

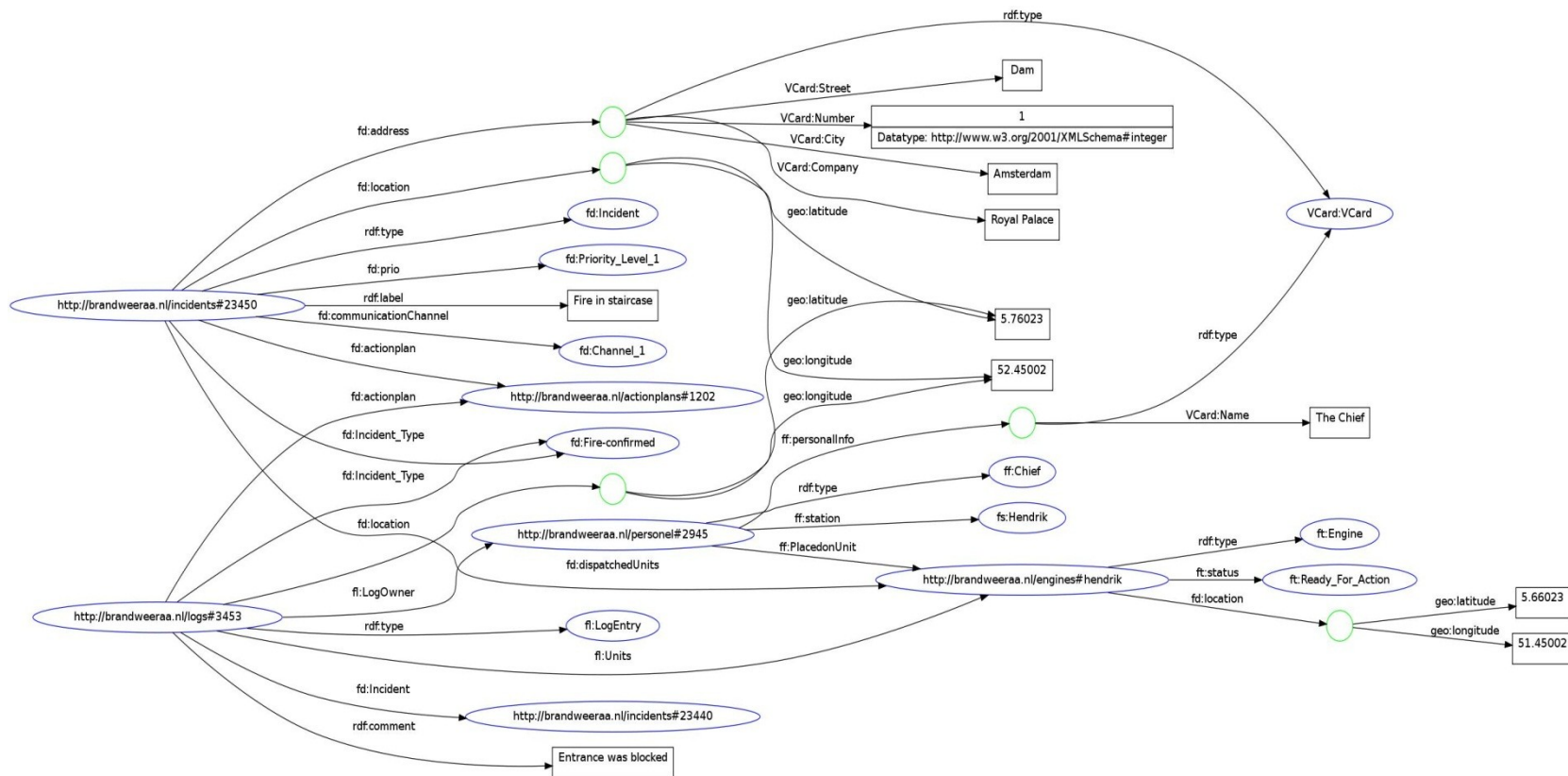


# Under the Hood

**Fighting Fires with Real-Time Semantic Web Technology**



Bart van Leeuwen / [bart@netage.nl](mailto:bart@netage.nl) / [@semanticfire](https://twitter.com/semanticfire)



Model:  
(Unknown)

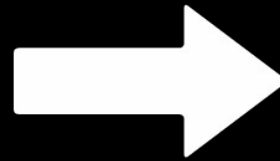
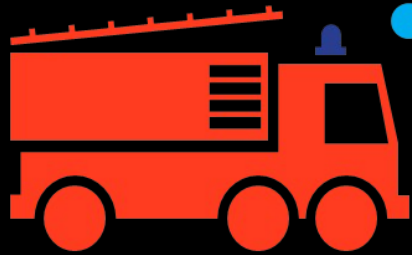
Namespaces:  
 geo: http://www.w3.org/2003/01/geo/wgs84\_pos#  
 VCard: http://www.w3.org/2006/vcard/ns#  
 ft: http://firedept.org/trucks#  
 ff: http://firedept.org/hrinfo#  
 fs: http://firedept.org/stations#  
 fi: http://firedept.org/logs#  
 fd: http://firedept.org/dispatch#  
 rdf: http://www.w3.org/1999/02/22-rdf-syntax-ns#





**My Fear**





4 MINUTES





**Reality**

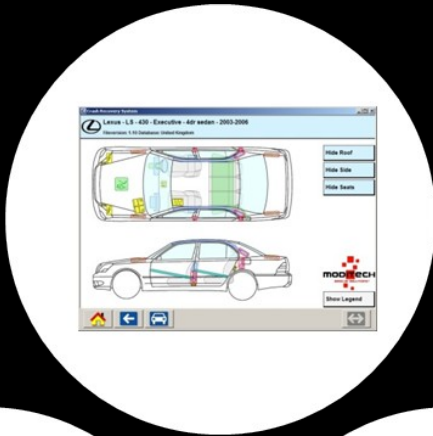








**Agile**





# Where it hurts most

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# Where it hurts most

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- Shift in personnel origin
  - Less 'native' Amsterdam
  - Deprived of local knowledge
  - Depend a lot on new technology
- Tools that just do not do it
  - Answers to Questions we didn't ask
  - Navigation system tells me next step, not the target adres
  - Needs interaction

# Navigation

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# Messages

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# Hands on!

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# Requirements

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- Non interactive
  - Always on
  - No keyboard or mouse
- Outside fire truck
  - 10 seconds of relative tranquility so limited information
- Overview
  - Station location
  - Incident location
- Non abbreviated text
  - Expand to full text

# Proof of Concept

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- Over the air P2000 Messages
  - RS-232 connected receiver
- Build URI Encoded URL of message
- Web Browser in Kiosk Mode
- PHP Script
  - Extract address
  - GeoCode with GoogleMaps API
- Google Maps on web page

# POC - Conclusion

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- 'Great can you show information X as well?'
  - Data model needs to be extensible
- 'After a Windows update the maps looks wierd'
  - Client software should be under stricter control
- 'I Work on another station can we get this as well?'
  - Deployable software
  - Distributed infrastructure



**The first version**

# Data Model

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# Why RDF?

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- No clear overall picture
  - Flexible model
  - Agile development
- Point to external data
  - Linked by definition
- Open data ready
  - Multiple serializations
- Web technology
  - W3C Recommendation



# Vocabularies – Reuse!

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- Events & relations
  - VU SEM Simple Event Model [1]
- Geo Locations
  - W3C WGS84 Geo vocabulary [2]
- Metadata
  - OWMS/Dublin Core [3]
- Addresses
  - Vcard [4]
- Definitions
  - SKOS [5]
- Only 6 domain specific properties! [6]

# Distribution

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# Apache ActiveMQ

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- JMS Broker [7]
  - Opensource Java
- Multi protocol
- Scalable
  - Single instance +10k queues
- Message Persistence
- Web based configuration / monitoring

# Queue Interaction

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- P2000 message listener
  - REST Interface
- P2000 message decoder
  - Handled by php script
- Message distribution
  - 1 queue per attached monitor
  - Based on P2000 address code

# Server software

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- PHP Daemonized & REST
  - Quick prototyping
  - In house knowledge
- Semsol ARC2 [8]
  - Triple store
  - Multiple serializations
  - Maintained and Documented
- Stomp [9]
  - Standard messaging protocol
  - Supported by ActiveMQ

# User Interface

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# Mozilla XULRunner

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- Multi platform Gecko Engine ( Firefox ) [10]
- Package HTML + Javascript apps
  - low level extras
    - Certificate control
    - Multi threading
    - Window dressing
- No Cross domain policy issues !
  - Mainstream JS libraries work perfectly

# The Application

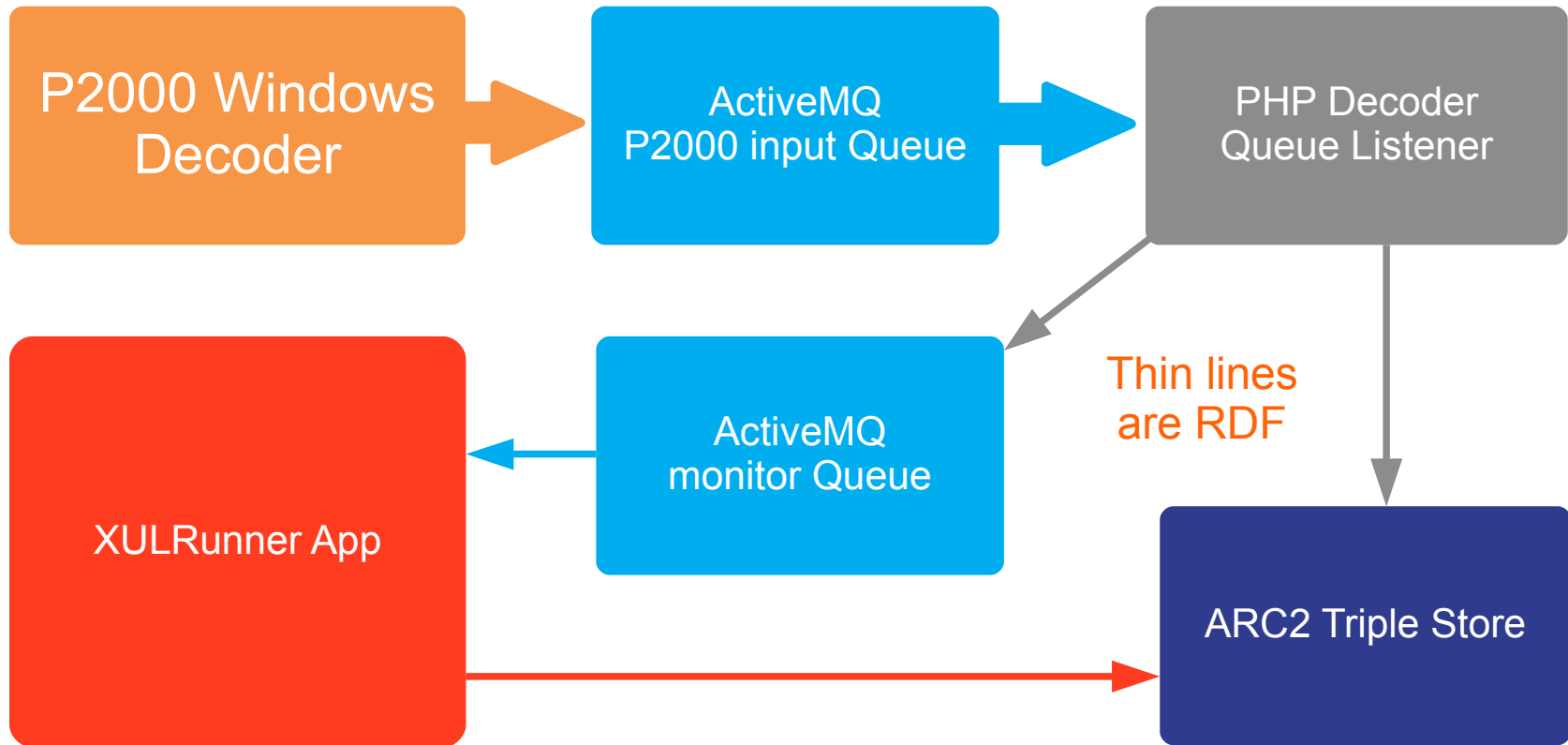
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- Queue listener over HTTP
  - Fetches Incident URI
- Rdfstorejs [11]
  - Extract property values
- HTML OpenLayers web page [12]
  - Show overview
  - Zoom view if needed
- Auto restart on connection loss
- Software update-able

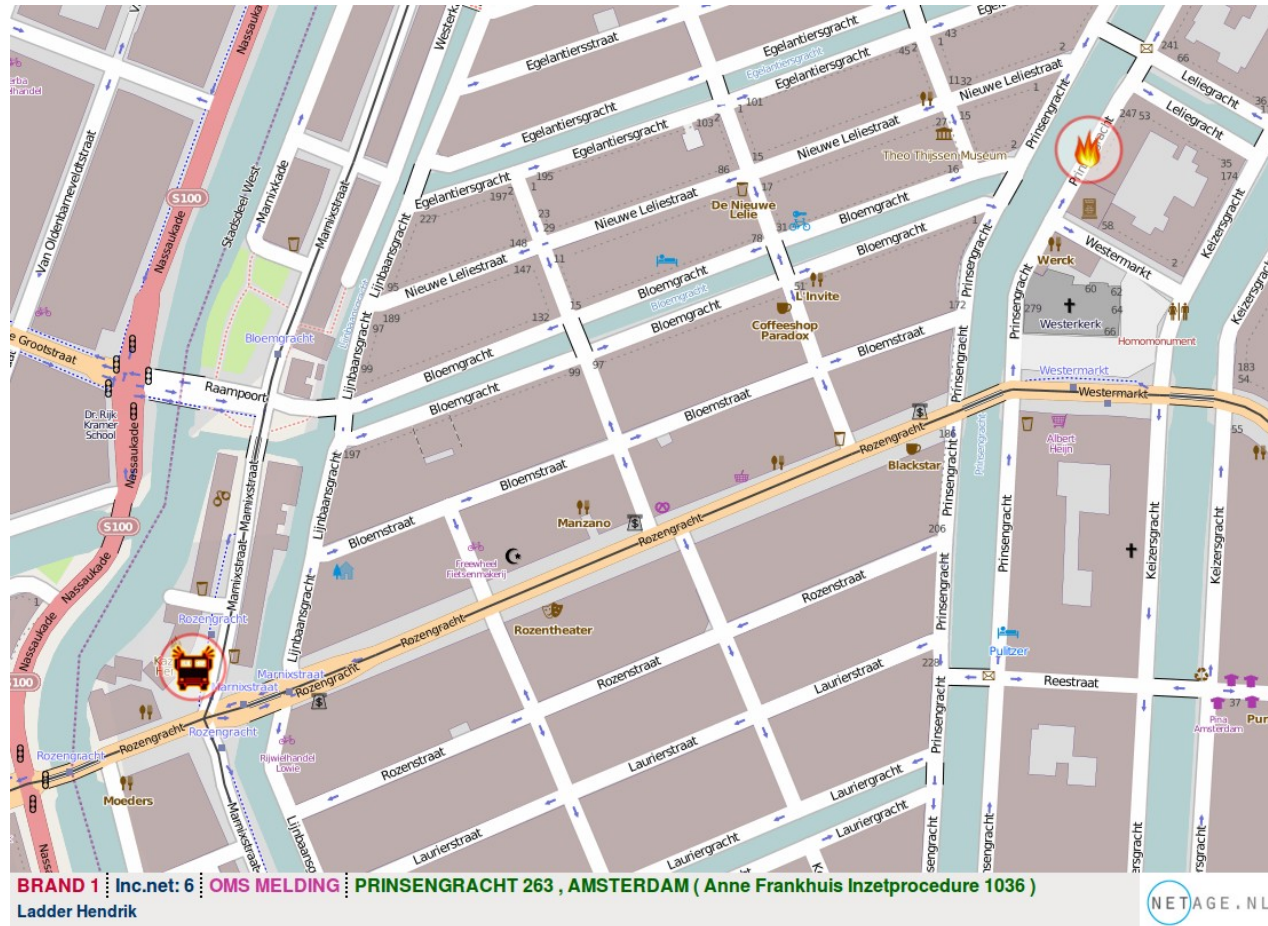


# Overview

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# Current monitor







**Let's make a  
product**

# Publications

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# Product

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- Interest outside Amsterdam
- Installable
- Local requirements
- Less control
- Portable clients

# New Features

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- Distribute SPARQL 1.1[13] updates
  - More fine grained control
- Use WebID [14] for monitors
  - Single Sign On
- Enterprise patterns
  - J2EE Container
- Introduce Agent structure
  - Fetch external data
- Move to another Triple store
  - Scalability
- Multiple interfaces
  - a.o. mobile

# Distribution

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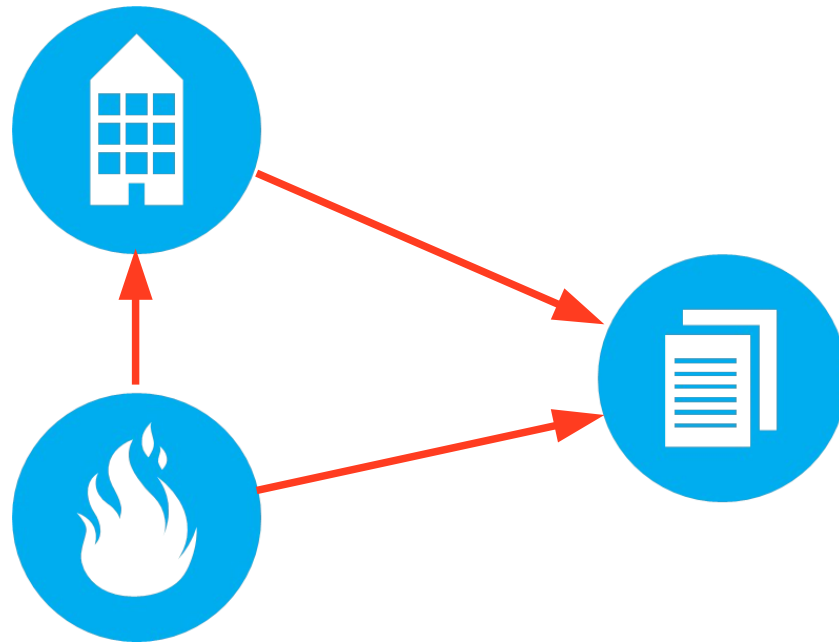
# Distribution

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- IBM WebSphere Application Server CE [15]
  - J2EE Container
    - Includes ActiveMQ
- Triplestore
  - Jena TDB [16]
  - IBM DB2 v10 Graph store [17]
- RESC.Info components
  - Jena Based [18]
    - Servlets
    - Message driven beans

# External Data

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# External Data

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- Agents fetch external Data
  - Convert and insert linked data
- Sources
  - Linked data
    - Historic Museum
  - Traditional datasets
- Traditional data sets
  - CSV / SQL Databases
    - D2RQ mapping [19]
- Linked Data sets
  - Sparql endpoint
  - Dereferencing
- Insert copy of data in incident graph

# User Interface

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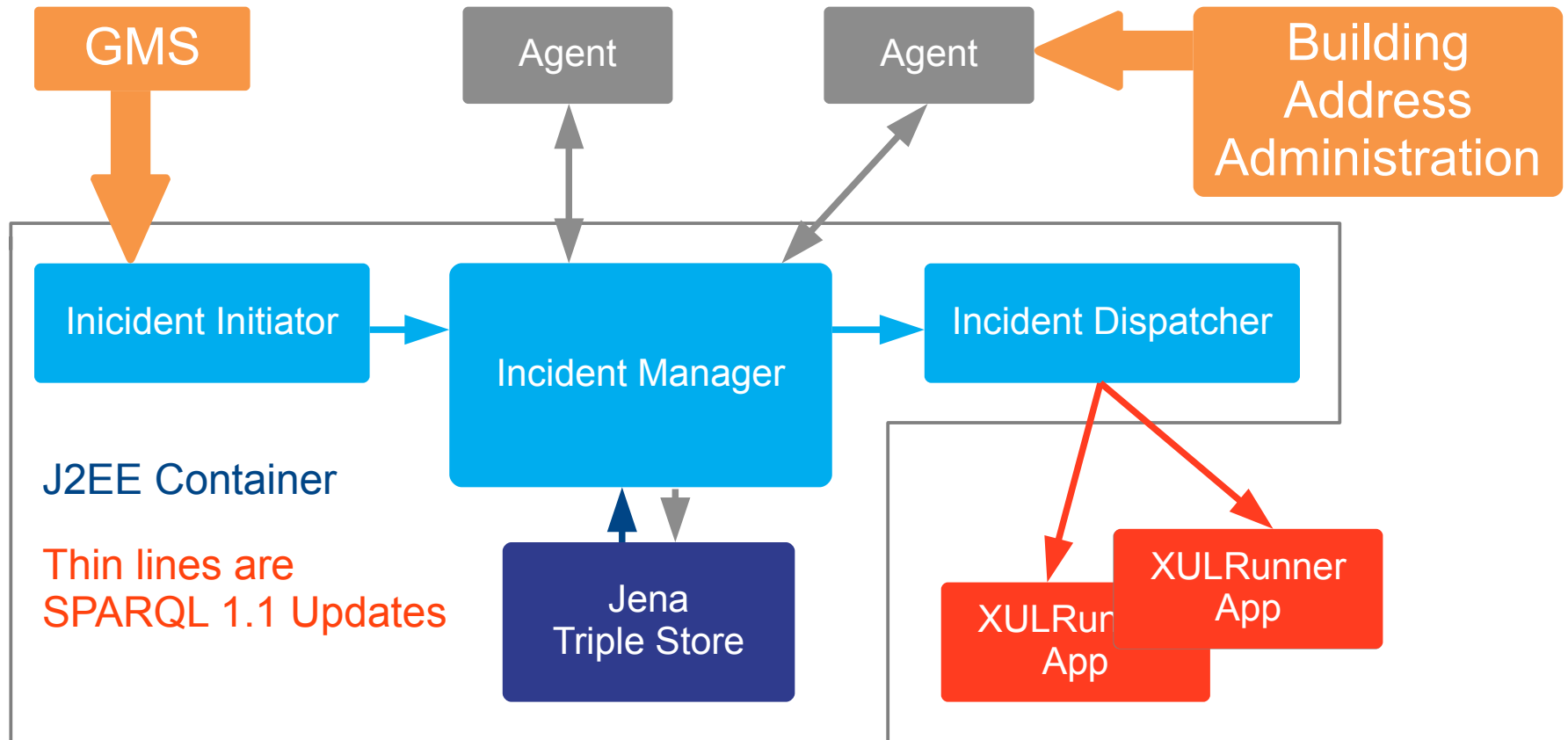
# User Interface

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- Visualization is never a goal
  - User demand rules
- Multiplatform
  - Desktop
  - Mobile
- Data driven
- Technologies
  - Enyojs [20]
  - HTML5
- Beware of information overload
- WebID for authorization

# Overview

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# Updated station monitor

**Uniek gebouw**  
**Unieke Collectie**  
**Complex Gebouw**  
**Desorientatie, terugweg kwijt**  
**Dichtslaan automatische deuren**  
**Oproken ademlucht door lange aanvalsweg**

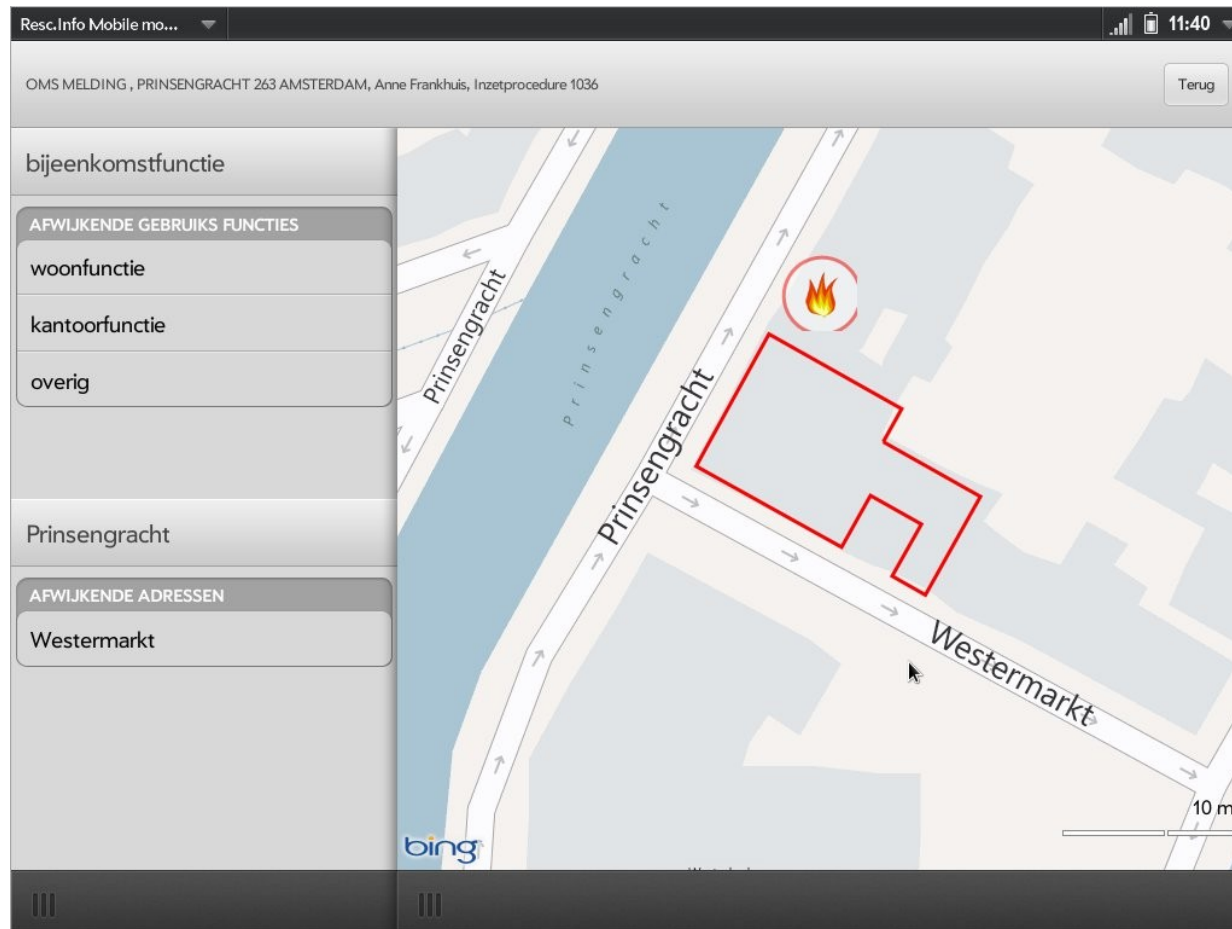
**BRAND 1** : **Inc.net: 6** : **OMS MELDING** : **PRINSEGRACHT 263 , AMSTERDAM ( Anne Frankhuis Inzetprocedure 1036 )**  
**Ladder Hendrik**

Laatste contact met dienst: 20:28:08    Tijdstip alarmering: 2011-08-27T17:08:55    versie: 1.0.16    Monitor naam:HENDRIK2

NETAGE.NL

# Tablet Application

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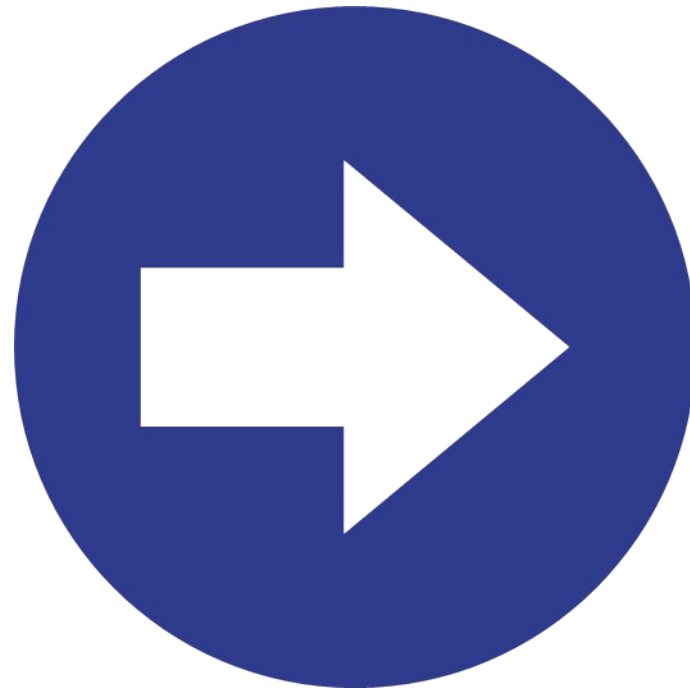




# Larger Context

# Onward!

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# The Buzz

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- Linked Data Fire Engine
  - Linked data bus on new fire engine
- 'Open Data' resonates
  - Organization
  - Nation wide advisory groups



**My Fear**



@Semanticfire



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# Reference

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- [1] <http://semanticweb.cs.vu.nl/2009/11/sem/>
- [2] [http://www.w3.org/2003/01/geo/wgs84\\_pos](http://www.w3.org/2003/01/geo/wgs84_pos)
- [3] <http://standaarden.overheid.nl/owms/4.0/doc>
- [4] <http://www.w3.org/2006/vcard/ns-2006.html>
- [5] <http://www.w3.org/TR/skos-reference/>
- [6] <http://vocab.resc.info>
- [7] <http://activemq.apache.org/>
- [8] <https://github.com/semsol/arc2/wiki>
- [9] <http://stomp.github.com/stomp-specification-1.1.html>
- [10] <https://developer.mozilla.org/en-US/docs/XULRunner>

# Reference

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- [11] <https://github.com/antoniogarrote/rdfstore-js>
- [12] <http://www.openlayers.org>
- [13] <http://www.w3.org/TR/sparql11-query/>
- [14] <http://www.w3.org/wiki/WebID>
- [15] <http://www-01.ibm.com/software/webservers/appserv/community/>
- [16] <http://jena.apache.org/documentation/tdb/index.html>
- [17] <http://www.ibm.com/developerworks/downloads/im/udbexp/>
- [18] <http://jena.apache.org/index.html>
- [19] <http://d2rq.org/>
- [20] <http://www.enyojs.com>