Laying the Foundations of a 5D Strategy

Ipswich City Council has implemented a bold plan that embraces new ways of living, learning and working as one of Australia's most liveable and prosperous Smart Cities.

As a direct action of the *Advance Ipswich Plan*, Council announced its intention to develop Australia's most comprehensive Smart City program based on three simple principals of jobs, growth and liveability. The result was a list of prioritised Smart City initiatives addressing the particular needs of Ipswich in the most effective and efficient way. Among these priorities is the development of a 5D Model for visual collaboration for city data.

Council is continually improving how it delivers and provides spatial services internally and externally. Council partnered with Cohga, the developers of Weave, to enhance and leverage its various information assets and capabilities. The partnership has resulted in an easy to use solution that allows all staff to access spatial and non-spatial information in a simple and intuitive manner.

The Cohga Weave solution has provided Council with a Systems Integration and Web Mapping solution that facilitates the rapid integration of current and future enterprise information systems with information from these systems spatially enabled and presented through a standard web client.

The solution integrates with existing enterprise information systems such as Land Information System (Pathway by Infor), Nearmap 3D, and Oracle Spatial database (10g). Council has maximised their investment in their existing corporate solutions while adding a spatial enablement component.

The solution has unlocked potential for a range of internal data sets and information systems that were previously siloed and unavailable to staff. The result is a greater use of this valuable information asset benefitting rate payers. The six hundred Council system users now have access through a common system interface (spatial portal) to the information needed to carry out their business in a more efficient and effective manner without needing to access multiple information systems or deal with multiple information custodians.

The deployment of this solution has been well received by Council staff who see it as a very positive addition to, and replacement of, their existing systems and processes. The intuitive nature of the system means staff are quickly active with limited training, which has had a positive effect on morale and productivity.

This solution is now the foundation for Councils 5D data modelling initiative which brings together a range of corporate information and systems from the Ipswich Smart City program and maintains a single point of truth and collaboration for city data.

The 5D Data Modelling initiative uses data from across Council constructing a five-dimensional view of city infrastructure, with a three-dimensional digital model of above and below ground city infrastructure, merging with dimensions of data and time to produce the 5D Data Model.

Continuing the Smart City Program principals of open and interoperable platforms, the 5D Data Modelling initiative further integrates Council data with state and federal government data as well as telecommunications and utility data.

The 5D Data Modelling initiative leverages and advances many related Smart City program initiatives. For example, it utilises the Smart City Data Platform as the source for many streams of city data including the UAV Operations initiative, Corrected Transport initiative, Healthy Living Lab

initiative, Sustainable Living initiative, Connected City Lighting initiative and Smart Parks, Building and Facilities initiative.

Never before has it been possible to access and integrate this quality of data overlaid as a five-dimensional model manipulating space and time.

Benefits include:

- Faster Council and Community solutions
- Visibility of Council operations and limitations
- Enhanced citizen engagement and satisfaction
- Significant public sector, private sector, and community collaboration
- Improved quality of data collection and analysis.

Meeting the Business Goals

The broader business goals of this project include:

Governance
Clear governance assures the investments in IT generate business value and mitigate the risks that are associated with IT projects. This project implements a Governance model over spatial data creation, maintenance and distribution that decision makers comply with and rely on.

Software Change
The objectives include:

- Reduce the number of MapInfo Pro licences and reduce annual maintenance costs.
- Be Business Process driven in creating and/or spatially enabling data.
- Reduce the number of MapInfo users who have little or no spatial skills in creating/ maintaining spatial data.
- Use skilled spatial people to do spatial work and maintain spatial data.
- Clearly define End User vs Data Maintainer roles and responsibilities.
- Implement a web based spatial enquiry system to replace legacy systems.
- Spatial toolbox. Get to a point where Council is Vendor agnostic and simply use whatever software tool is required to resolve any given problem.

Cultural Change
The objectives include:

- Make spatial information core in business decision making rather than a secondary consideration.
- Make stakeholders aware that we are a location based industry and the key to that is business processes with spatial data as a core.
- Get stakeholders involved in the project so that they are part of the change and that any changes should benefit all stakeholders, particularly end users of any new software.
- Not to facilitate a like-for-like perceived solution.

Spatial Data Environment
The objectives include:

- Manage, consolidate and synchronise Council data repositories to support all users of spatial data.

Demonstrated Benefit and Outcomes

Moving to a 5D Platform completely transforms the way Council deals with asset and spatial data, leading to new forms of collaboration and integration across Council and the City and redefining the services built on those assets. The benefits that have already and will continue to be realised include:

- Increased speed of planning approvals
- Decreased time spent in coordinating with the state government
- Decreased time spent updating asset data
- Decreased duplication in asset data
- Decreased friction in collaborating on management of assets
- Decreased re-digging of the same areas
- Decreased cost associated to Dial Before You Dig concerns for Council, service providers and utility companies
- Improved maintenance and management of assets for all service providers
- Greater transparency of new planning applications for the public
- Decreased traffic delays and re-routing due to construction
- Reduced carbon emissions due to traffic congestion stemming from construction
- Increased operational efficiencies for service providers and utilities

An important benefit has been better logic in how to deliver data to a quite diverse user base and the derivation of a three-tier model which is not obvious to end users but to Council, was critical in how datasets are built. The three-tier model is illustrated as follows:

Tier 1: Provide answers to questions at a property level without having to visually see the data it was derived from. (e.g. Based on Historic flood information, was the site flooded yes/no what are the planning constraints/zones on this property? etc.)

Tier 2: Using the same flood example, if the answer to the flood question was true at tier 1 you can open other layers and visually see more enhanced data. Where did the flood cut my property, what were the flood and property levels etc. at this location?

Tier 3: Using the flood example again with Weave's ability to use access control lists (ACL's) and web based delivery, control the accessibility of data from disparate sources to provide more in depth hydrologic modelling information for use by Council Engineering teams without worrying about general data access and inappropriate use of data.

Another positive outcome of the project is that Council is now looking at further business processes which may be enhanced through using spatial information, a benefit Council was previously unable to entertain. Council is also modifying existing business processes which use spatial data to make the Weave system a part of those processes and expand on the success of the Systems Integration and Web Mapping project.

Award Winning Technology

Cohga was awarded the 2017 Queensland Spatial Excellence Award in the category of Spatial Enablement for the above project http://www.siba.com.au/Awards/APSEA-Awards/QSEA-Queensland-Spatial-Excellence-Awards

Daryl Hickey - Spatial Systems Team Leader, ICC; Alistair Byrom – President SIB GITA; Peter James – Cohga & Chair QLD Branch SIBA GITA; Brett Parkin - Technical Systems Analyst, ICC

Judge's comments:

This project is an impressive example of spatial technology providing extensive and far reaching benefits. The ambitious use of spatial technology links all aspects of Ipswich City Council's broader Smart City initiative, based on the real world needs of jobs, growth and liveability. The project highlights the application of smart spatial systems as an integral part of a Smart City.

Project benefits include improved collaboration, reduced response timeframes and more efficient processes. Council is now looking at other business processes which can be enhanced through using spatial information.

Cohga is to be congratulated for the way this successful project highlights spatial capability.