Job Messaging Format (JMF) Tutorial

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Overview

- Transport protocols for JMF
- JMF Message families
- JMF over HTTP
- MIME packaging
- Open issues in JMF

What is a JMF Message?

- An XML document contained in
  - a file written to a folder
  - the body of a HTTP request or HTTP response
- Some usages
  - Job submission
  - Snapshots of job and device status
  - Dynamic job update
  - Queue support

Transport Protocols for JMF

- File Protocol
  - JMF is written to and read from a folder in a file system
  - Unidirectional
  - Asynchronous
- **HTTP Protocol**
  - JMF is sent in the body of a HTTP request/response
  - Bidirectional
  - Synchronous and asynchronous
  - Required by Base ICS Level 2 and 3
  - Optionally secure with HTTPS

JMF Message Families

- **Command** — requests a state change
- **Query** — requests information
- **Response** — synchronous reply to a *Command* or *Query*
- **Acknowledge** — asynchronous reply to *Command* (and *Query* in JDF 1.3)
- **Signal** — a response to a subscribed *Query*; triggered by a condition

Levels of JMF Messaging

- Base ICS Level 1
  - No messaging
- Base ICS Level 2
  - *Signal* messages — hard wired subscriptions to *Queries*
  - Manager requires a HTTP server
  - Worker requires a HTTP client
- Base ICS Level 3
  - *Query*, *Command*, *Response* and *Acknowledge* messages
  - Manager and worker both require a HTTP client and server

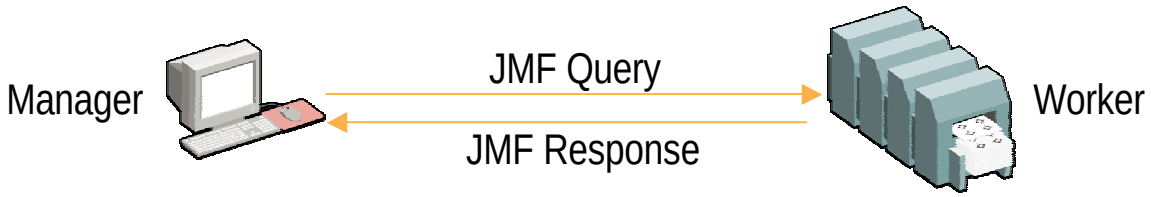
JMF over HTTP

- JMF messages are transported in the body of a HTTP POST request or HTTP response
- JMF *Command*, *Query*, *Signal* and *Acknowledge* are sent in a the body of a HTTP POST request
- JMF *Response* is sent in the body of a HTTP response

JMF over HTTP

- If the HTTP POST body contains a
  - JMF *Query* or *Command*
    - The HTTP response body contains a JMF *Response*
  - JMF *Signal* or *Acknowledge*
    - The HTTP response body is empty
- If the HTTP body contains a JMF message the HTTP header *Content-type* must be set to *application/vnd.cip4-jmf+xml*

JMF Example




```
<?xml version="1.0" encoding="UTF-8"?>
<JMF SenderID="JMFTransmitter" TimeStamp="2005-01-23T10:10:03+01:00"
    Version="1.2" xmlns="http://www.CIP4.org/JDFSchema_1_1"
    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
  <Query ID="0815" Type="Status" xsi:type="QueryStatus"/>
</JMF>
```

JMF Query

```
<?xml version="1.0" encoding="UTF-8"?>
<JMF SenderID="No ID configured" TimeStamp="2005-01-23T10:10:10+01:00"
    Version="1.2" xmlns="http://www.CIP4.org/JDFSchema_1_1"
    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
  <Response ID="R0815" Type="Status" xsi:type="ResponseStatus" refID="0815">
    <DeviceInfo DeviceStatus="Idle">
      <Device Class="Implementation" DeviceID="Elk" ID="Elk1234"
        KnownLocalizations="En" ModelName="Elk" Status="Available"/>
    </DeviceInfo>
  </Response>
</JMF>
```

JMF Response

MIME Packaging

- A JMF message may be bundled in a MIME encoded package together with a JDF job ticket and other digital assets
- The MIME package is sent in the body of a HTTP POST request
- The HTTP header *Content-type* must be *multipart/related*

MIME Packaging

- The content in the MIME package must be in the following order:

Position	Content	Content Type
0	JMF message	application/vnd.cip4-jmf+xml
1 to N	JDF job ticket	application/vnd.cip4-jdf+xml
N+1 to M	Digital assets	*Depends on asset*

- JMF and JDF refer to other files in the package using the CID URL scheme: ***cid:****file.pdf@cip4.org*

Open Issues in JMF

- Automatic discovery of JMF-enabled systems on the network
  - IETF Zero Configuration Networking (Zeroconf), http://www.zeroconf.org
- Authentication
  - Standard Client-server authentication with certificates over HTTPS
  - How should certificates be exchanged and installed?

References

- JMF messaging
  - JDF Specification 1.2, Chapter 5
    http://www.cip4.org/documents/jdf_specifications/JDF1.2.pdf
  - Base ICS
    http://www.cip4.org/document_archive/documents/ICS-Base-1.0.pdf
  - CIP4's JMF Working Group
- CIP4's Elk Framework
  - An open source implementation of JMF messaging with partial Base ICS Level 3 support
  - Project homepage: http://elk.itn.liu.se

Thank you for listening!

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JDF NOW