876.378" extension="Pharmacy"/>
      <name>JavaSIG Object Browser</name>
    </servedBy>
  </receiver>
  <versionId>v3r1b3</versionId>
  <interactionId root="2.16.840.1.113883.9876.5" extension="JSIG_IN003000"/>
  <processingCode code="P"/>
  <processingModeCode code="T"/>
  <acceptAckCode code="AL"/>
  <applicationAckCode code="AL"/>
  <hasPayload><![CDATA[message continues]]></hasPayload>
</Message>
Parsing V3 XML messages

```xml
<?xml version="1.0" encoding="utf-8"?>
<Message xmlns="urn:hl7-org:v3"
    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xsi:schemaLocation="urn:hl7-org:v3.schemas/MCCI_MT000101.xsd">
    <id root="2.16.840.1.113883.9876.349" extension="347782"/>
    <creationTime value="20021006170600"/>
    <sender>
        <servedBy>
            <id root="2.16.840.1.113883.9876.349"
                extension="EpicCare"/>
            <name>EpicCare Patient Medical Records</name>
        </servedBy>
    </sender>
    <receiver>
        <servedBy>
            <id root="2.16.840.1.113883.9876.378"
                extension="Pharmacy"/>
            <name>JavaSIG Object Browser</name>
        </servedBy>
    </receiver>
    <versionId>v3r1b3</versionId>
    <interactionId root="2.16.840.1.113883.9876.5"
        extension="JSIG_IN003000"/>
    <processingCode code="P"/>
    <processingModeCode code="T"/>
    <acceptAckCode code="AL"/>
    <applicationA1ckCode code="AL"/>
    <hasPayload><!-- message continues -->
```
API current status

- "Preliminary, incomplete prototype" demonstrated at HIMSS 2003
- Classes for HL7 V3 RIM classes: all completed
- Classes and handlers for HL7 V3 data types: only 3 of 29 completed
- Message parser: completed
- Message builder: not yet started
Next steps for Java SIG

- Assess current completion
- Calculate requirements to complete alpha-level components
- Recruit further technical resources
- Publish a tentative schedule for alpha release of API
Thanks for your attention!

Questions?
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