SCIRT GIS

When collaboration, integration and the future of our city matter

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New Zealand Government

Christchurch City Council

GIS in NZ in 2011

- GIS is in most Engineering Consultancies, but is seen as a nice to have and not necessary for Projects. It's a provider of Maps.
- Use of GIS by construction teams is not common.
- SCIRT takes a visionary view of GIS, as part of the business systems that will support the project.
- **GIS doesn't build physical outcomes, we can only provide information to enable the appropriate people to make the best decisions they can**

Implementation of GIS

- Original 2 full time, 1 part time
- 8 weeks to get the systems up and going before designers arrived.
- No existing systems
- Failover systems
- GIS is an overhead to all projects.

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What did it look like to start?

- The switch from Emergency response to Rebuild
- Getting data from external agencies
- Designing internal working structure
- Significant manual processes
- Only GIS team gets GIS desktop software
- IT team interested, supportive and involved, but allowing us to utilise our GIS software knowledge

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Data in, Data out

- Esri and Safe's FME
- Formats into Esri File GDB
- Projections into Mt Pleasant 2000
- Nearly all spatial data comes through GIS team
- Single Source of information
- Data accuracy, reliability and consistencies between supplies from external organisations, shaped the way we handled data
- Most data originally obtained had poor or no documentation

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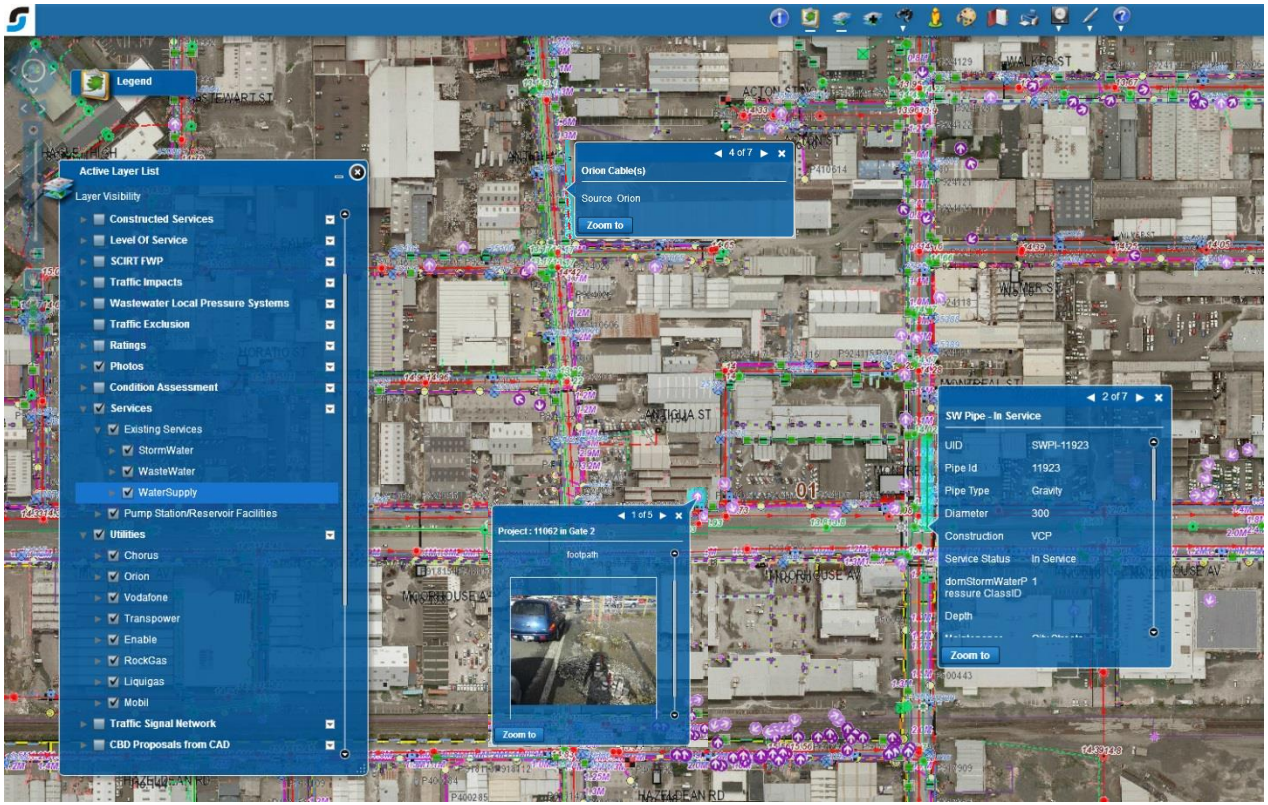
GIS Webmap – The first part of the GIS

Asset assessment → Project Scoping → Design → Construction → Handover

- 1400+ users
- 600+ layers
- 30+ roles
- 120,000+ photos
- 1000's of settings
- 20+ data suppliers



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What does GIS look like now

- Wider take-up and demand than initial expectations
- Integrated with most SCIRT systems
- Significant improvements
- GIS team bigger than envisaged.

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GIS through the years

- Flex-based desktop webmap (2011…upgraded 2013)…over 100,000 requests per day
- Javascript basic mobile webmap (2013)
- FME Server (2014)
- iForm and Collector Apps (2016)

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What did we miss?

- SCIRT is not a perfect example, there were several things that the GIS team regrets:
  - Between all SCIRT systems we never implemented a globally unique asset id.
  - deploying exactly what had been conveyed didn't always occur
  - Design teams worked on projects, not networks and they could choose their working formats (some benefits/some issues).
  - How to enact? Getting easy ways to record asset data such as RFID tags on assets to enable quick asset pickup

Examples from the last couple of years

Network-wide display of design data (2013)

Pre-Design surveyed pipe match with local council GIS data (2014)

Fully Automated data updates (2014)

Changing to Automated Survey Checks for Asbuilt information (2014)

Apps for asset collection in the field (2016)

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Network-wide display of design data(2013)

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A simple task?

Combine all project into one layer

A simple task? Unfortunately, No

- Design teams were only required to design new pipes in 12d.
- Projects changed
- Numerous revisions of projects
- Significant numbers of rules and numerous error checks had to be developed

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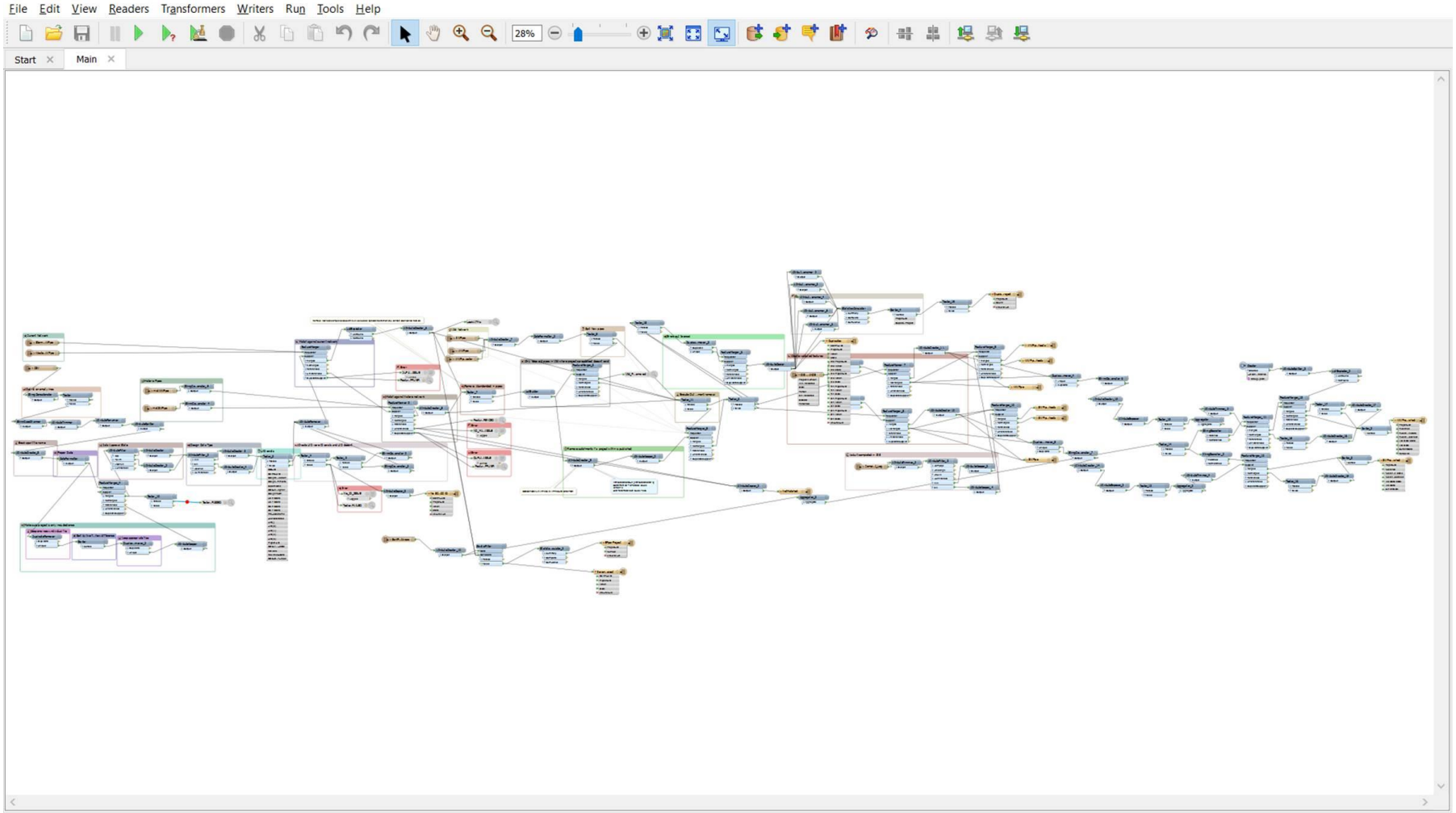
The process



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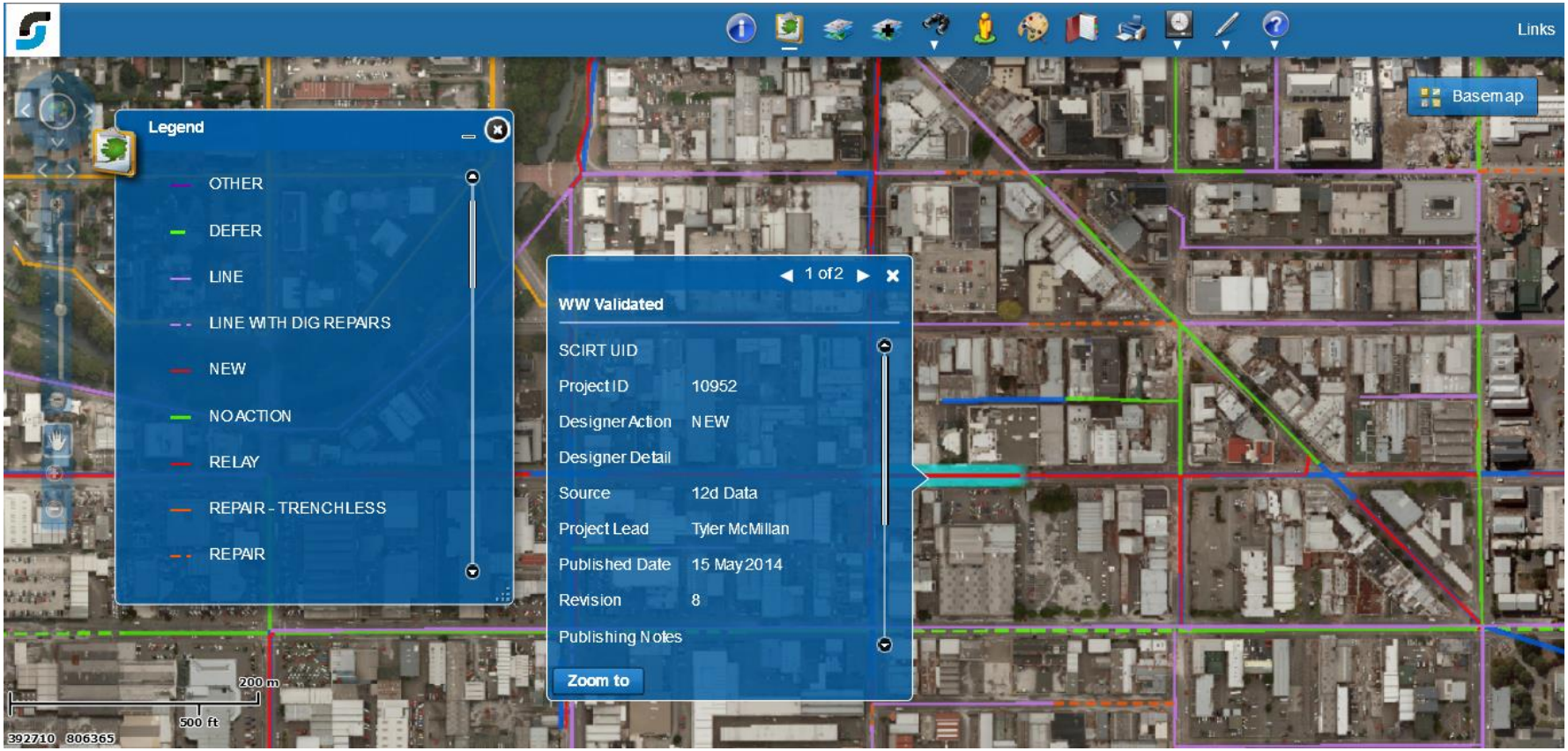
The Output



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Pre-Design surveyed pipe matched with local council GIS data (2014)

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The Challenge

- Significant investment in surveying a majority of the networks. But no matching asset id.

Benefits of pre-design survey data

- Higher accuracy than related Council GIS data
- Z values through survey, virtually none in existing GIS data
- Known accuracy error
- Most of the pipes that SCIRT would work on would not require full survey at asbuilt (e.g. lined pipes, partial repairs, etc)

Difficulty

- Large difference between the two networks, both in terms of the geometry of the actual feature and its spatial relationship to itself in the Council GIS data
- Cost of processing

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How would we match

Pipe

- Length
- Angle
- Diameter

Network relationship

- Did the pipe connect into the same amount of pipes at either end
- Did the relationship of the connected pipes also match, associated survey data
- Once confirmed that specific pipes had the best relationship between survey and council GIS, did the network relationship match

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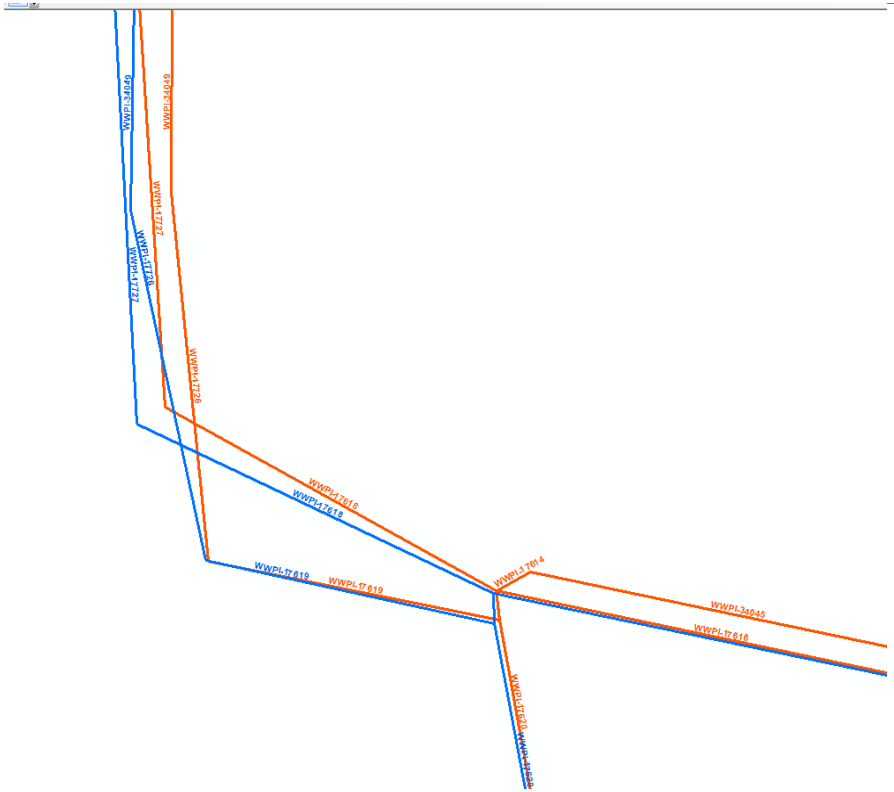
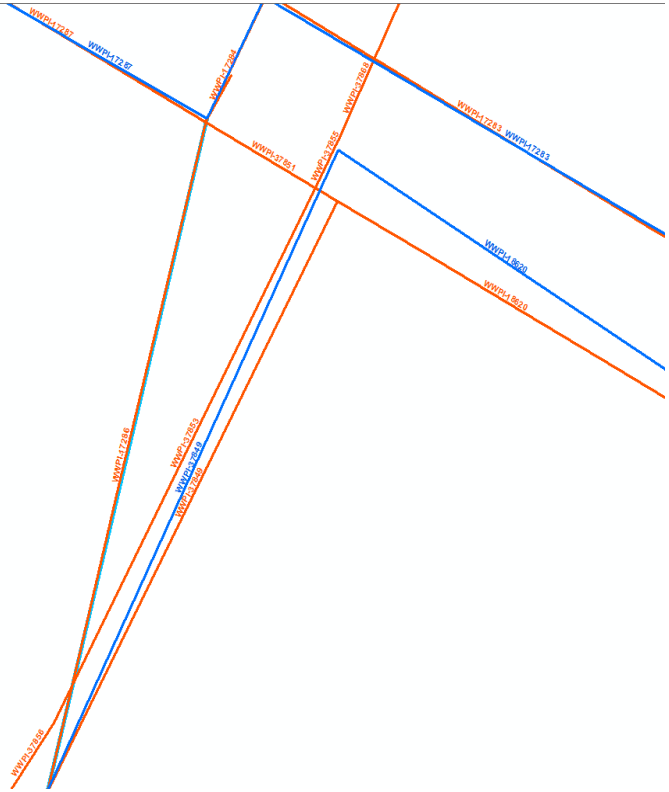
The result

- < 3 weeks to develop process, achieving 88% conservative match (blue = survey, orange = council GIS)





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Completely automated Data updates (2014)

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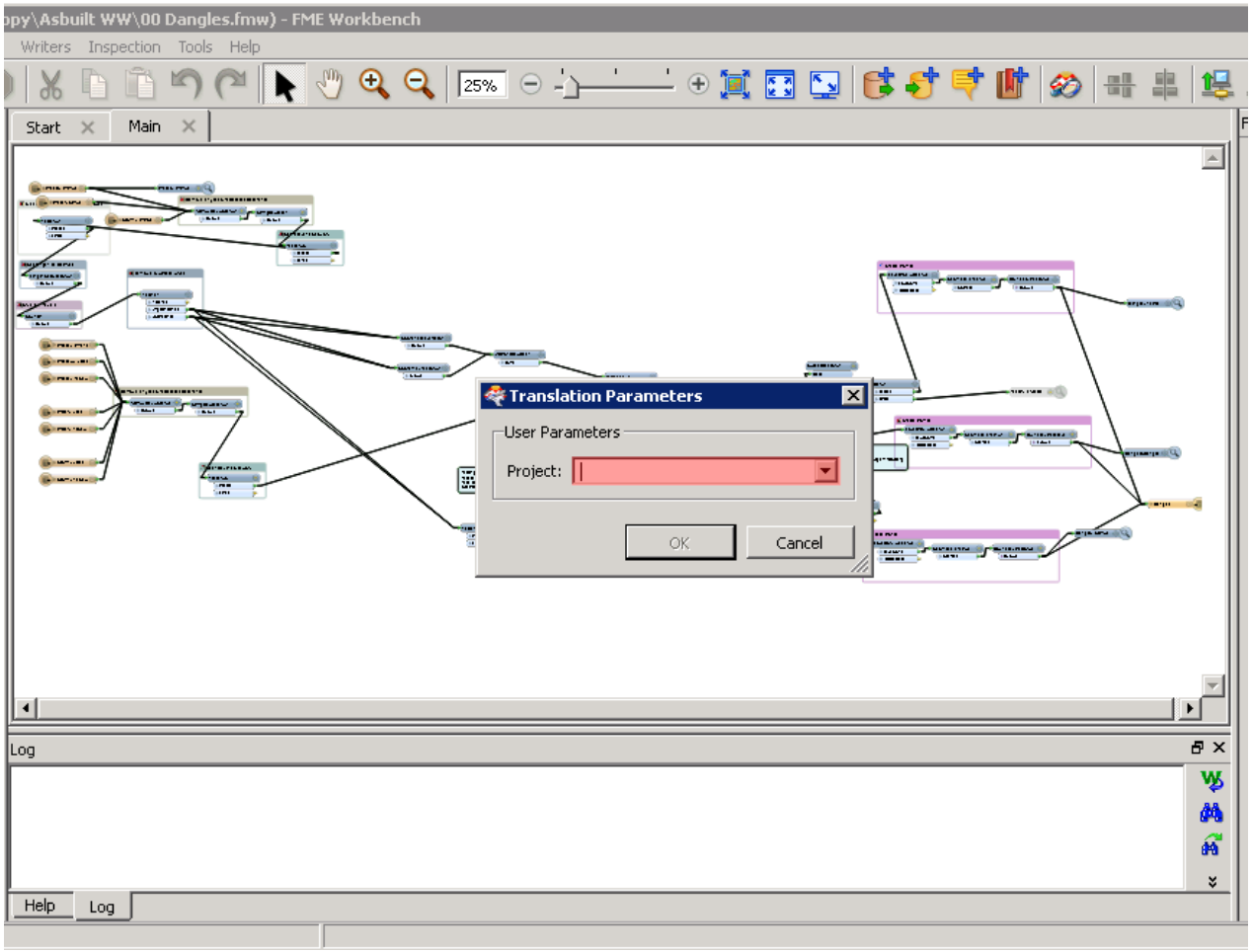
Semi-automated prior to 2014 – FME Desktop



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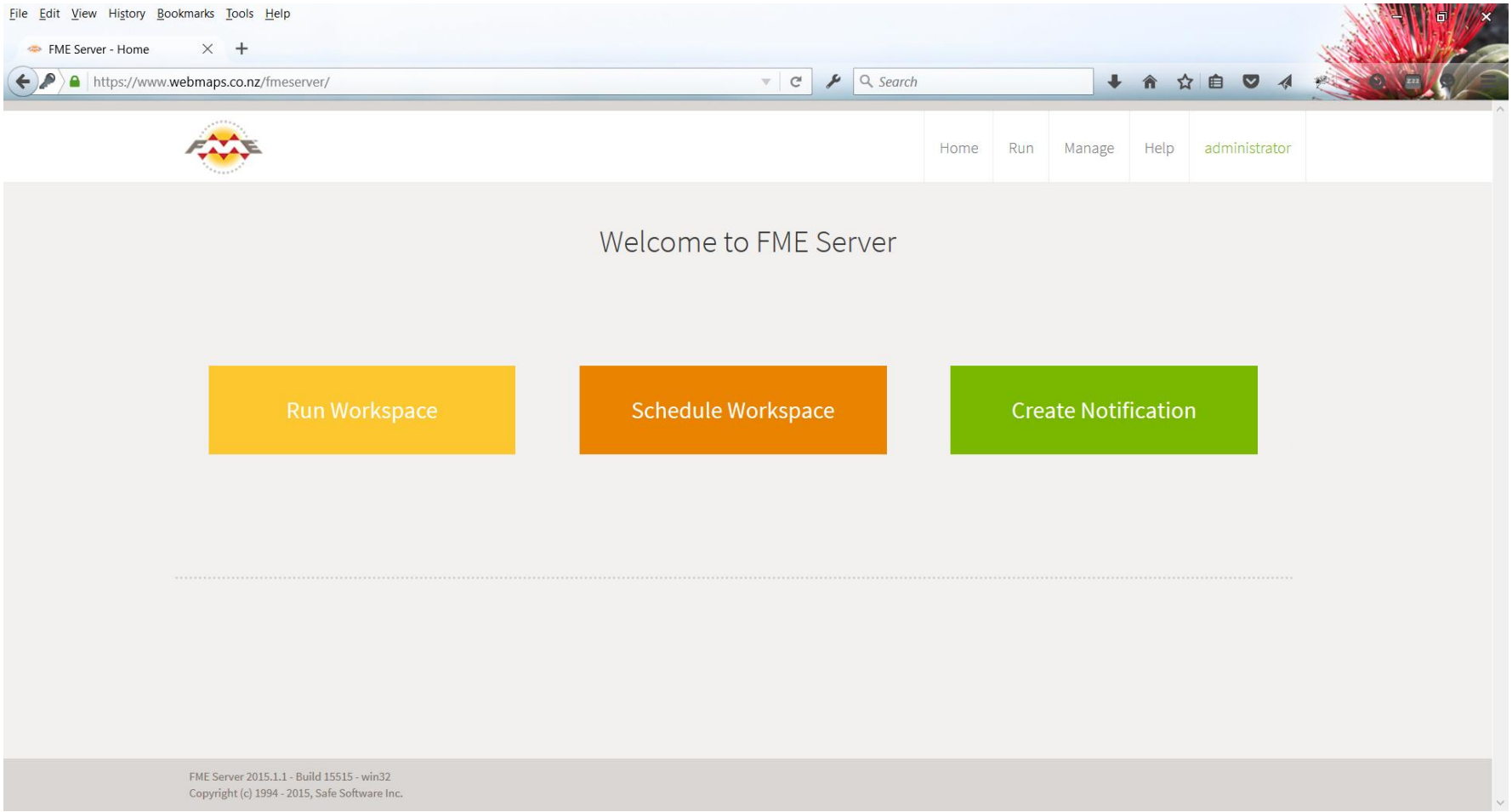
Implementation of FME Server



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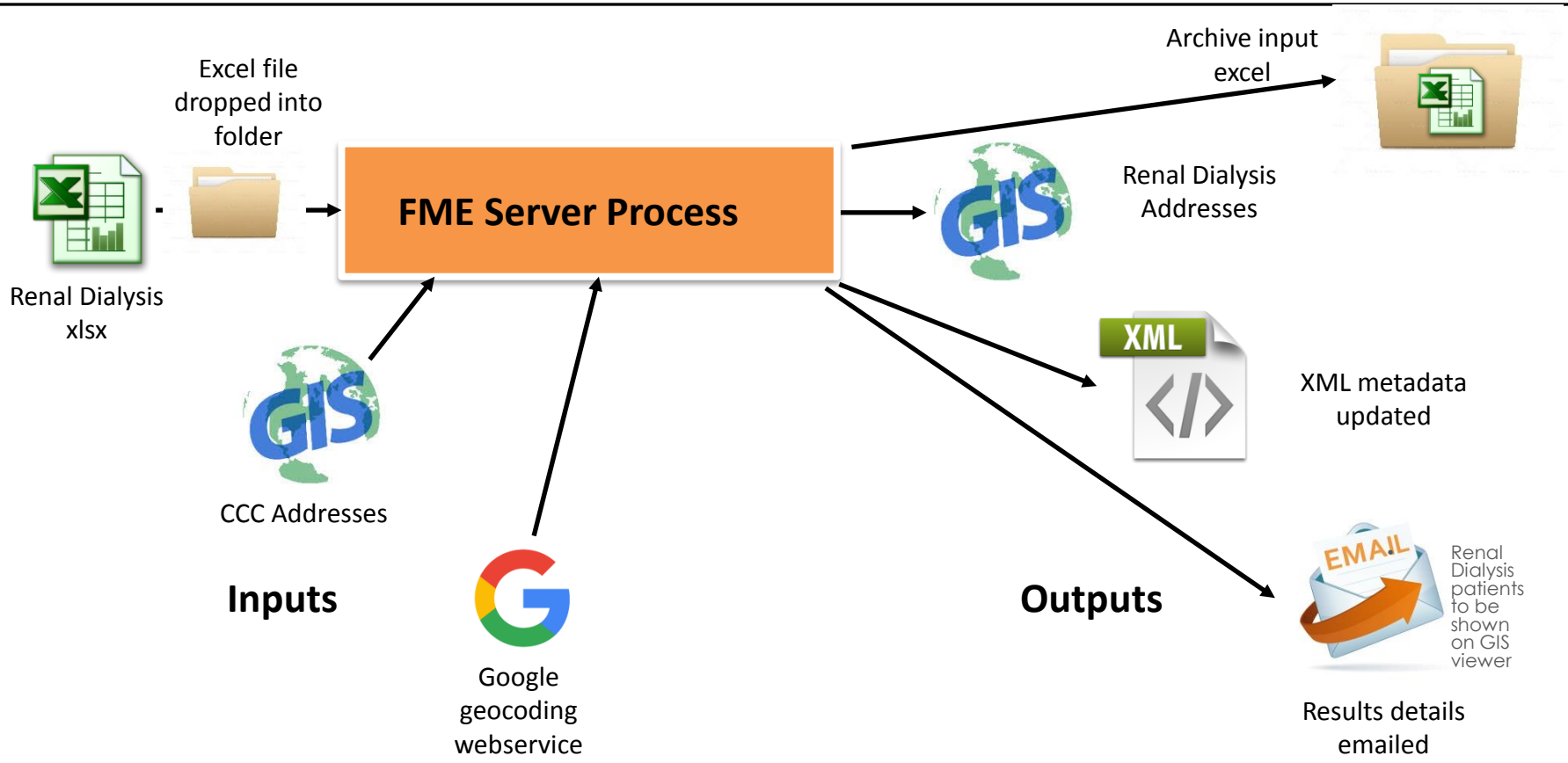
Fully automated updated – Renal Dialysis Example



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Changing to Automated Survey Checks for Asbuilt information (2014)

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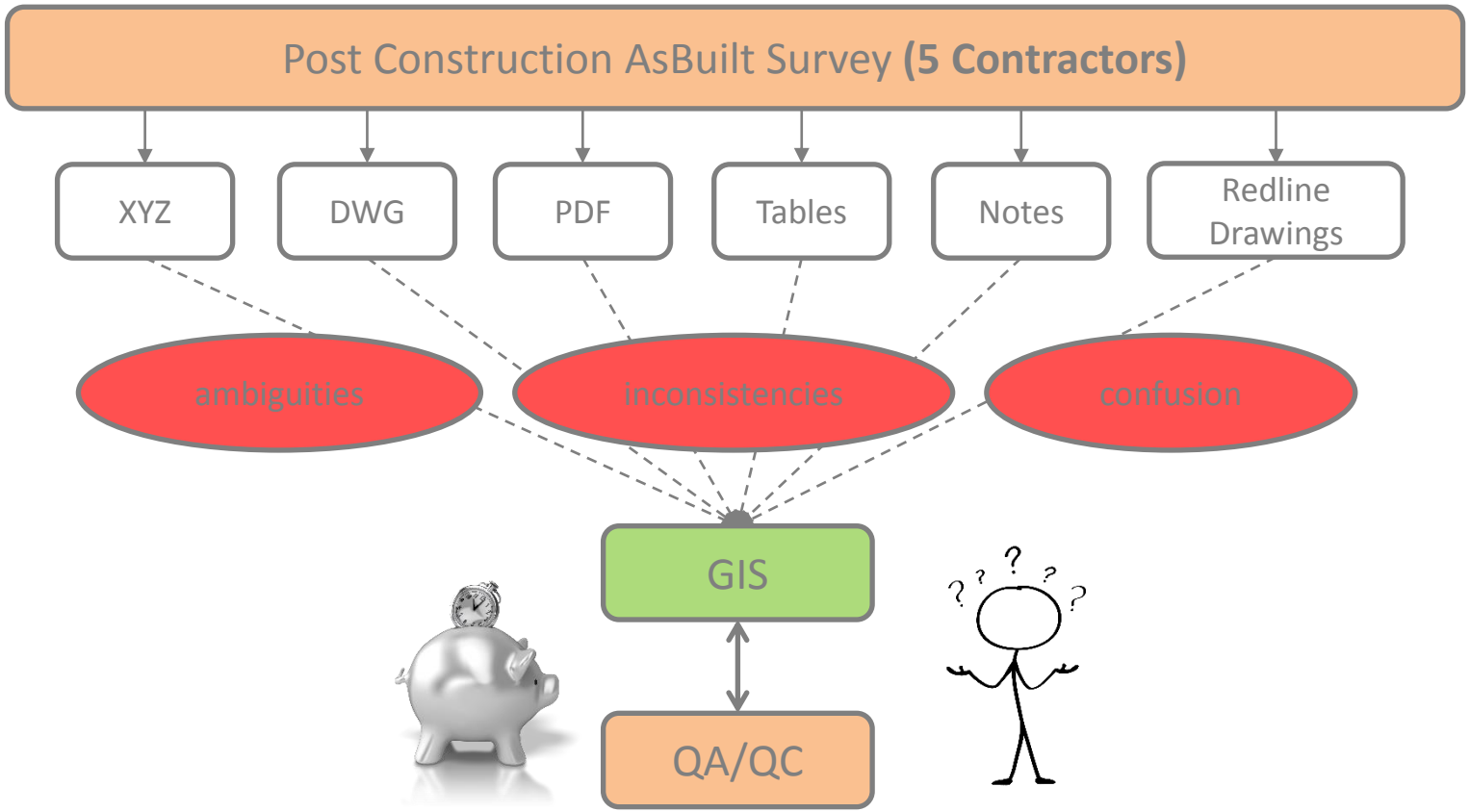
Asbuilt Processing – Initial (slow turnaround)



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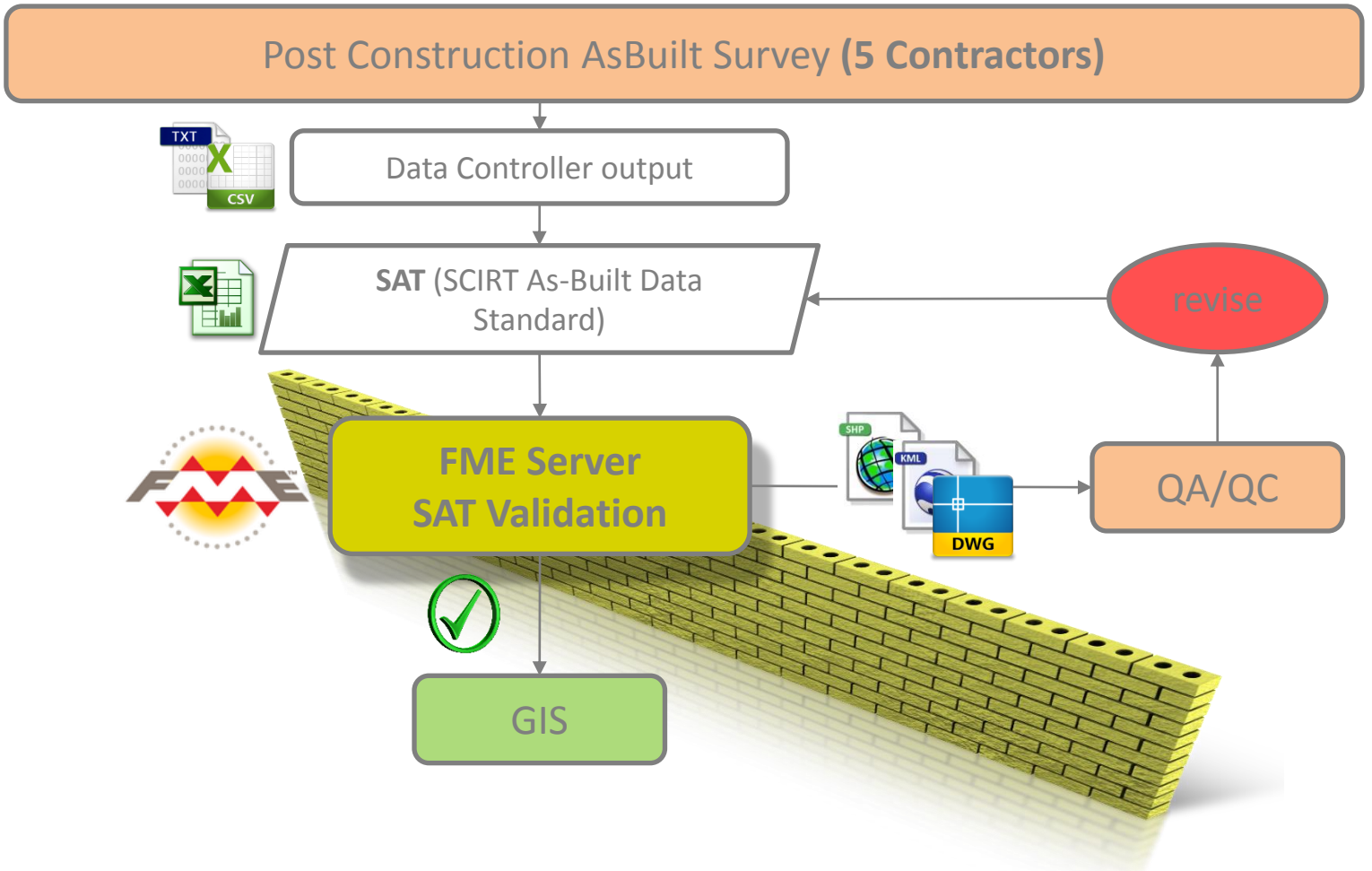
Asbuilt processing through FME Server (fast)



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Apps for asset collection in the field (2016)

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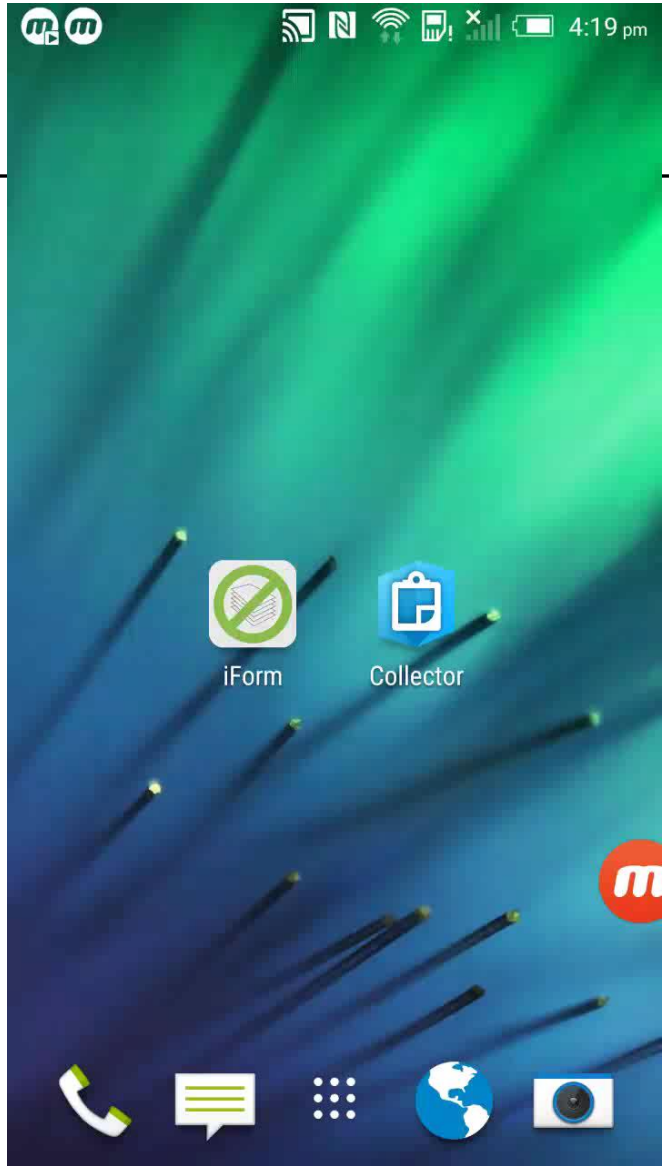

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What we would look at if we setup this year

- 3D GIS
- BIM
- All cross platform programs (i.e. javascript)
- Investigate ability for natural language queries, No SQL databases etc

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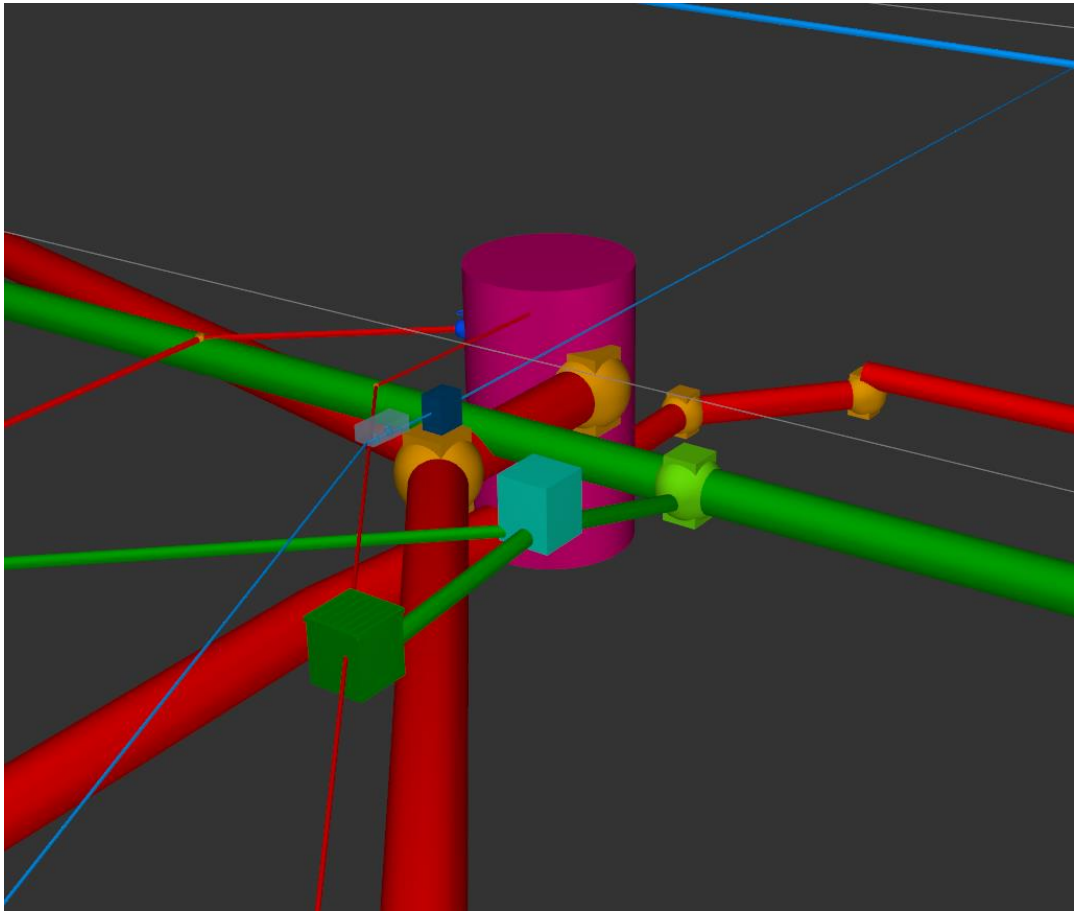
Questions



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