Cloverleaf on FHIR:
HL7 V2 meets the Message Bundle

Paris, FHIR Hackathon #9, Track 2

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Who we are

Health–Comm GmbH

European Centre of Excellence for Implementation, Consultancy and Training for Cloverleaf® Integration Suite by INFOR since 1996
What we do
What we want to do
What we already did

- Joined the Hackathon in Amsterdam 2014
- Extracted Patient information from HL7 V2 message and created a Patient Resource
- POST‘ed Patient Resource to different FHIR Servers
What we did not (yet) do

- Update Patient Resources of which we do not know the URL
- Extract more information from ADT Messages (Encounter, Insurance, Allergies, Location…)
- Interlink the Resources without knowledge of their respective URLs
...so we made a Bundle

```xml
.bundle xmlns="http://hl7.org/fhir"
  <id value="20150425113948"/>
  <type value="message"/>
  <entry>
    <resource>
      <MessageHeader/>
    </resource>
  </entry>
  <entry>
    <resource>
      <Patient/>
    </resource>
  </entry>
  <entry>
    <resource>
      <Encounter/>
    </resource>
  </entry>
  <entry>
    <resource>
      <AllergyIntolerance/>
    </resource>
  </entry>
</bundle>
```

**MSH**|~\&|LegacyKIS|Cloverleaf|...
---|---|---|---|---
**EVN**|A01|20150502090000|
**PID**|1|1234123123^10^...|
**NK1**|1|Kennedy^Joe|FTH...|
**PV1**|I|INT^0001^02^GENHOS|...|
**AL1**|1|DA|1605^acetaminophen^L|MO|...|
**AL1**|2|DA|1558^Oxycodone^L|MO|...|
**AL1**|3|MA|2221^Peanuts^L|SV|...|
...for Server who can deal with

- Snapshot style updates of multiple Resources of a kind (delete previously known Allergies before adding the new ones)
- Re-identifying resources by a unique value (e.g. Patient by identifier.system & identifier.value) and dynamically chose the appropriate action
- Updating client assigned IDs in all references throughout the bundle
- Complex & heterogenic business logic association with different Message Event Types
...and for those who can’t...

We made a custom FHIR protocol driver who does the heavy lifting client side, reducing the server side requirements to atomic REST operations.*

*after all, you *can* move complexity around, right?
Using HAPI to get the job done

<?xml version="1.0"?>
- <Bundle xmlns="http://hl7.org/fhir">
  <id value="20150425113948"/>
  <type value="message"/>
  - <entry>
    - <resource>
      + <MessageHeader>
    </resource>
  </entry>
  - <entry>
    - <resource>
      + <Patient>
    </resource>
  </entry>
  - <entry>
    - <resource>
      + <Encounter>
    </resource>
  </entry>
  - <entry>
    - <resource>
      + <AllergyIntolerance>
    </resource>
  </entry>
  - <entry>
    - <resource>
      + <AllergyIntolerance>
    </resource>
  </entry>
  - <entry>
    - <resource>
      + <AllergyIntolerance>
    </resource>
  </entry>
  - <entry>
    - <resource>
      + <AllergyIntolerance>
    </resource>
  </entry>
</Bundle>
More Messaging...

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