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GPC's GeoSmart Solutions



Digital Twins & Infrastructure

May 2024



Agenda

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Introduction

02



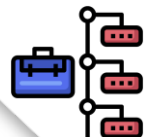
Company Profile

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GeoSmart Approach for
Government Solutions

04



Business Use Cases

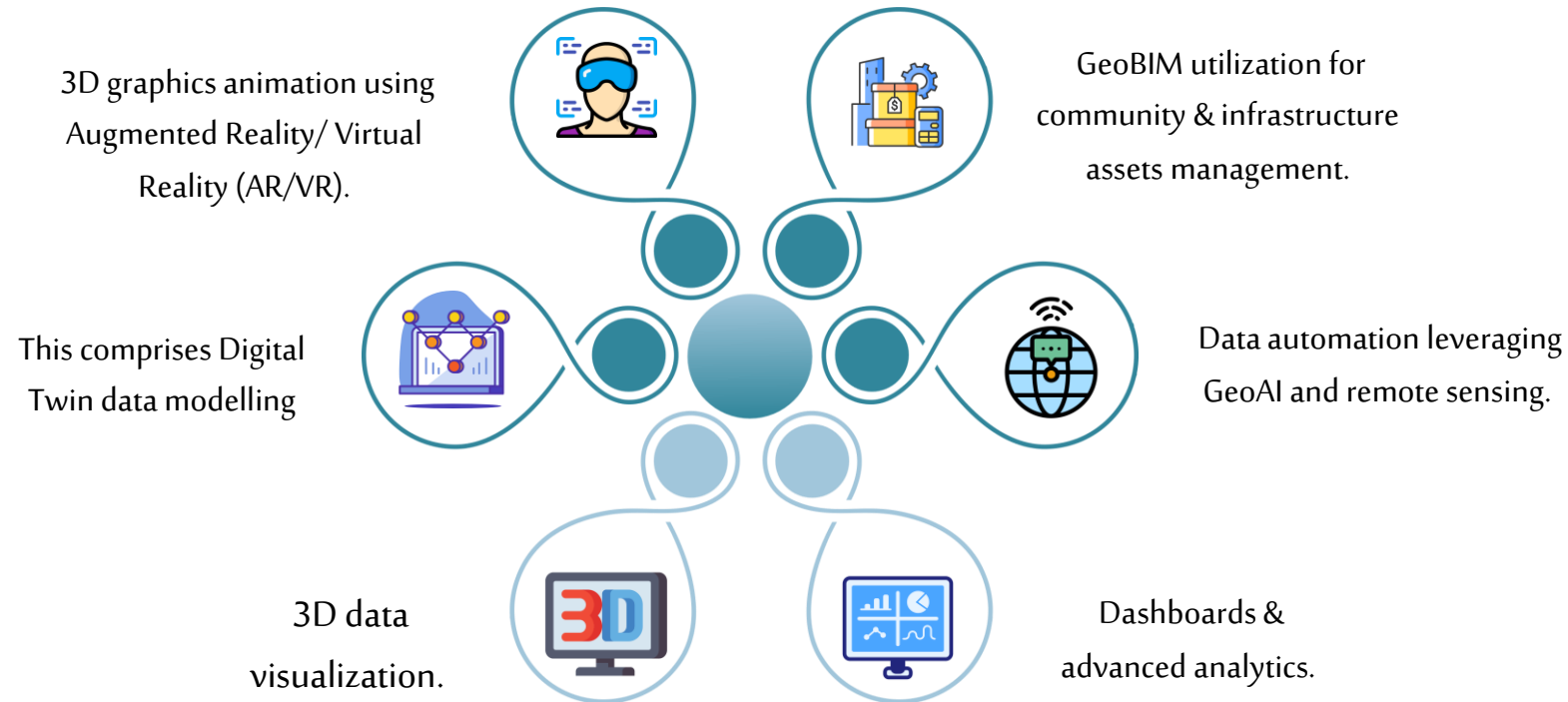
05



Our Key Projects

01. Introduction

Digital Twins & Infrastructure Abstract: The notion of GeoSmart Digital Twins for infrastructure solution (s) in organizations relies on strong visions, comprehensive implementation strategies, complemented by adequate deployment & rollout of key solutions' architecture components.



In this panel, we would like to provide a couple of insights on sound practices for deploying and rolling out such GeoSmart solutions, based on our long experience and proven know-how in the industry benefiting several stakeholders across multiple sectors.

0.2 a. GPC Group - About

The Geographic Planning Collaborative (GPC) Group empowers government and private institutions to respond to the changing environment they serve, by combining advanced spatial data solutions and emerging technologies to create “**GeoSmart Solutions That Matter**”. Our unique and proven methods and services provide a foundation for implementing initiatives ranging from small projects addressing focused business areas to whole-of-enterprise digital transformation programs.

GPC Group provides **consultancy and technical services** specialized in leveraging the power of GIS, ICT and new and emerging technologies to create full business solutions for our customers.



International

GPC Programs were benchmarked by the United Nations amongst best practices of renowned Implementations



Local

GPC was showcased as exemplary out of 532 firms studied in the UAE for innovative qualifications

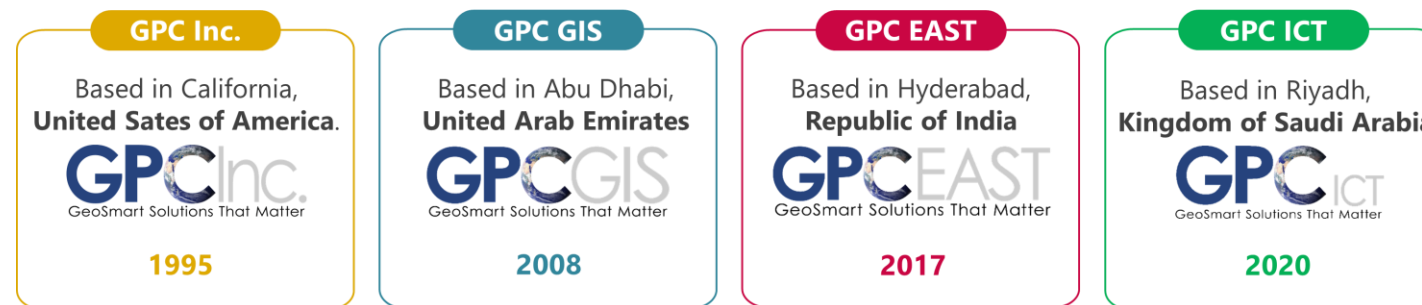


Internal

United by a common vision, GPC is comprised of Four companies: GPC Inc., GPC GIS, GPC East and GPC ICT

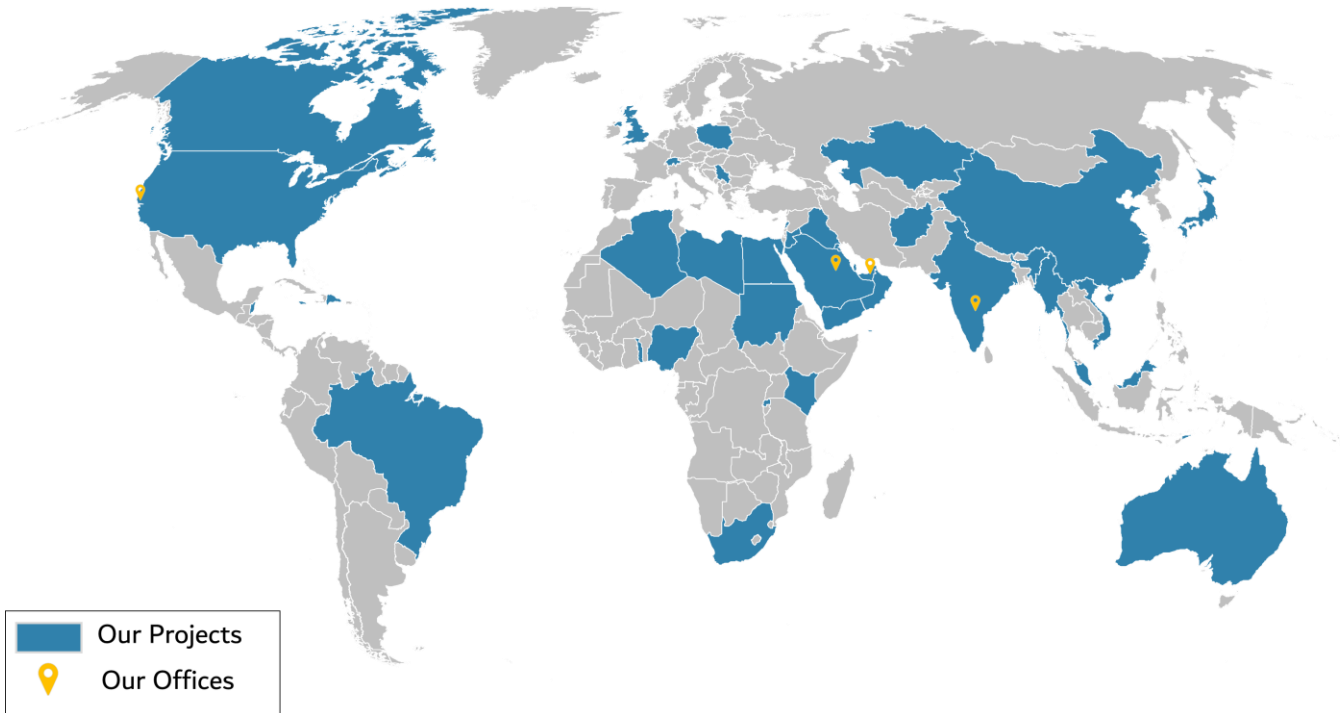
With local, regional and international presence, GPC comprises four companies as following:

The Geographic Planning Collaborative (GPC) Group of Companies:



0.2 b. GPC Group - Global Footprint

With **over 30 years** of experience, **more than 230 projects** undertaken worldwide and **over 20 partners internationally**, the GPC Group offers applied comprehensive experience as well as an extended network of key partners and industry leading experts to ensure addressing the broadest range of customer needs.

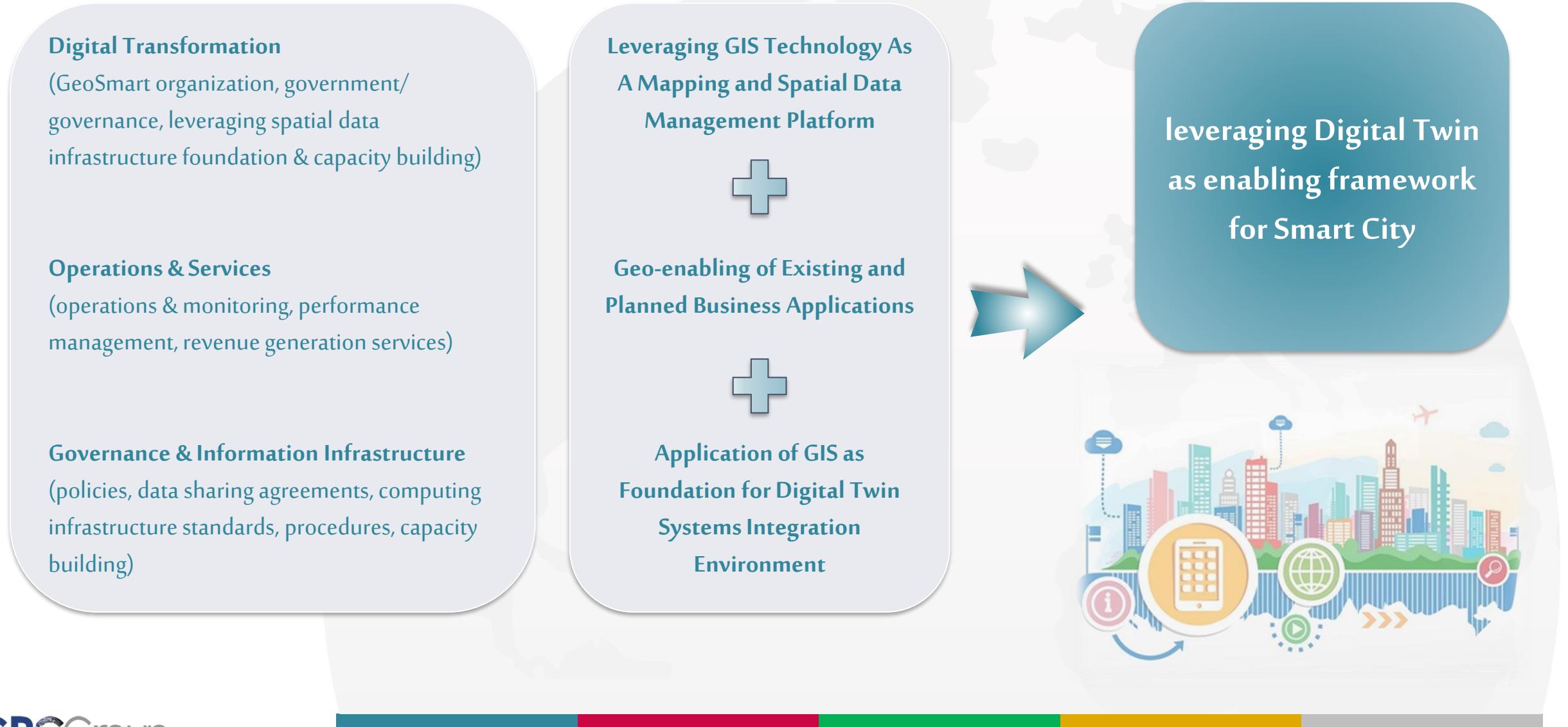


230 Projects	68 Countries	11 Services
73 Clients & Partners	30 Years of experience	
Our Vision To be recognized as a leading innovator in the development of smart solutions while actively promoting local, regional and global initiatives that enable and unlock the power of spatial and non-spatial data for government, civic, social, environmental and private enterprise alongside our pursuit to deliver services that promote sustainable economic development and the well-being of society.		What we do The GPC Group provides consultancy services to a diversity of organizations to plan, design, build and operate infrastructures that capitalize on the convergence of spatial and non-spatial information, emerging technologies and workflows that address evolving business needs.
30+ Utility & Infrastructure Management	25+ GIS Local Regional & National SDI Master Planning/ Roadmaps	30+ Regional & Urban Landuse Planning
20+ Environmental Assessment & Natural Resources Management	6+ GIS Applications for Emergency Response Planning	30+ years experience and services
MENA region project experience		

- Abu Dhabi Street Addressing, Geonaming & Signage
- Jeddah Municipality GIS Strategy
- Abu Dhabi Spatial Data Infrastructure
- Abu Dhabi Global Environmental Data Initiative
- Abu Dhabi Water and Electricity Authority
- Libya Spatial Data Infrastructure
- Oman National GIS Strategy
- Yemen Spatial Data Infrastructure Jeddah Municipality GIS Strategy
- Bahrain Ministry of Electricity and Water Abu Dhabi Global Environmental Data Initiative
- Algeria National Cadaster Assessment
- Lebanon Spatial Data Infrastructure
- Afghanistan Spatial Data Infrastructure
- Electricity Provincial Authority of Thailand

Please, check our website for further information about GPC <https://thegpcgroup.com/>

0.3 a. GPC Unique Approach for Developing GeoSmart & Innovative Platforms

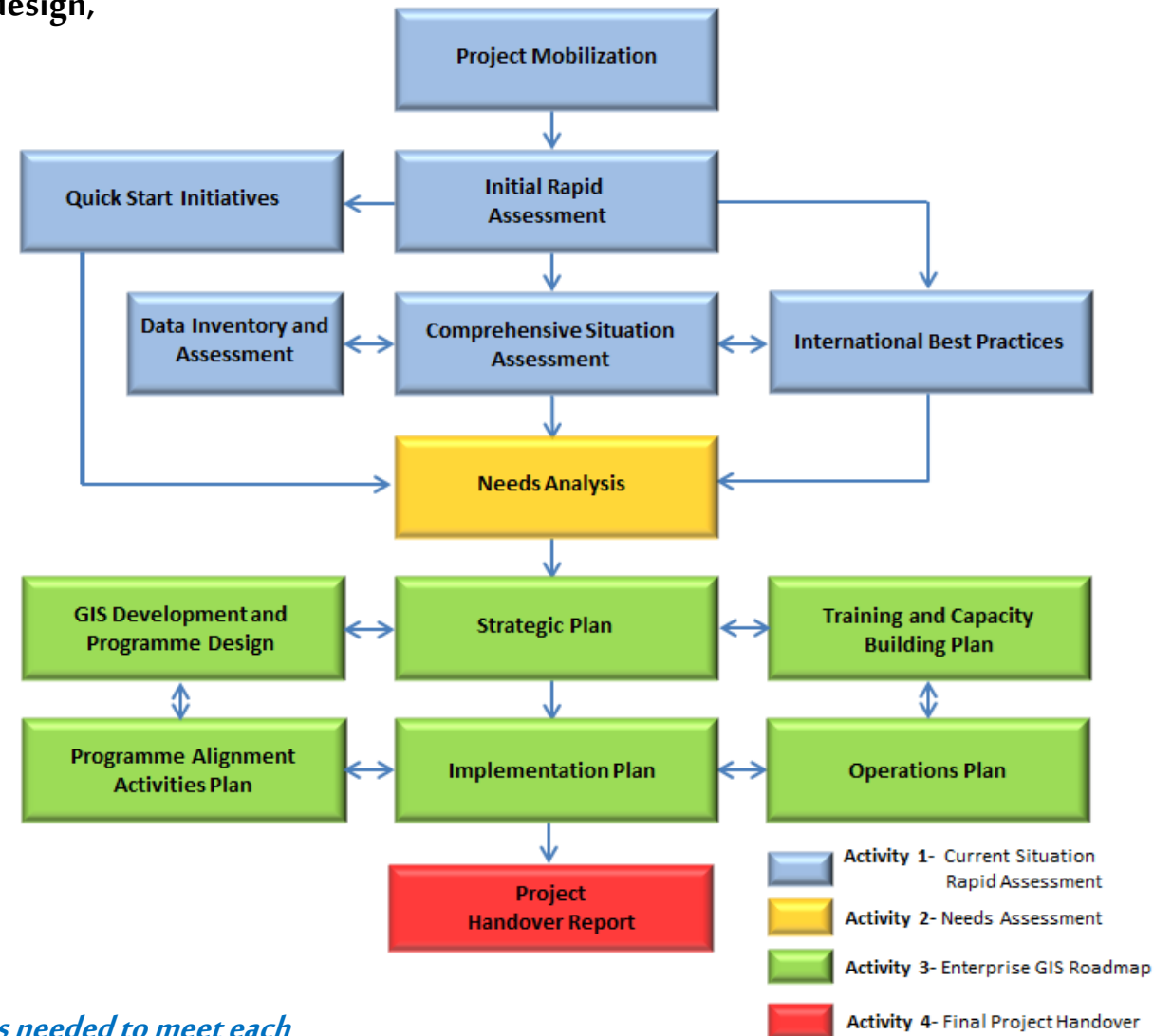


0.3 b. A Proven Methodology for Roadmap Development that is Tailored to the Stakeholder Needs

GPC GIS provides the required support at every stage of the planning, design, implementation and operation of electronic solutions:

This includes, but not limited to, the following activities throughout the development stages of the roadmap:

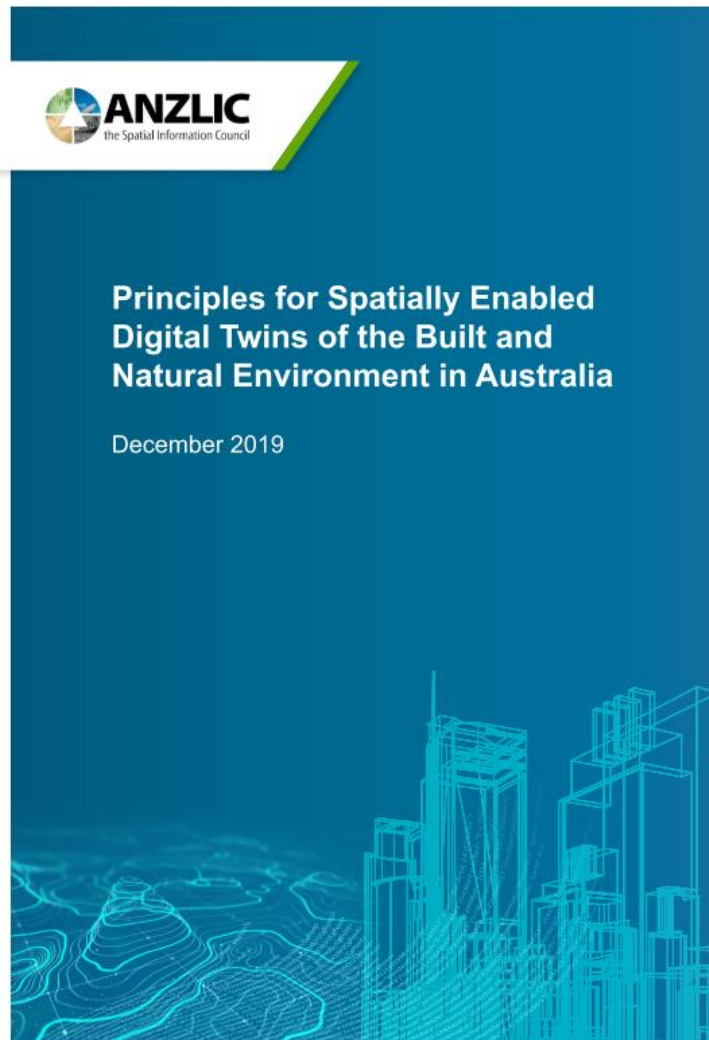
- Systems planning and design consultancy (road mapping)
- The "geo-smart" platform for services
- Specialized software development
- data conversion
- Remote sensing and data collection
- Systems integration planning and implementation
- Staff training and capacity building
- Operations support (on-site and remote)



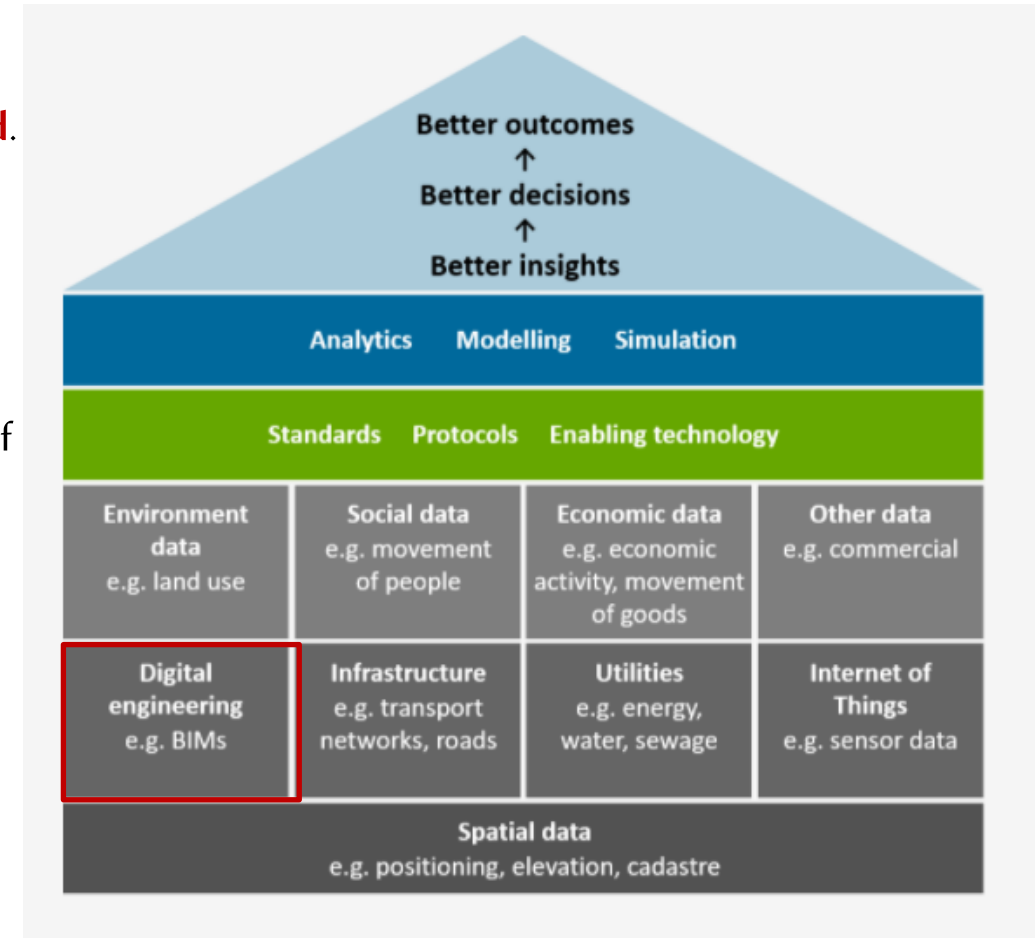
We adapt our structured approach as needed to meet each client's needs and priorities.....



0.3 c. Introduction/ Overview of GeoBIM role in Spatially Enabled Digital Twin/ Smart City

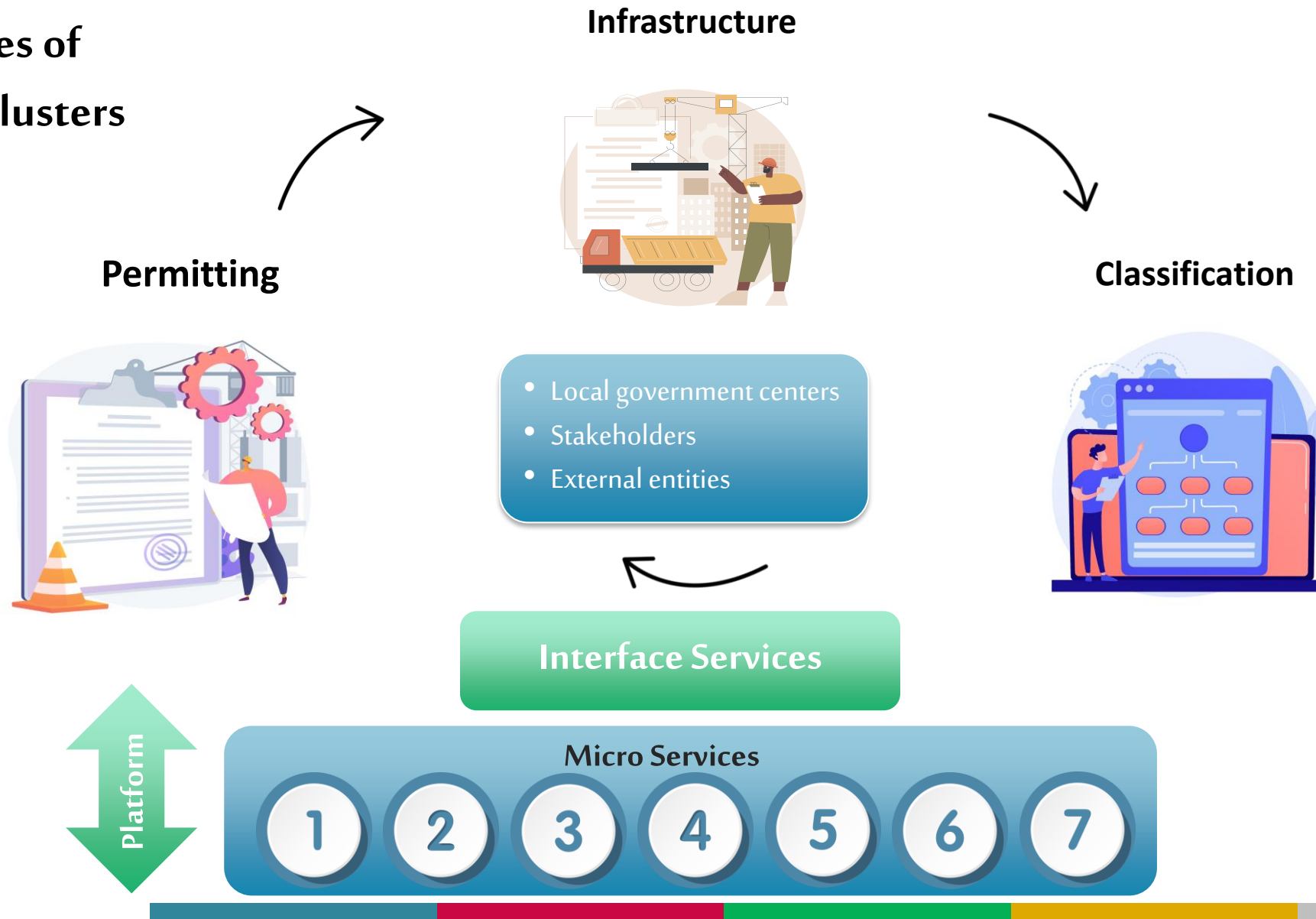


- Highly advanced digital representations of the **real world**.
- Combining with underpinning spatial data increases the value of Digital Twins as it can provide valuable **location-based insights**.



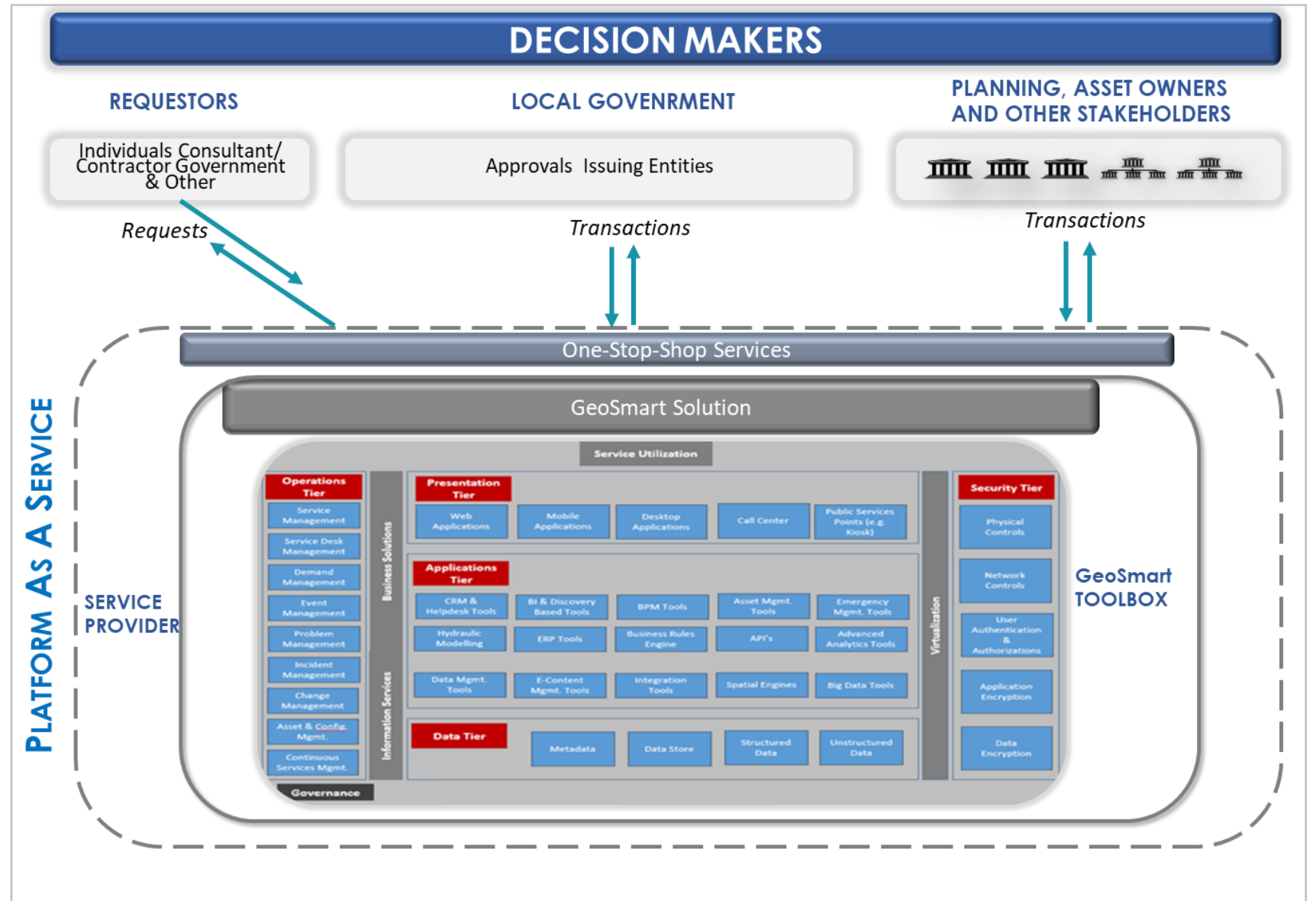
0.3 d. Envisaged Digital Twin Services Framework

Examples of Services Clusters

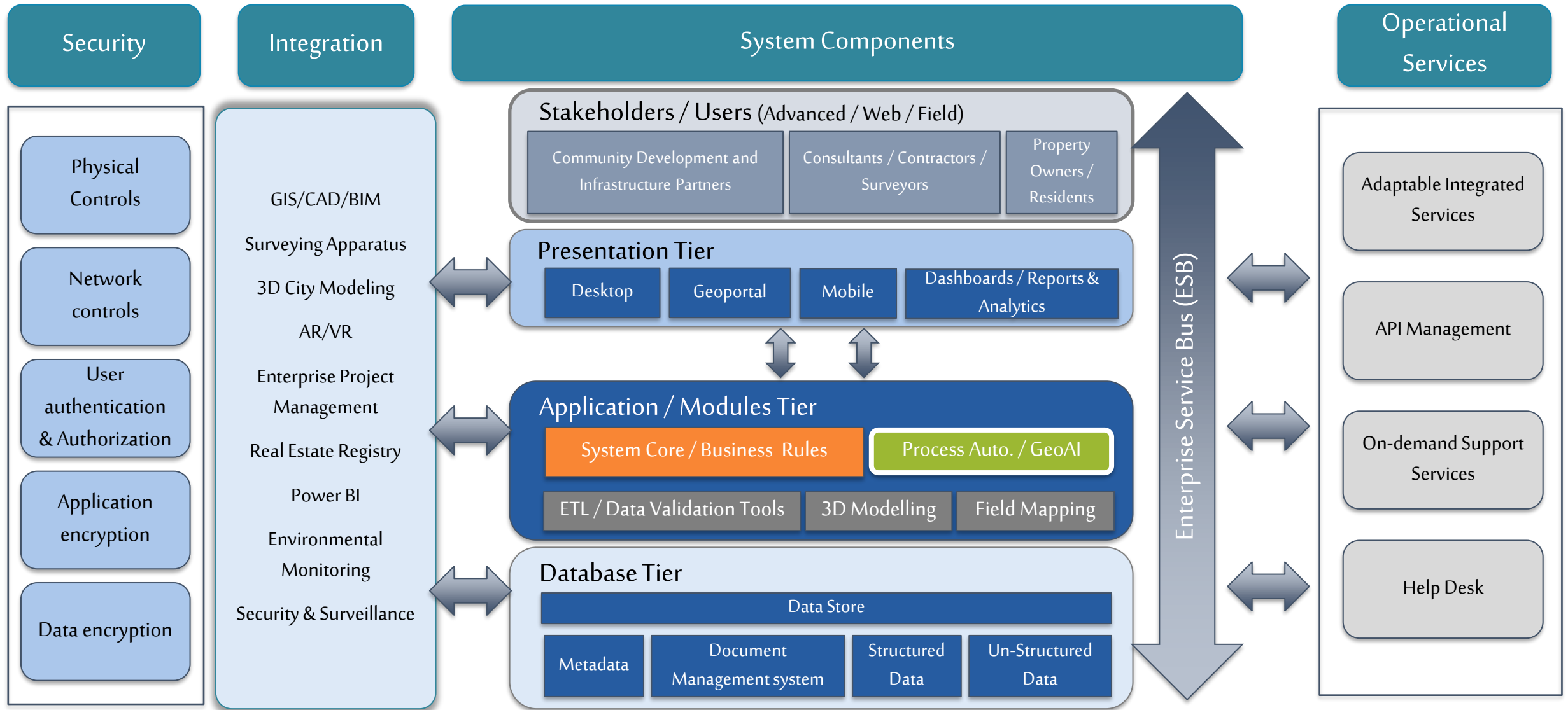


0.3 e. Innovative GeoSmart Platform As A Service...

Providing solutions and services empowered via an integrating platform across multiple systems where GIS acts as a common operating environment

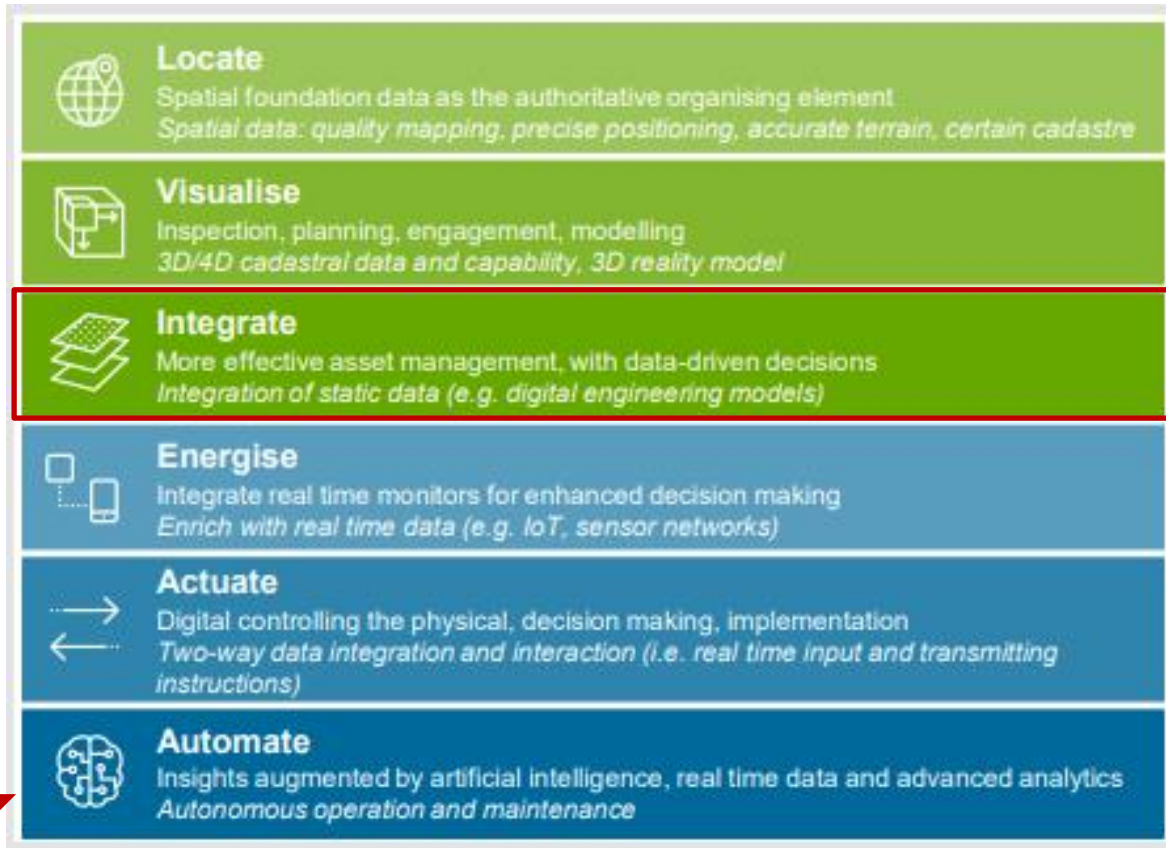


0.3 f. Digital Twin Conceptual Architecture Framework



0.3 g. Data modelling and Integration Being a Key Component in Digital Twin

Digital Twin Maturity Model



<https://www.anzlic.gov.au/resources/principles-spatially-enabled-digital-twins-built-and-natural-environment-australia>

Data
The underlying information comprising the digital twin

Model
The efficacy of the code and algorithms used to generate the digital twin and simulate processes within the digital twin

Visualisation
The quality of the visual output showing the digital twin

Three main components of Digital Twin. Source:(ANZLIC, 2019)

CONCEPT NOTE

Abu Dhabi GeoSMART Digital Twin (GDT)

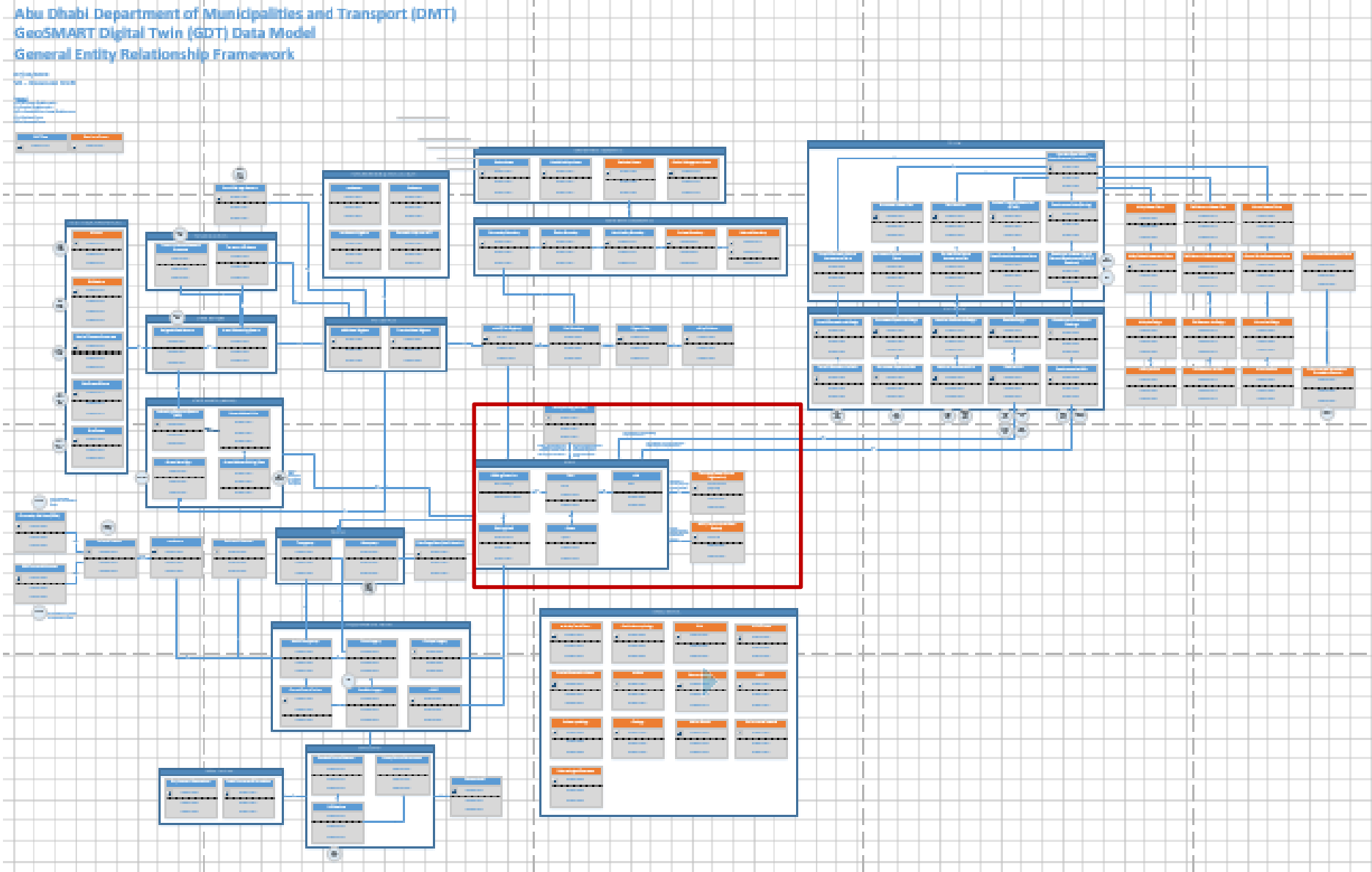
Property, Buildings and Addressing Cluster

<https://www.autocar.co.uk/sites/autocar.co.uk>

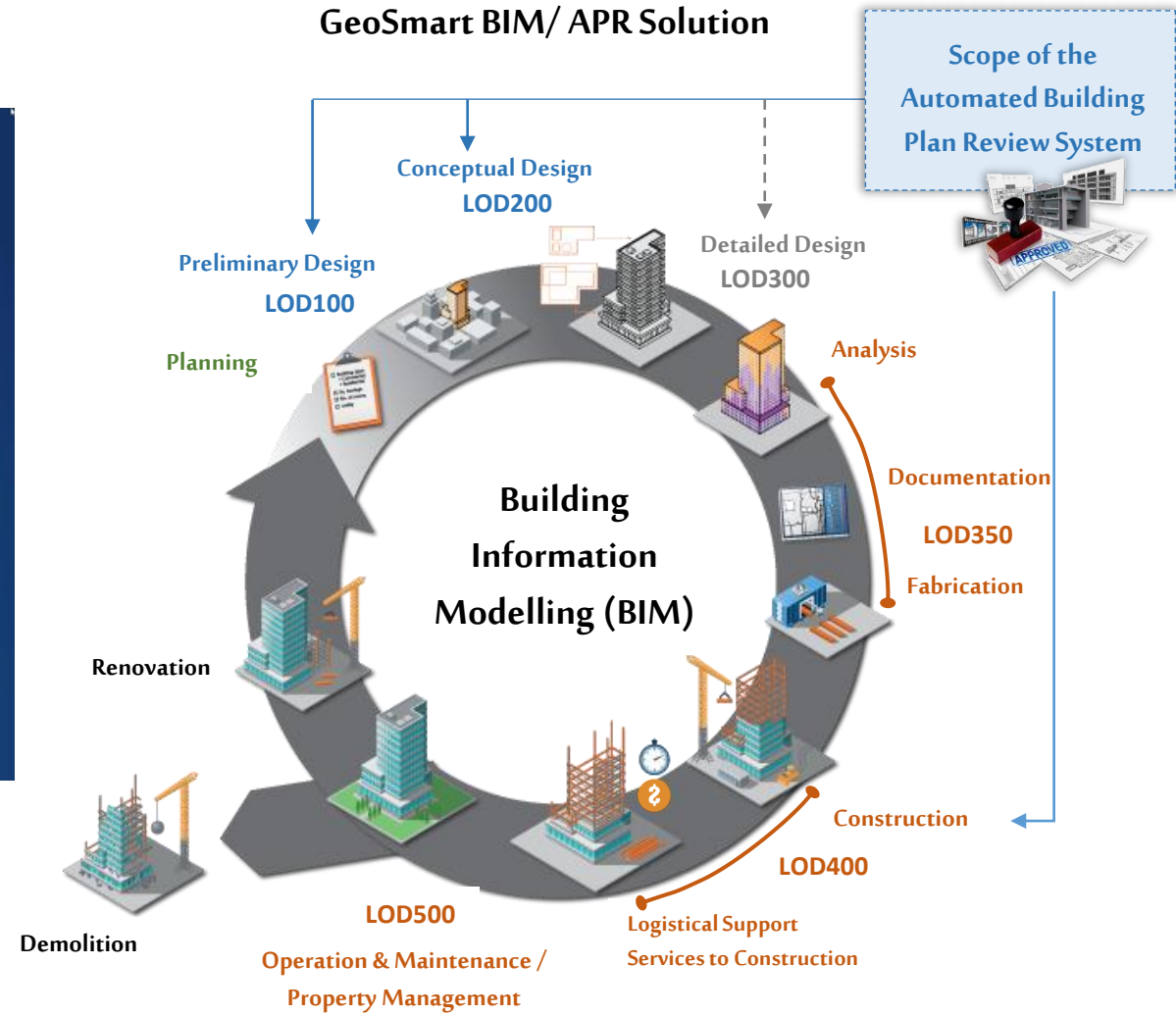
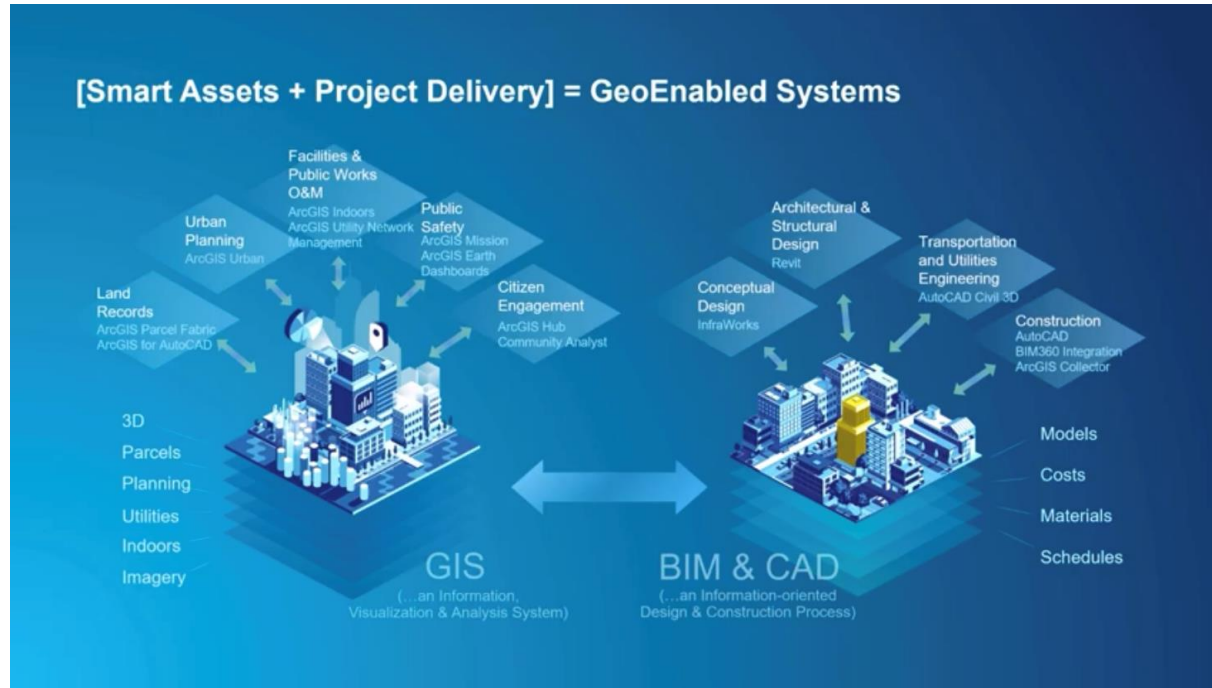
<https://cdn4.vectorstock.com/i/>



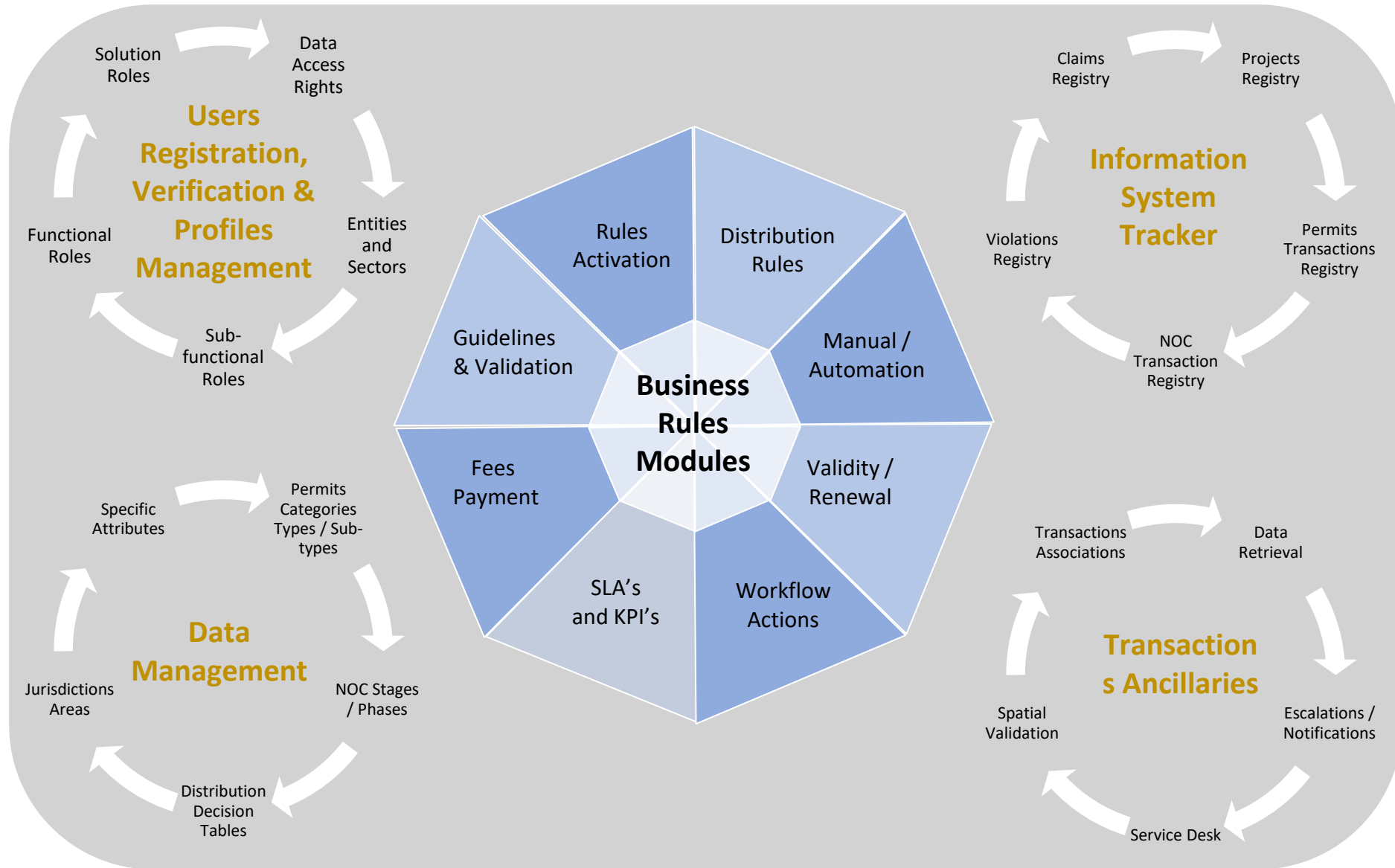
0.3 g. Data modelling and Integration Being a Key Component in Digital Twin



0.3 i. APR - Automated Building Plans Review



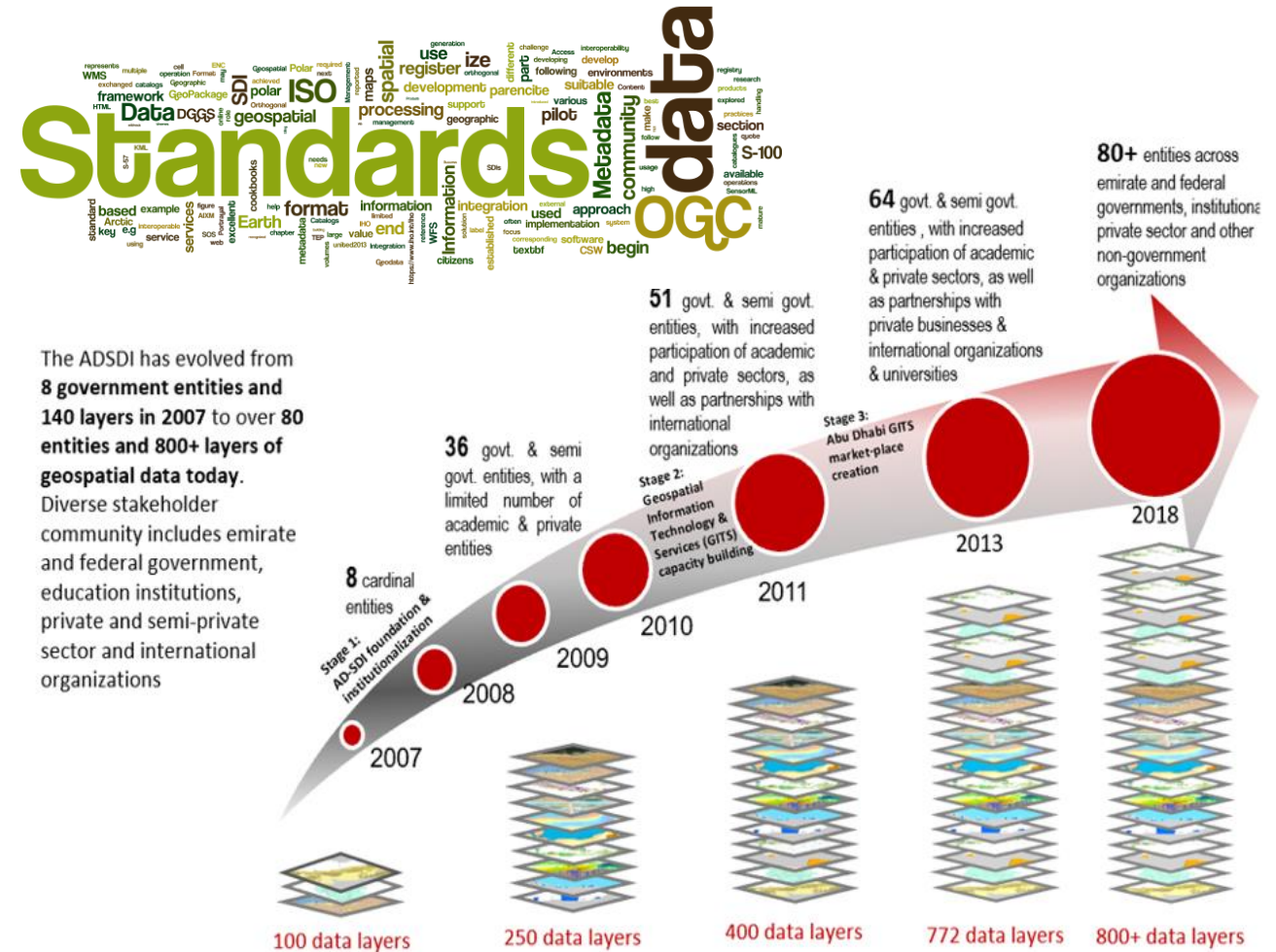
0.3 j. Applying GeoSmart Business Rules...



0.3 k. Leveraging Knowhow and Experience to Enable the SDI for the Stakeholder Entities

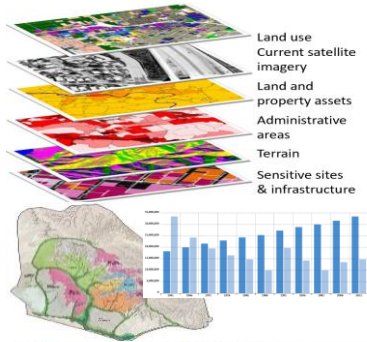
- For example, in Abu Dhabi, the AD-SDI **data clearinghouse** grew from 100 data layers in 2008 to more than 800 layers today
- GPC facilitated multi-agency **working groups** to develop standards for the most needed data themes
- GPC also codified the **data standards to Service Level Agreements** that each data custodian was responsible for complying with
- We also developed the **standard operating procedures** and technical infrastructure to streamline updating of the central data clearinghouse
- This clearinghouse is now accessed by over 87 end user organizations

SHOWCASE Abu Dhabi Spatial Data Infrastructure (AD-SDI)



0.3 I. Empowering Spatially-Enabled Decision Making via GeoSmart Dashboards Analytics

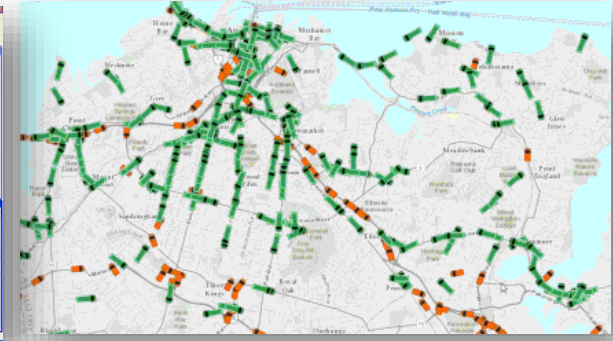
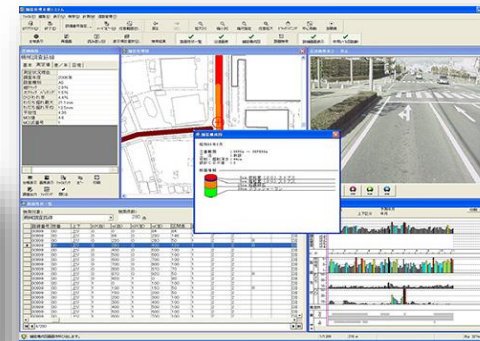
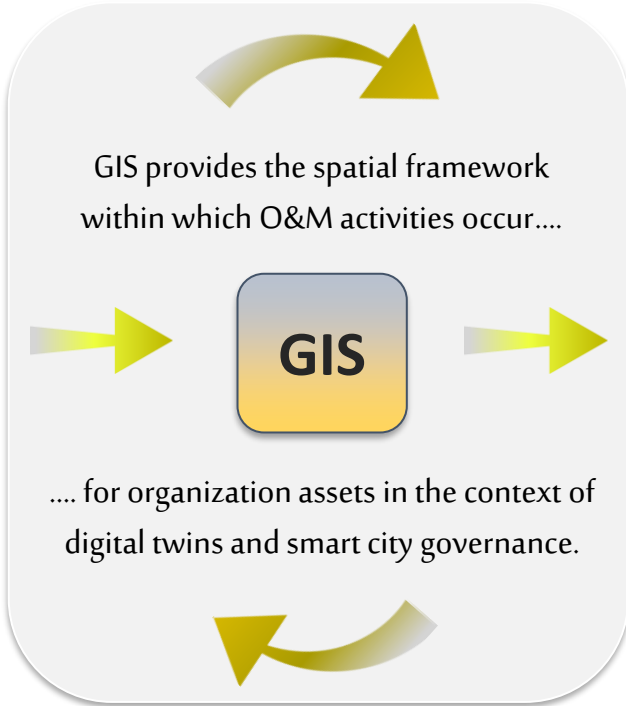
ENTERPRISE DASHBOARDS & ANALYTICS



Integrated Datawarehouse

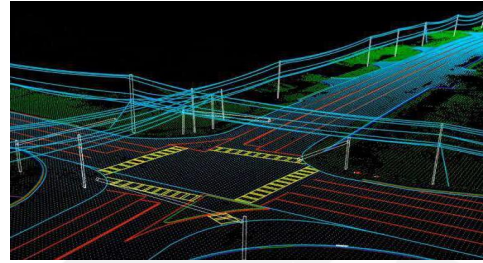
GEOSMART OPERATIONS

Advanced Analytics leveraging GeoSmart Solutions interoperating across various enterprise



0.4 Business Use Cases - Community Development & Infrastructure Component

INFRASTRUCTURE COMPONENT



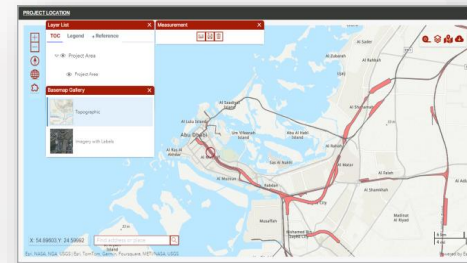
GeoAI & Data Automation



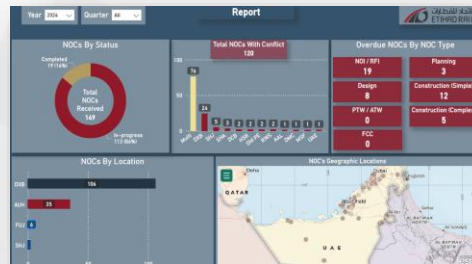
3D/ GeoBIM/
Graphics Design
Animation



Field Inspection



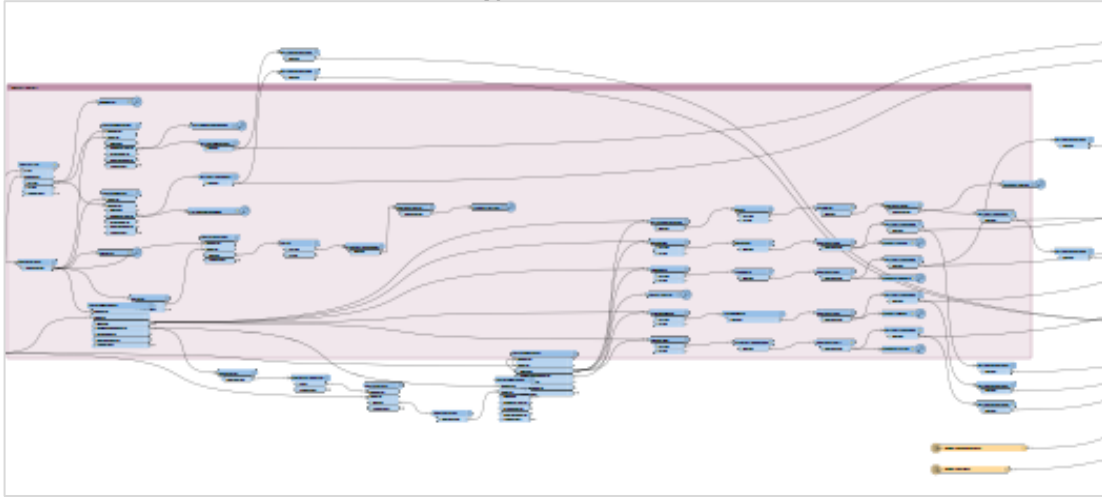
Permits & NOC
Approvals



Dashboards & Analytics

0.4 a. Use Case (1): GeoAI/ Data Automation

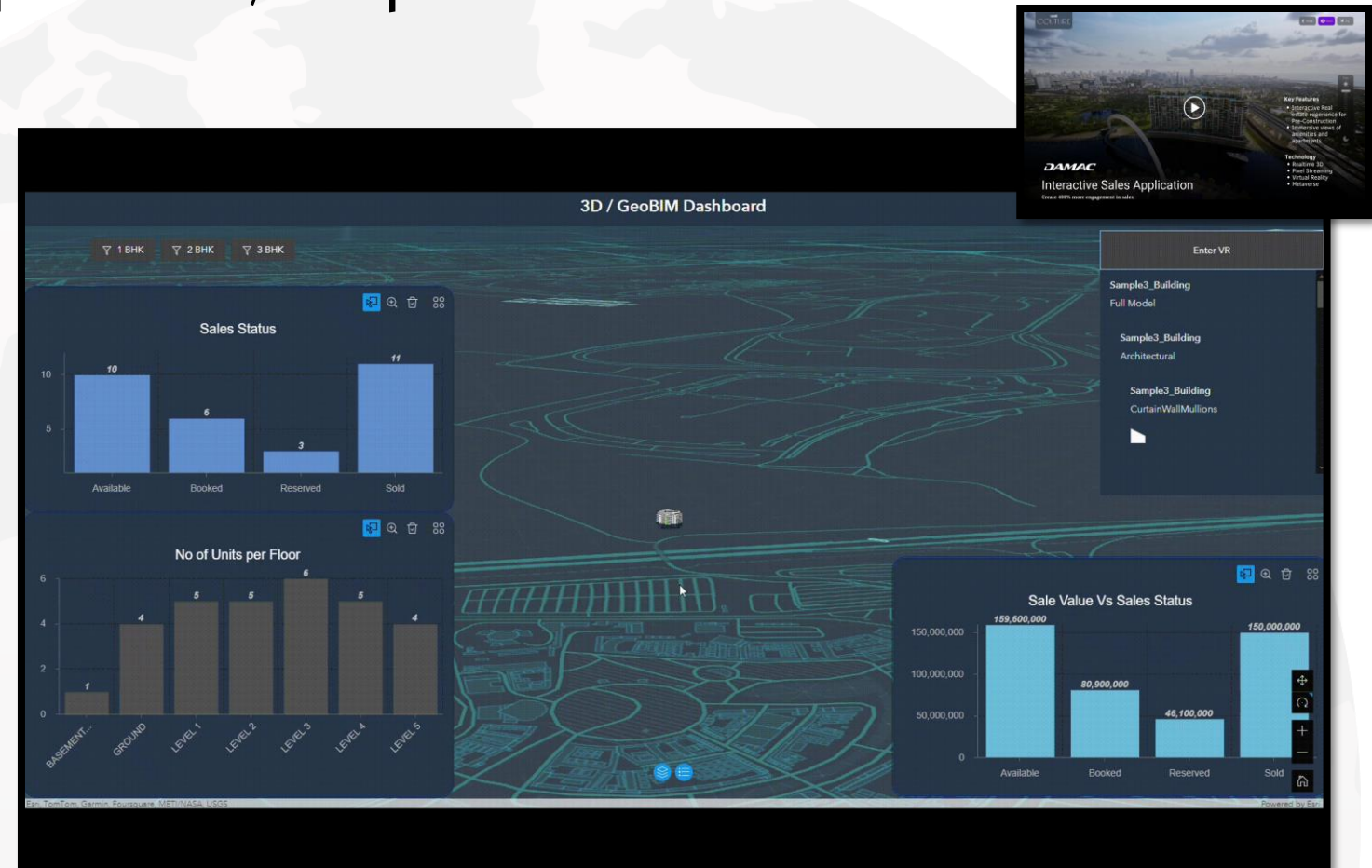
Use of GeoAI, Remote Sensing, and Data Automation



0.4 b. Use Case (2): 3D enabled Dashboards with AR/VR

Based on the available data, GPC develops 3D and AR/VR requirements as follows:

- Identify the requirements based on the detailed design use cases.
- Develop the user journeys for navigating into the 3D and AR/VR graphics via user interactive experience.
- Implement the 3D graphics based on the prioritized scope.
- Embed the 3D graphic in the Geoportal/Dashboards as necessary via integration with the graphic technology used (Reality or Unity Framework).



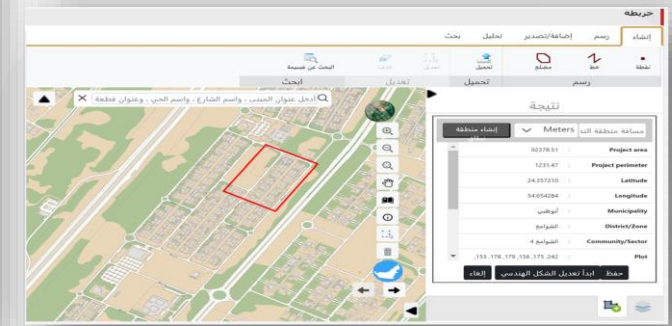
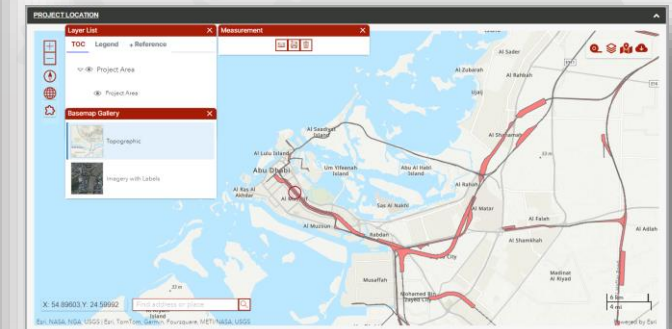
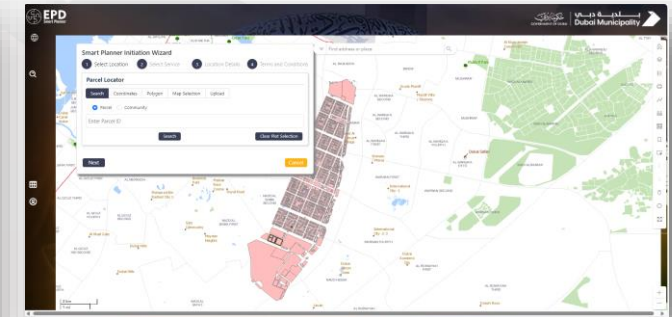
Example of 3D/ GeoBIM Dashboard Tracking Sales Status with Interactive Real Time 3D Experience (incl. amenities, interior, etc...)

0.4 c. Use Case (3): Planning & Permitting

The value proposition offered by GPC in relation to NOCs / Approvals / Permits Solutions encompasses a range of activities, including:

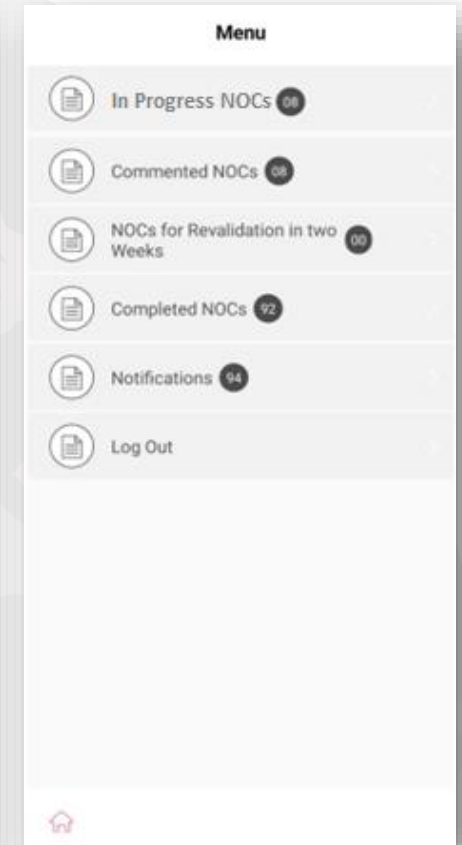
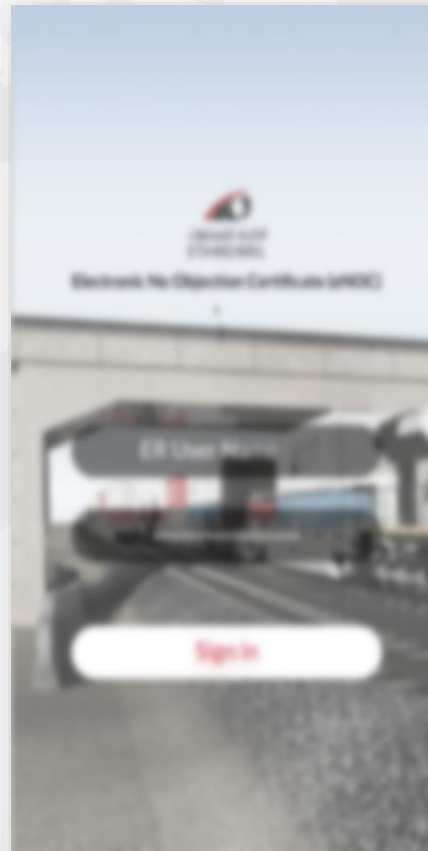
- Designing and developing **advanced NOCs / Approvals / Permits solutions for utilities and infrastructure projects in the public realm.**
- Establishing these solutions on **advanced business-rules engines** to govern and streamline **intricate processes** and **diverse operational scenarios.**
- Optimizing these solutions by integrating **advanced geospatial functionalities** and **incorporating geospatial business rules.**
- Developing and implementing **structured stakeholder coordination frameworks** covering the full spectrum of concerned parties, i.e., permitting bodies, NOC Issuers, and NOC requesters (developers, consultants, and contractors).

The screenshot shows a web application interface for project management. The top navigation bar includes 'Project Details', 'Contact Details', 'Project Location', 'Attachments', and 'History'. The main content area is divided into several sections: 'Project Details' with fields for Project Number, Project Type, Project Name, Project Description, Project Start Date, and Project End Date; 'Contact Details' with fields for Project Contact, Email, and Phone; 'Project Location' with a map showing the project area; and 'Attachments' with a table for uploaded files. The interface is clean and professional, with a blue and white color scheme.



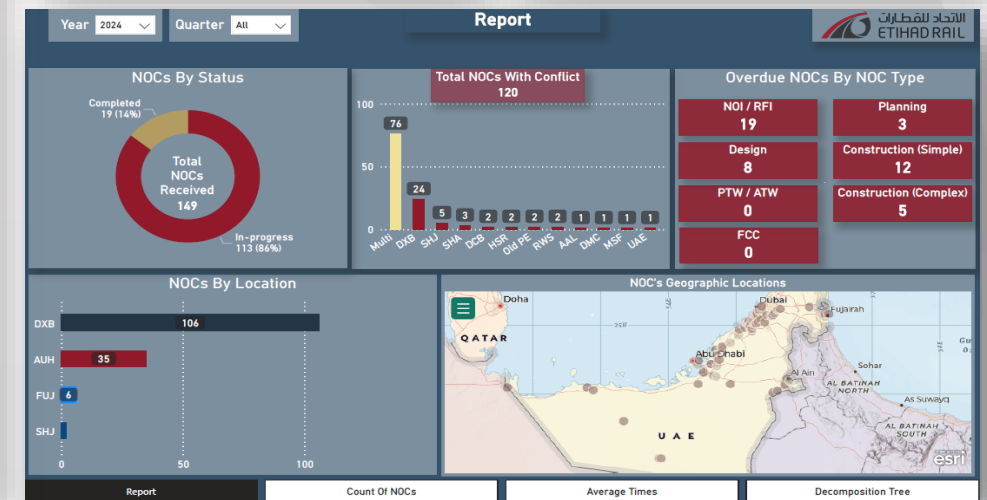
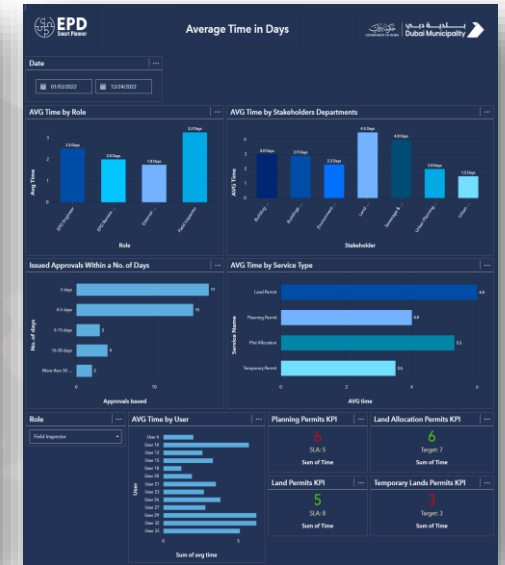
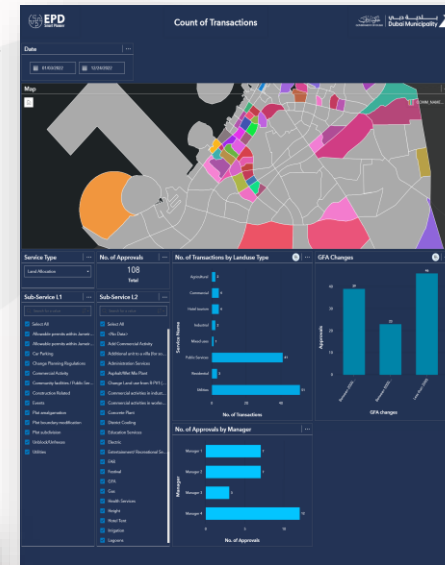
0.4 d. Use Cases (4): Inspection Applications

- Have implemented and rolled out for clients several mobile applications for **enhanced office work and field inspection**
- Solutions are deployed on various **mobile platforms/ stores** like Apple Store and Android
- Advanced features comprise:
 1. Geofencing.
 2. Assignments offline work and synchronization.
 3. Embedded location and time stamp for captured photos.
 4. Embedded workflows.
 5. Document management support services.



0.4 d. Use Cases (5): Dashboards & Analytics

- Designing dashboards to **amalgamate various types of data** (including spatial), **analytics**, and **key performance indicators** into **comprehensible and interactive displays**.
- Developing advanced **geospatially empowered dashboards** (comprising advanced widgets, charts, and geospatial visualizations).
- Integrating **sophisticated analytical capabilities** to catalyze the depth, context, and clarity of raw data, enabling the generation of **comprehensive and visually conclusive insights** into spatial and non-spatial patterns, trends, correlations, and essential **metrics/KPIs**.



Agenda

01



Introduction

02



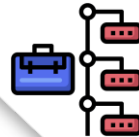
Company Profile

03



GeoSmart Approach for
Government Solutions

04



Business Use Cases

05



Our Key Projects

5.1 Our Key Projects

No.	Clients' and Projects' Names	Project Period
1	<u>Abu Dhabi Department of Municipalities & Transport (DMT), UAE - DMT electronic No-Objection-Certificates (e-NOC) Project</u>	2013 – 2023
2	<u>Department of Municipality & Transport (DMT), UAE - Studying the Authorities' Procedures on the Unified Municipal Electronic Permitting System (MePS)</u>	2022 – 2023
3	<u>Etihad Rail , UAE - Etihad Rail e-NOC Solution (foundation and 5-year operations support)</u>	2021 – On-going
4	<u>Majid Al Futtaim Properties (MAFP), UAE - MAFP Enterprise GIS Project</u>	2017 – 2019
5	<u>Abu Dhabi Department of Culture & Tourism (DCT), UAE - Abu Dhabi Historic Environment Record System Project (ADHER)</u>	2017 – 2021
6	<u>Abu Dhabi Department of Energy (DoE), UAE - Energy & Water Intensity Heatmap Dashboard</u>	2021
7	<u>Dubai Municipality, UAE - Enhancements of Executive Planning Department's Operations</u>	2023 - On-going
8	<u>MOMRAH, KSA - Urban Development Priorities GeoPortal Solution</u>	2021 – 2022
9	<u>Zakat, Tax, & Customs Authority (ZATCA), KSA - GIS Foundation Solution for Customs Authority</u>	2022 – On-going
10	<u>Ministry of Tourism, KSA - Executive & Analytical Dashboards and Geographic Information Systems Applications.</u>	2023 – On-going
11	<u>The Federal Geographic Information Center (FGIC), UAE - UAE National Spatial Data Infrastructure (NSDI)</u>	2020 – 2022
12	<u>Abu Dhabi Waste Management Company (Tadweer), UAE - Roadmap Elaboration to Establish Enterprise GIS & Spatial Database in Tadweer</u>	2023 – On-going
13	<u>ADSDI, UAE - Abu Dhabi Spatial Data Infrastructure (SDI) Program</u>	2008
14	<u>Abu Dhabi Food Control Authority (ADFCA), UAE - Abu Dhabi Food Control Authority (ADFCA) Enterprise GIS Solution</u>	2014 - 2015
15	<u>Sharqia Development Authority (SDA) – (KSA) - Design and Implementation of the Regional Data Center (RDC) Enterprise Architecture</u>	2021 – 2023

Abu Dhabi Systems and Information Centre - Abu Dhabi No Objection Certificate (NOC) Solution

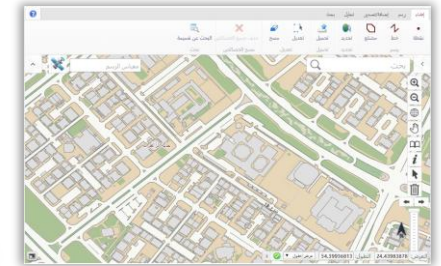


Project scope

The NOC Program initiation was triggered by the rapid pace of urban development in Abu Dhabi which fuels an average of 15,000 permits and approvals transactions annually. These result in approximately 100,000 No-Objection-Certificate (NOC) transactions that required complex and lengthy processing.

The prime objectives of the program focused on protecting valuable infrastructure assets, enhancing integrated government business processes, raising customer satisfaction and improving the overall investment environment.

This project has involved the planning, design and development of a comprehensive online system for processing of No-Objection-Certificates (NOC's) for site clearance "Call Before You Dig" operations. The system integrates the NOC application and review process across over 25 government entities and several hundred consulting engineering, contractor and developer companies. Development of the system has also involved the refinement of key government policies, inter-institutional agreements, normalization of business processes and rules for NOC issuance and other issues that were required to strengthen the entire NOC business solution area.



25 Stakeholder



69 workflows



152 NOC types



130 data topic



Operation & Implementation Plans



Full solution implementation and rollout



Project scope

Another successful milestone leveraging the Platform-As-A-Service. As part of its drive to continuously improve on planning & infrastructure development regulatory services, DMT has renewed the services of GPC Group to support the operational and performance management of the e-NOC program. In addition, the scope comprises the rollout of prioritized releases related to the e-NOC solution as part of a continuous improvement strategy driven by the urban development & construction community needs and requirements (municipalities, stakeholder entities, consultants, contractors, and developers). The intended additions on the comprehensive e-NOC solution leverage the e-NOC platform capabilities which was conceived since inception in 2013 as a configurable and scalable platform-as-a-service (PAAS). The e-NOC solution currently serves 25 government and semi-government entities with participation of several dozens of developers in addition to thousands of consultants and contractors.

The intended enhancements are being rolled out while sustaining operations, which comprises close to 15 thousand projects and close to two hundred thousand individual NOCs issued per year.

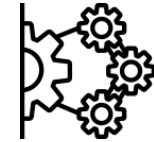
As part of this project, GPC extended its services to DMT, in the context of the on-going successful e-NOC services provisioning to government and the municipal sector since 2011, to provide e-NOC services in the following areas:

- Configuring & rolling out new and updated business rules and roles
- Usability enhancements
- Development and rollout of validation services
- Reports' enhancements
- Spatial map view and analysis enhancements
- Other enhancements



1200

Government participating employee



6

Major System Enhancements



15000

Annual municipal approval projects

200,000

Annual individual NOCs

DMT - Studying the Authorities' Procedures on the Unified Municipal Electronic Permitting System (MePS)



Project scope

- Study and assess existing situation.
- Identify requirements and opportunities for enhancements.
- Formulate recommendations.
- Plan for implementation (with identifying prioritization and interdependencies).



Domains for Enhancements



Community of Stakeholders:

- Building Permit Regulator (DMT)
- Permitting Authorities (Municipalities)
- Approving Entities:
 - Municipal Assets (roads, parks & irrigation, street lighting, vehicle parking, ..)
 - Specialized Approvals (Urban Planning, HSE, Traffic Studies, GIS & Surveying, ...)
 - External Entities / sectors (utilities and infrastructure, transportation, safety & security, energy, environmental assets, cultural heritage assets, ...)
- Applicants (Consultants, contractors, citizens, ..)
- Developers (*playing multiple roles from the described above*)

Outcomes & Deliverables:

- Situation Assessments.
- International Best Practices Study & Benchmarking.
- Governance Reports.
- Entities Procedures Guidelines.
- Workflows Mapping.
- Recommendations for Enhancements.
- Implementation Roadmap.
- Awareness and Capacity Building.





Main Objectives



Automate the No-Objection-Certificates (NOCs) services across all UAE



Streamline internal processes including improving efficiencies and strengthening coordination



Enhance governance and performance monitoring via advanced reporting and dashboarding analysis capabilities



Transform the services while maintaining access to historical information



Develop a unified online platform integrated with internal and external government systems, as needed



Project scope

The ultimate objective of the project is to support the development (plan, design, implementation & rollout) of the E-NOC solution to address the needs of Etihad Rail. This will eventually introduce efficiencies and effectiveness in the business activities and streamline service provisioning to contractors, consultants, developers, utilities, infrastructure service providers, and government Entities.

The e-NOC System will allow the Applicant to apply for a NOC, view NOC application status, update NOC applications, and receive the final NOC through the system. It will allow E-NOC System internal users to manage and review NOCs, as well as comment notify other users about NOCs. The system will facilitate 100% electronic, paperless processes and automate many previous actions in ER's NOC application process.

Main System Features

Core Functional Requirements	Digital Stamp
Spatial & Geographic Data	Reporting
Location & Conflict Analytics	Mobile Application

The platform infrastructure capabilities comprise and/or integrate with the following

- Geographic Information System (GIS) and CAD Tools
- Document Management System (DMS)
- Business Process Management (BPM) Engine
- Web Portal
- Mobile Chanel
- Public Web Pages
- Business Rules Engine
- Reports & Dashboards
- Location & Conflict Analytics

Project scope

Majid Al Futtaim Properties LLC (“MAFP”) is an integrated real estate development and management company. The primary focus of MAFP is the development of Shopping Malls, Hotels and Mixed-Use Communities across the MENA region.

The Senior Management of MAFP is committed to ensuring that this future growth is enabled with the right processes and technology. This transformation includes the standardization and automation of many core business processes. With this transformation the company’s success is increasingly relying on Information Technology, it becomes crucial to manage/ control the associated risks to confidentiality, integrity and availability of MAFP’s information and IT Infrastructure.

The design, development and implementation a foundation Enterprise GIS System for Majid Al Futtaim Properties (MAFP), Communities Business Unit (CBU) projects.

The Enterprise GIS System will be a system capable of supporting the MAFP CBU’s immediate and future core functionality and integration needs. The core of the system will be a set of geospatially-enabled services that will access both internally and externally.

Deliverables of the GeoSmart Communities project include:

- Proof of Concept (Demonstration Model);
- Enterprise GIS system with online portal and GIS applications;
- Extended IT Warranty and Support.



Department of Culture & Tourism (DCT) - Abu Dhabi Historic Environment Record System Project (ADHER)



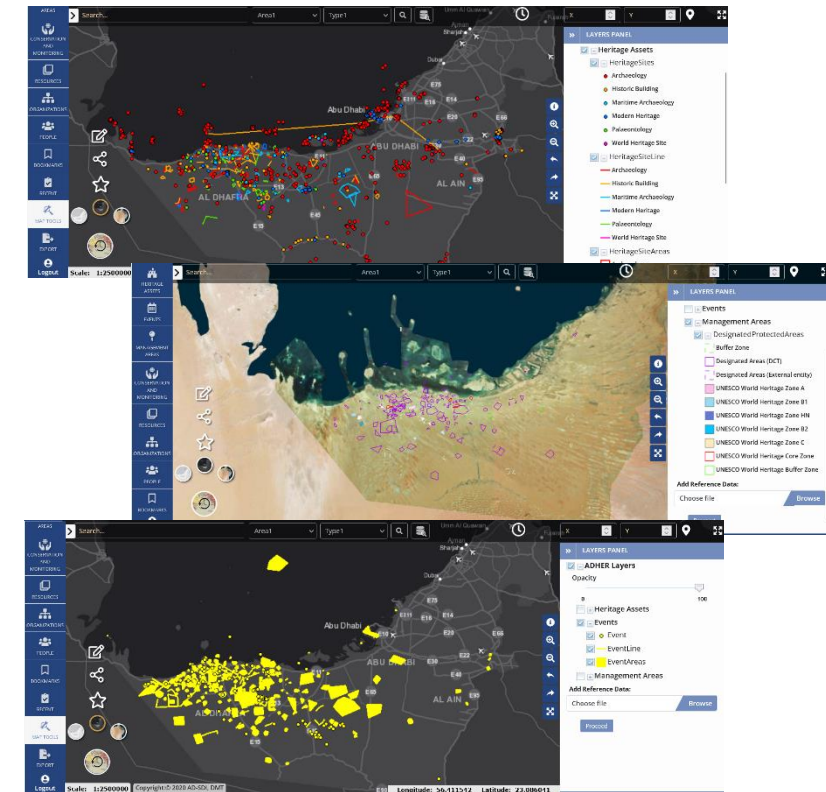
دائرة الثقافة والسياحة
DEPARTMENT OF CULTURE
AND TOURISM

Project scope

Historic Environment Records (HER) are an important source of information on archaeology, built heritage, and history of an area. They provide information on a wide variety of buildings and sites, from finds of prehistoric artifacts to more recent historical and cultural locations and structures. HERs are, among others, a primary source of information for planning, development-control work, and land management.

The ADHER system, complying with the Abu Dhabi government IT rules and regulations, is a GIC-based solution, following the agile development principles.

The ADHER project will support consolidating the cultural heritage information in one centralized database providing a single source of truth for all the concerned users. The ADHER system will leverage geospatial technology and tools providing a rich set of tools that facilitate search and analysis. The system will also consider the required information security requirements by providing access according to each user's roles and responsibilities and privileges.





Project scope

In collaboration with Abu Dhabi Department of Energy (DoE) consultant 'Guidehouse', GPC has developed a scalable geospatial heatmap dashboard that helps raise stakeholders awareness and provides them with the necessary actionable information in regard to energy and water consumption throughout the Emirate of Abu Dhabi.







- Consumers can visualize the performance of buildings in their area of interest and start opting for higher-performing buildings.
- Building Owners can assess the need to upgrade their buildings with energy and water-efficient technology to increase building performance and attract customers.
- Energy Managers in Supply Companies and ESCOs can better visualize energy and water use consumption throughout their service territories and consider more focused demand-side management actions to reduce consumption.
- DoE policymakers can use the dashboard to better assess the impacts and implementation of their energy and water efficiency policies and conservation measures across the Emirate.
- The DoE Heatmap Dashboard featured integration with the Department of Municipalities and Transport to retrieve spatial data as well as with the Abu Dhabi and Al Ain Distribution companies to retrieve electricity and water consumption data.

The dashboard availed smart search and locating tools to optimize the user experience as well as tailored analysis tools that enable comparison of the consumption trends to different benchmarks as well as within spatial extent.

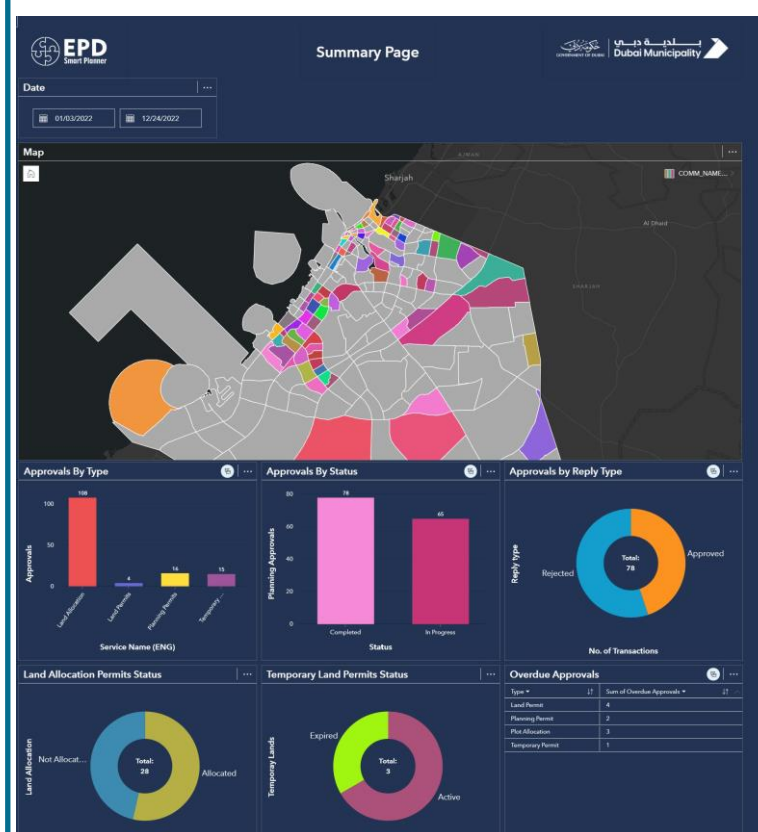









Main System Features

-  **Integrated planning services** in one platform automating processes
-  Complete **transformation of services definitions** in alignment with DM Executive Orders (no. 500+)
-  **Spatial enablement of services** as a key feature across all services and roles up to **planning decisions**
-  **Providing guidance to applicants** on DM planning terms & conditions
-  **Smart transactions distribution business rules** to different stakeholders across the various services
-  Revamped automated **internal reports** (dozens of templates) and **dashboards**

Geospatial Analysis and Dec. Making



Key Benefits of the Solution

-  Important **transformation** in planning services in participation of stakeholders
-  **Streamlining applicants' services submittals** through proper guidance
-  **Resulting in substantial efficiencies** in planning activities empowered by **spatial enablement**
-  Assisting EPD engineers by **benchmarking vs. historical decisions and executive decrees**
-  **Readiness to link the results of the planning transactions** to DM enterprise GIS
-  **Informing decision making** to realize the department objectives

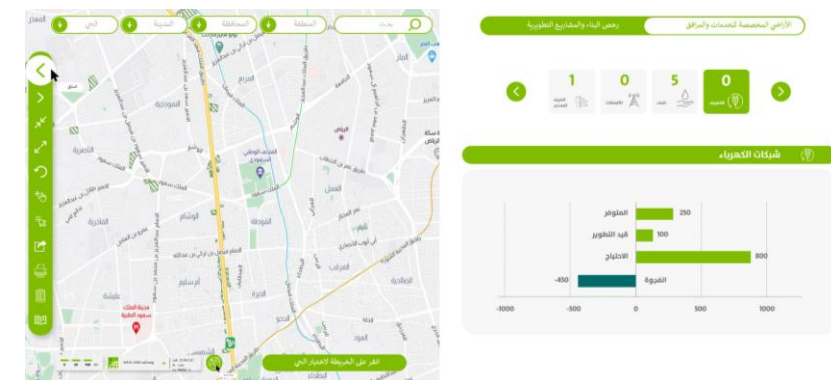
Project scope

Automation of joint procedures related to setting urban development priorities (more than 20 entities)

- Exploration of data related to urban planning to determine urban development priorities.
- Analysis of neighborhood data in terms of urban development priorities requirements (planning, existing status, projects)
- Setting the elements of the planning criteria in the system, which are used in calculating the requirements of the planning units
- Preparing executive reports and dashboards to support decision-making
- Mechanisms for recording and automating related data by the concerned parties
- Achieving a qualitative leap in defining urban development priorities with the participation of the concerned authorities
- Update planning standards related to public services and utilities
- Updating the guiding principles and procedures related to urban development priorities
- The ability to access and benefit from the reference data on the platform to support decision-making
- Preparing the reports and analyzes required to enable the relevant procedures with the concerned authorities.



Geospatial analysis and planning decision making



Project scope

- GPC-ICT, our Riyadh-based member of The GPC Group of companies has been commissioned to support Zakat, Tax and Customs Authority (ZATCA) in building its geospatial foundation framework that will help ZATCA in its digital transformation and 2030 vision. This foundation framework will leverage ZATCA employees with a complete and comprehensive environment that can be utilized to support the current and future tasks and activities, also it will help in reducing the time and effort for employees and enhance the quality of ZATCA's interactions with external entities as well as with the individuals. Also, it will help ZATCA develop people, assets, and programs for data management and service delivery to develop people, assets, and programs for data management and service delivery to ternal and external stakeholders.
- We are helping ZATCA in its foundation phase of building the geospatial framework which includes executing different types of survey works, creating enterprise geodatabase, and developing new solutions and services (GeoPortal and Work Permit Systems), in addition to delivering a variety of other requirements, such as but not limited to hardware, software, licenses, training, operational support, and maintenance.



Carrying out surveying work for infrastructure networks with the latest surveying technologies.

Carrying out aerial photography work with drones to develop three-dimensional models of land ports.

Carrying out surveying work for security technologies for all customs ports, collecting spatial and descriptive data, documenting all data, and adding them to the authority's geospatial database.

Building and developing an electronic geospatial portal that supports the implementation of activities and tasks related to geographical systems.

Developing an electronic system to organize and govern obtaining requests for permits for excavation, construction, demolition, etc.

Providing maintenance service, technical support, and monitoring systems associated with the project.



Project Scope

The scope of the project lies in the development of applications that are completely dependent on maps and geographic solutions so that data panels and targeted applications provide geographical analyzes and use the latest technologies and advanced analyzes in the science of geographic information systems in addition to technical support. The project aims to achieve the following objectives:

Activate the role of geographic information systems by developing a set of applications based on advanced geographic data analytics to contribute to the decision-making process for internal and external use in support of tourism in the Kingdom of Saudi Arabia.

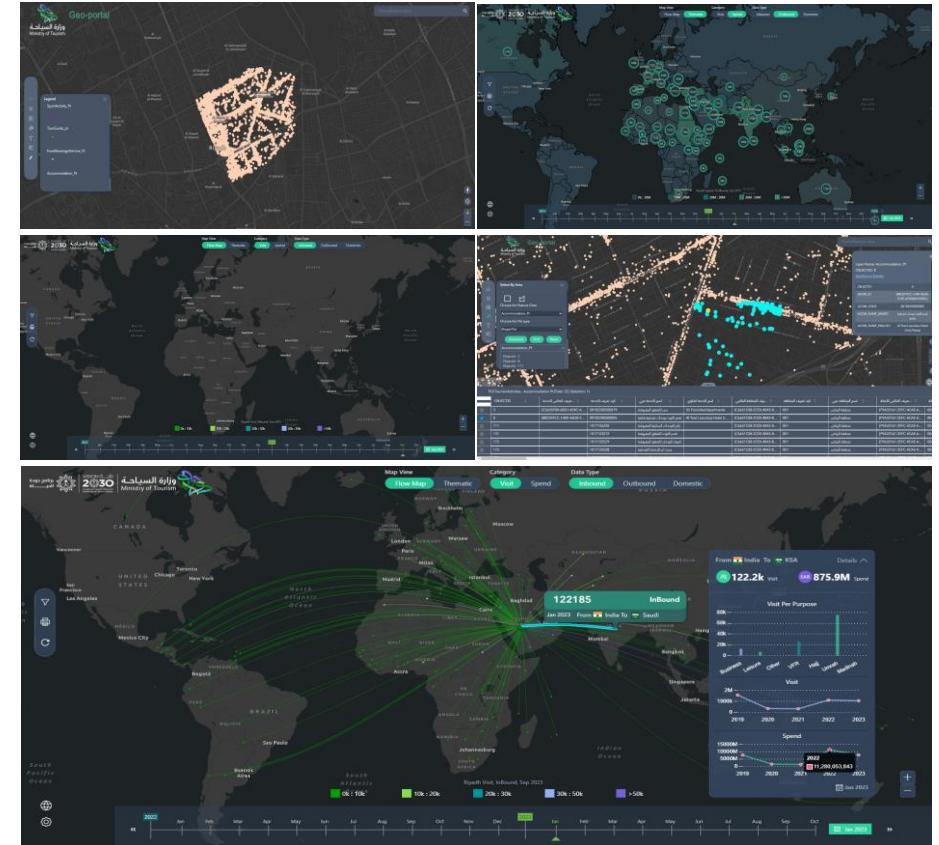
Complete data integration processes and update databases to serve the objectives of the use cases (via integration between enterprise geodatabase and enterprise data warehouse supporting the operations for several enterprise systems).

Use Cases:

- Lands Targeted for Tourism Investment & Tourist Trend Analysis Interface
- Geodata Interface
- Implement Tourist Site Readiness
- Real-time monitoring of inspectors

Integration:

- The National Tourism Monitoring Platform & Licensing platform
- Human capital data Investment attraction platform
- Sector, data of tourism statistics





Project scope

The UAE has been at the forefront for the adoption and effective utilization of GIS technology as a critical tool support the rapid economic development and expansion of the country's cities, infrastructure and population over the past 25 years. A newly created Federal Geospatial Information Center (FGIC) was established through Law No. 5 in 2019 and among other duties is now responsible for the development and oversight of a National Spatial Data Infrastructure (NSDI). The purpose of the UAE-NSDI program is to better coordinate and leverage government investment in geospatial data and applications, establish the institutional, technical elements and governance processes that are needed to support more effective data sharing and utilization across government and society, and provide the strategy and roadmap of specific actions that need to be carried out to implement all dimensions of this program.

The first activity of the NSDI involves a Study and Design Phase initiated in December 2020. The FGIC has commissioned a team led by the GPC-GIS company to support this 21-month effort, inclusive of an extensive requirements analysis involving over 40 key stakeholder organizations, a comprehensive inventory and assessment of existing geospatial data sources across the country, the development of a wide variety of standards, guidelines and procedures, and a program design defining the overall institutional and technical framework for the UAE NSDI. The effort also includes the development of a detailed roadmap for the implementation of priority components of the program design.



Tadweer - Roadmap Elaboration to establish Enterprise GIS and Spatial Database in Abu Dhabi Waste Management Company (Tadweer)



Project Scope

Tadweer is the lead agency responsible for controlling and governing waste management activities throughout the Emirate of Abu Dhabi, UAE. GPC is supporting Tadweer in developing a GIS Roadmap and Implementation Plan for establishing a GIS infrastructure for integrated waste management following the SDG principles and goals and transform waste management into an economic pillar to contribute to national sustainability ambitions.

GPC is addressing the following aspects in this project that is underway:

1. Situational assessment and gap analysis of existing systems.
2. Definition of the business requirements of each core business area (Strategy & Planning, Projects & Facilities, Waste Collection & Transportation, Licensing & Customer Care, HSE & Crisis Management, and support functions such as the IT, HR, and legal).
3. Data Management based on identified use cases for each supporting business function; and the data acquisition planning.
4. GIS ROI Study.



5. Detailed plan to build a Geoportal for data visualization and management; and spatial analytics & spatially enabled dashboards for informed decision-making.
6. System and infrastructure (cloud based) design in alignment with e-Government directives of the Emirate.
7. Implementation Plan for GIS with estimation of needed resources, time, and cost including operation requirements (GeoSmart platform; system integration; spatially applications leveraging the GeoSmart platform).
8. Knowledge transfer and capacity building plan.
9. Developing a GIS Roadmap with phased implementation priorities (guided by a GeoMaturity Assessment that provide systematic transformation to advanced GIS maturity levels).





Project scope

Plan and implement a world class Spatial Data Infrastructure Program for the Emirate of Abu Dhabi.

This program identifies, organizes and facilitates of the creation, maintenance and sharing of fundamental geospatial information across all government, semi-government and other organizations within the Emirate.

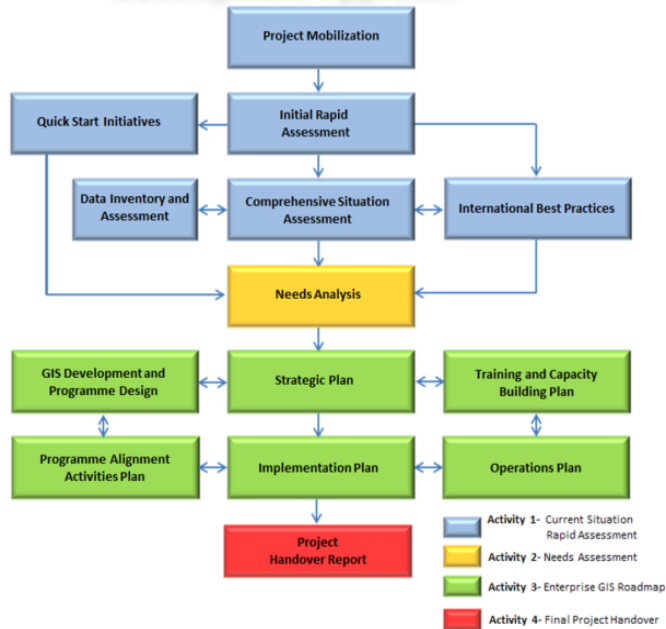
In recognition of its efforts in implementing Spatial Data Infrastructure (SDI) and driving the cooperative use of geospatial information across a wide range of Government entities in Abu Dhabi, Abu Dhabi e-Government was the inaugural recipient of the first-ever “2015 Smart Government Award” launched by the Environmental Systems Research Institute (Esri) User Conference, held in San Diego, California in the United States on 20th – 21st July.

For nearly 8 years, GPC GIS has been a key partner of ADSIC in the planning, design and development of a world class, international award-winning SDI program that today comprises nearly 80 government and quasi-government entities sharing over 800 layers of geospatial data. The GPC Team supported ADSIC in the planning and design of the program in 2007. We assisted ADSIC in the implementation of the program, supporting operations and assisting the organization in developing its internal capacity to manage the program over the subsequent years.





Development Approach



> Master Plan

❖ A GeoSmart Food Security Management Plan covering short, medium and long term objectives.

> Foundation Projects

❖ A set of select products and applications that comprise a foundation for initiating geospatially enabled operations and services.

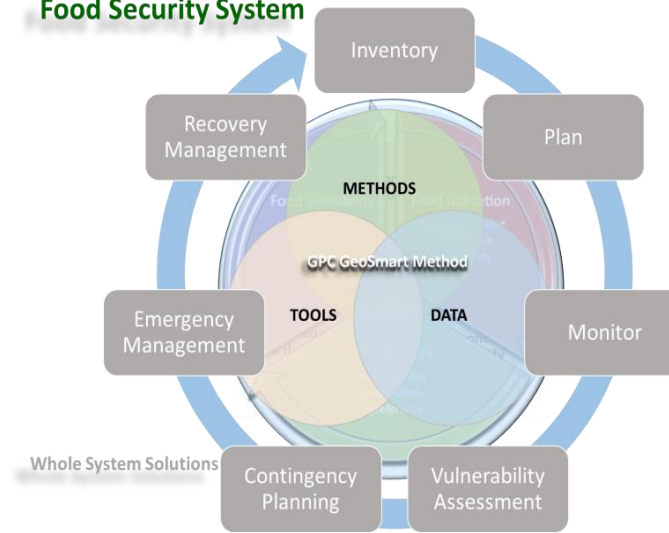
> Capacity Building

❖ Develop FSCAD local staff capacities through knowledge transfer and engagement in developing the GeoSmart Food Security planning and implementation phases.

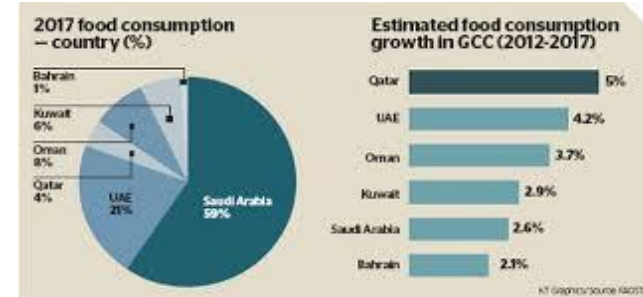
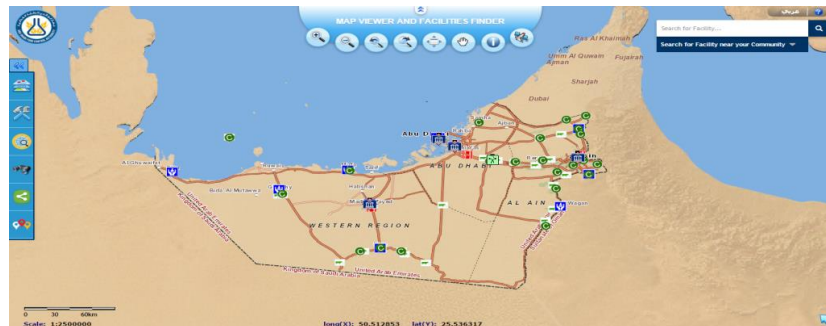
> Implementation

❖ Implement the Master Plan through building the technical tools, setting the operational and governance frameworks, supporting operations and building capacities.

Food Security System



Whole System Solutions



Project scope

The purpose of the Project is to develop a GIS Roadmap for Etihad Rail to implement spatial technologies in a manner that meets Etihad Rail's long-term business requirements for rail infrastructure planning, construction and maintenance, property acquisition and management, safety and security, and environmental modelling and compliance.

Project Objectives

This strategic project is part of Etihad Rail's "Digital Transformation Program" and aims to satisfy the need to define, design, develop, and implement an Enterprise GIS system for Etihad Rail capital project delivery and rail operations. Strategically, the project aims at serving multiple objectives including optimizing CAPEX and OPEX, developing effective governance, organization, and business processes, and promoting a performance driven culture within Etihad Rail.

Etihad Rail Aiming for a Geo-Empowered "Digital Twin"

- Phase One – GIS Strategy, Business Case And Roadmap
- Phase Two - Technical Requirements And RFP Support
- Phase Three (Optional / Upcoming) - Implementation Support And Quality Assurance



Project scope

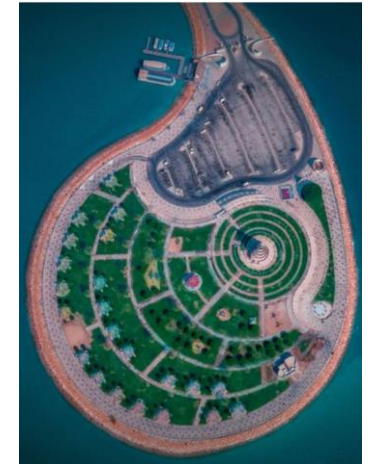
The objective of the Design and Implementation of the Regional Data Center (RDC) Enterprise Architecture Project is to assess, design and implement, and subsequently operate an Enterprise Architecture for RDC that can be used to capture, process, store and disseminate data for the Sharqia Development Authority (SDA) stakeholders enabling them to exchange data between various government and private entities as well as facilitating access to different databases (geospatial, statistical and remote sensing). The project aims to establish an RDC for the four (4) areas within the institutional work, namely Business, Data, Systems, and Technology. The project consists of four (4) stages:

- Stage 1: Current Situation Assessment
- Stage 2: Design
- Stage 3: Implementation

- Stage 4: Operation and Maintenance

GPC-ICT, a Riyadh-based member of The GPC Group of companies has partnered with AHCEC Engineering Services to perform the following tasks:

- Preparing and conducting international best practices analysis and recommendations;
- Supporting the stakeholder assessment activities (internally & externally);
- Creating Data Governance Model and Sharing Policy align with the KSA national model;
- Designing the Data Consumer Agreement (DCA) and Data Provider Agreement (DPA) Templates





Project scope

The Bahrain Ministry of Electricity and Water is in the process of implementing an enterprise GIS to support utility management, operations and administration.

GPC supported Geomatec, Bahrain in a Program Management role to oversee the development and implementation of the project from initial RFP through to the completion of the system implementation over a two-year period.



Types of services:

- GIS Rapid Assessment and Planning
- Enterprise System Design and Implementation Planning
- Project Management
- Resource Management
- Database Development
- Utilities





Project scope

The awarded project from the Supreme Committee for Town Planning (SCTP) that is not the Ministry of Housing and Urban Planning involved user needs analysis, system design and implementation planning for a national GIS development strategy for the Sultanate of Oman.

The project team collaborated directly with the Supreme Committee for Town Planning (SCTP) to develop a strategy for a nationwide system and integrated geographic database to serve the ongoing operations of twenty-three different Ministries.

Our CEO Mr. Sorensen served as Senior Consultant and Project Manager for a team of 10 international GIS consultants to conduct over 100 interviews within 23 different Ministries throughout Oman to determine requirements for geographic and geographic-related data and applications.

The project team then synthesized the information from the interviews to a system design and implementation plan addressing long-term needs for hardware, software, data, staff training, institutional development, and integration of GIS to the day-to-day operations of the Ministries.

This plan has been in used in Oman over eight years later after the project's completion.

Our team continued to support the Oman national GIS/LIS initiative through a series of detailed design and implementation support projects for various individual Ministries, including supporting the Oman National Survey Authority in the development of digital basemapping specifications for the country.



Types of services:

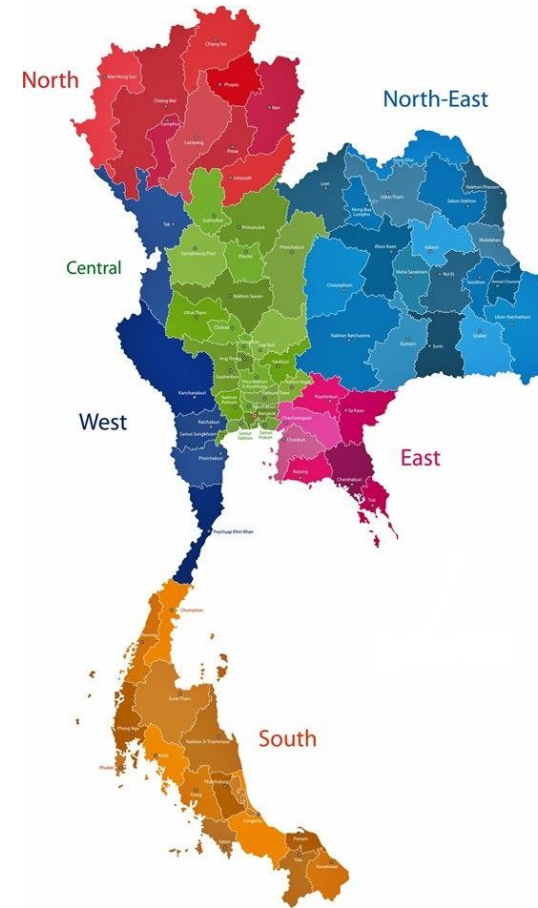
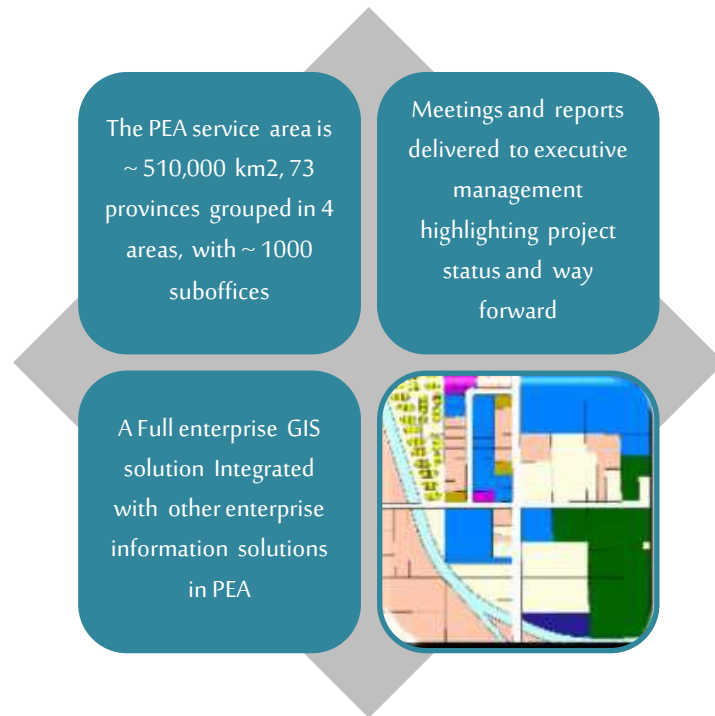
- Spatial Data Infrastructure
- Enterprise System Design and Implementation Planning

Thailand Provincial Electric Authority (PEA) - Enterprise GIS System Design and Implementation Planning



Project scope

Terms of Reference for the PEA (27,000+ employee) Enterprise GIS solution phase 2, and overall audit and performance management support to the project





Project scope

As part of its drive to digitally transform its services, DMT has continued evolving its initiative to develop and rollout the electronic Planning Approvals and Site Clearance (e-PASS) solution while incorporating more advanced services. A key foundation rollout milestone of the solution was accomplished during 2021 with participation of 21 government and semi-government stakeholder entities and the participation of several developers. The new application has been configured from the existing platform-as-a-service (PAAS) that was first used for the development of the common e-NOC solution. This resulted in streamlining key municipal master planning services and infrastructure development processes across the whole of government.

GPC extended its services to DMT as part of the successful foundation e-PASS solution initiated in 2020.

Main System Features

- Automating processes related to obtaining areas planning approvals from stakeholder Entities (27)
- Approvals comprise plots and utility corridors across various planning stages
- Distribution of projects plans in automated manner to all concerned stakeholders
- Allows the entities to provide their individual comments and conditions or no objections
- Aggregating entities responses for every trx. & analysing and presenting results to dec. makers
- Reflect planning decisions via operational controls applied on respective systems via integration

Geospatial Analysis and Dec. Making

No. Plots	%
Approved	75 100%
Rejected	2 2.50%
Total	78 100%

Entity	Approved	Conditions	Rejected	Total Plots
ADAC	75	2	1	78
ADOC	75	1	2	78
Musandah	75	0	0	75

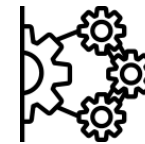
Key Benefits of the Solution

- Important transformation in planning services (across stages) in participation of stakeholder entities
- Expediting processes and addressing challenges faced by developers during permits & execution
- Expedite design stages, permitting approvals and execution of projects
- Facilitate budget estimation and impl. duration of projects in a more accurate way
- Identifying required budgets for infrastructure assets transfers early on in the process
- Strengthening construction & infra projects develop. by identifying design and impl. conditions



600

Government participating employee



6

Major System integrations/ impacted services



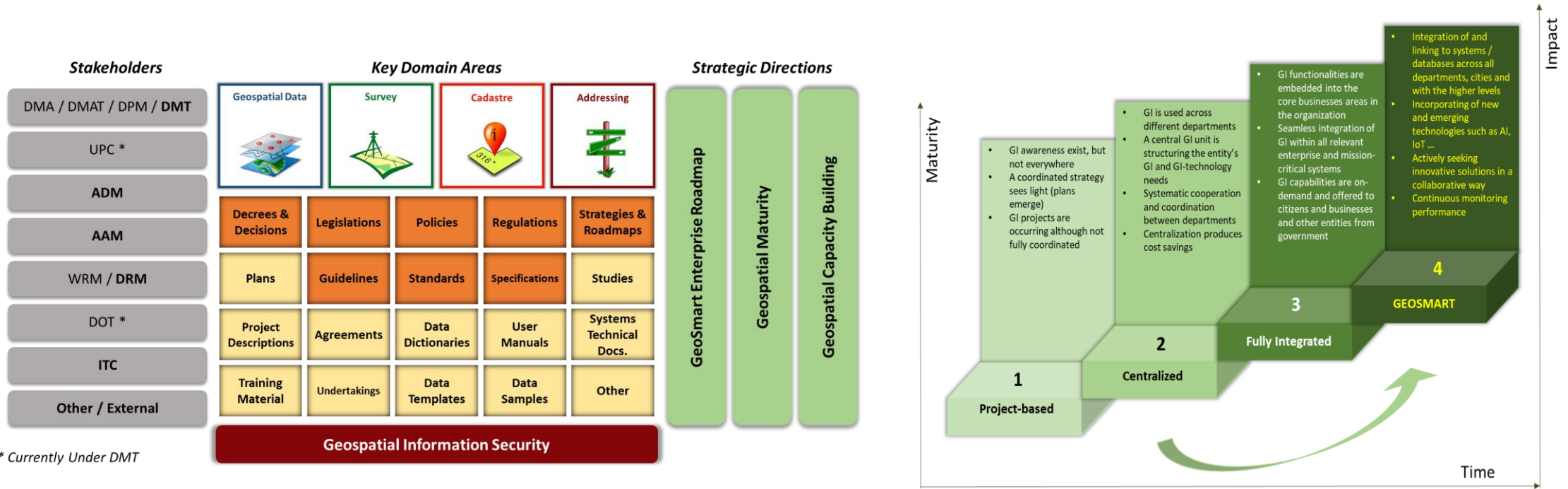
15000 Annual building permits
12,000 Annual infrastructure approvals
10,000 Annual plot approvals

Abu Dhabi DMT Preparation and Update of Policies, Standards, and Specifications of Spatial Data, Surveying, and Addressing



Project scope

Through this project, DMT-SDD aims to enhance its geospatial applications and services that can facilitate and leverage GIS capabilities and its usage to different type of users in both public and private domains. The current project is intended to update and refine priority elements of the DMT Spatial Data Division (SDD) GeoSmart program.





Project scope

GPC is currently providing PwC with Subject Matter Expert (SME) support in preparing the technical inputs and analysis to conduct the KSA Geospatial market assessment study, participating in (12) sectors stakeholders sessions/ workshops to assist in facilitating the technical discussion points, providing feedback and inputs for the proposed GASGI operating model assessment, providing feedback and inputs on the gap analysis provided based on the conducted international benchmarking study, and developing of the Standards, Terms and Conditions Documents for the proposed practitioner's qualification/classification and permits/ license issuances.

the effort resulted in a series of specific recommendations and the definition of actions required for implementation.

How GPC Empowers the Client

GPC Group benefits the client by utilizing our extensive experience in managing more than (68) Spatial Data Infrastructure (SDI) projects across the globe in general, and in the Geospatial consultancy and implementation experience in several government and private sectors within MENA Region and Globally sectors specifically which was the focus of this project

The Bottom Line:

The scope of work included the following services:

- Review questionnaire developed to conduct a geospatial and surveying sector assessment & market assessment study
- Provide technical input and analysis required on sector and institutional operating model assessment study
- Provide insights on the geospatial and surveying regulating and operating entities in UAE and other benchmarked countries
- Provide technical input to the process, requirements and relevant terms and conditions for licensing and permitting for relevant licenses and permits in the sector

Project scope

The **NEOM Environment Department**, a component of the NEOM Authority, is established with the **mandate** to:

- **Protect NEOM’s environment** against risks and harms from human activities, as well as the public from risks and harms of human-induced environmental change;
- **Promote the sustainability** of all development activities, including the design, construction, and operation of the built environment; and
- **Ensure the conservation, protection, and enhancement** of marine and terrestrial species and ecosystems.

In this role, NEOM Environment Department will be acting as a **government entity** overseeing activities of the private sector and working in collaboration with other government partners. To fulfil its mandate, NEOM Environment Department will need to **collect, manage, apply, and deliver environmental data and information products**.

To fulfill its mandate, NEOM Environment Department will require effective and efficient methods, systems and data to receive, process and decide upon applications for licenses, permits, registrations and similar other authorizations issued by the Department. **NEOM Environmental Information Management System (NEIMS)** is envisioned as a foundation system that will support the NEOM Environmental Department to fill its mandate to collect, manage, apply and deliver environmental data and information products to both internal and external stakeholders.



Project scope

GPC worked with the client to provide a high-level breakdown of interrelated standards that are typically required for the systematic naming and numbering of districts, streets, addresses and 'wayfinding' for an urban area such as Al Ula. While the current effort is focused on the standards for the delineation and naming of districts and streets, these standards are to be developed in a manner that can integrate with these other related topics if/when these are addressed for Al Ula in the future.

The following tasks and deliverables will be carried out for this project:

1. STAGE 1: Project Inception

1.1 Task1: Conduct project inception meetings.

1.2 Task2: Collect and analyze supporting materials.

2. STAGE 2: Standards Development

2.1 Task3: Prepare geonaming standard.

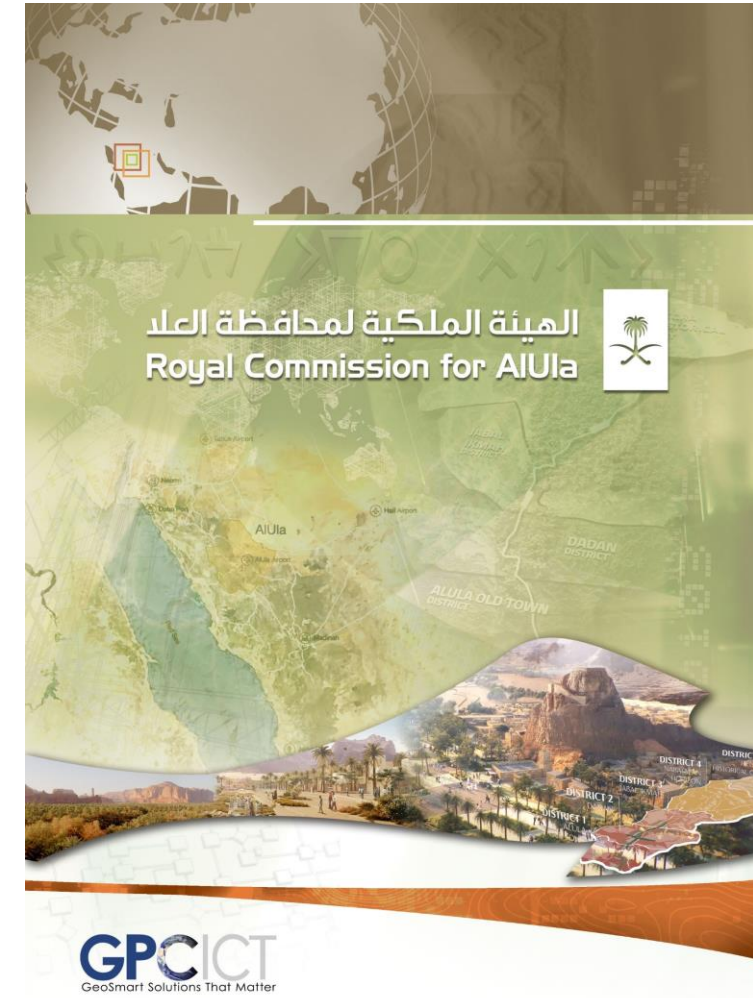
2.2 Task4: Prepare district/ARS delineation and naming standard.

2.3 Task5: Prepare Street delineation, naming and numbering standard.

3 STAGE 3: System & Organization Specifications

3.1 Task6: Conduct review workshop.

3.2 Task7: Prepare system and organization specification.



Project scope

GPC worked with the client to support in the urgent need to build up its foundation GIS and project technical information management platform and staffing to effectively manage these projects and resulting information over the next year/s. This foundation GIS capability should be established in a manner that can be easily expanded in the near future to address the Urban Information Center (UIC) and Spatial Data Infrastructure (SDI) components that will become necessary as the organization transforms to a Development Authority. The project tasks included:



Task 1 – Conduct activity inception meeting. To identify and review any existing information and documentation.

Task 2 – Conduct onsite visits. The consultant will schedule meetings with key stakeholders.

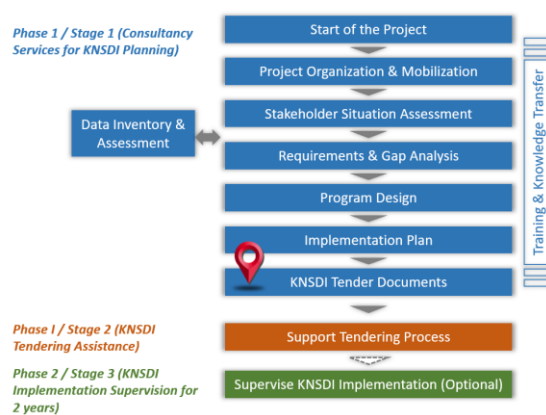
Task 3 – Conduct Requirements Assessment. Defining of the general requirements for the entire GIS 'ecosystem' including any potential refinements to existing policies and regulations, technical infrastructure, business processes, organization, data standards, database organization, applications, staffing, system administration and security and other related matters.

Task 4 – Propose Refinements to GIS Roadmap RFP. Submit the recommendations and suggested refined RFP for review and comment by the JCP project team



Project scope

GPC supported the Kuwait Central Authority for Information and Technology (CAIT) in the planning and design of a comprehensive program for the NSDI.



Kuwait National Spatial Data Infrastructure (KNSDI)

KNSDI Roadmap Delivery February 2020

Logos: Central Agency for Information Technology (CAIT) and NEWKUWAIT.

Visuals: A collage of images including a Kuwaiti airplane, a city skyline at sunset, a modern building, a group of men in traditional attire, and children.

Logo: GPCGIS GeoSmart Solutions That Matter.



Hong Kong - Common Spatial Data Infrastructure (CSDI)



Lands Department

Project scope

GPC worked with a local partner over an 18-month period involving dozens of workshops with 8 Working Groups. Implementation has been ongoing and a new GeoPortal based on our design is planned for implementation starting early 2021.



Standard Template for Data Specifications

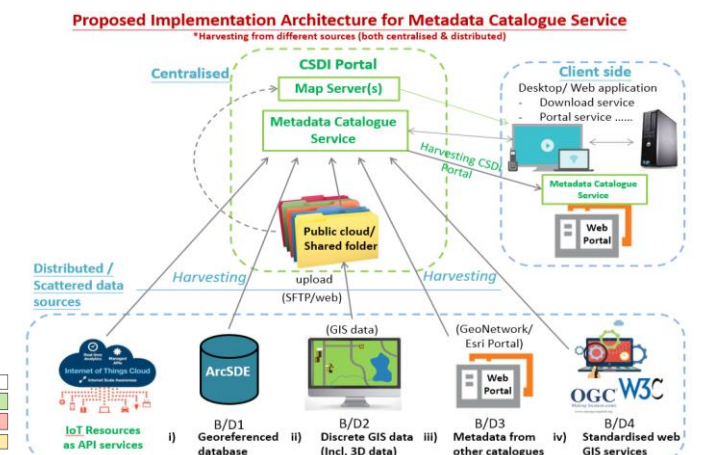
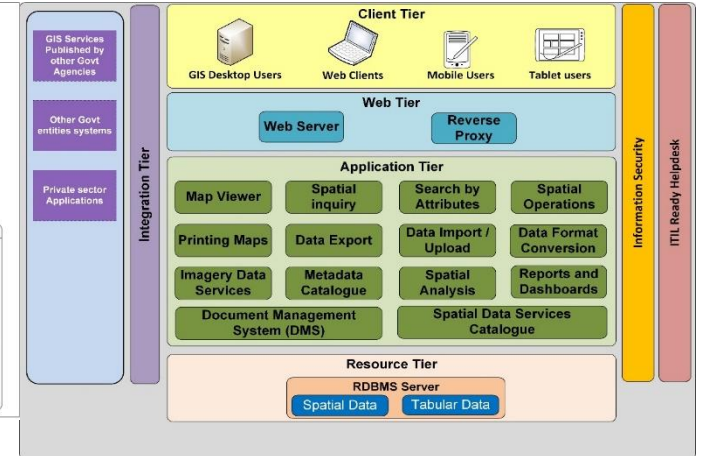
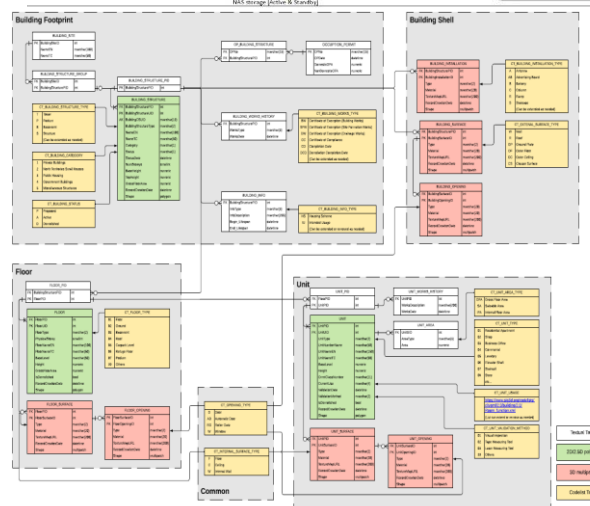
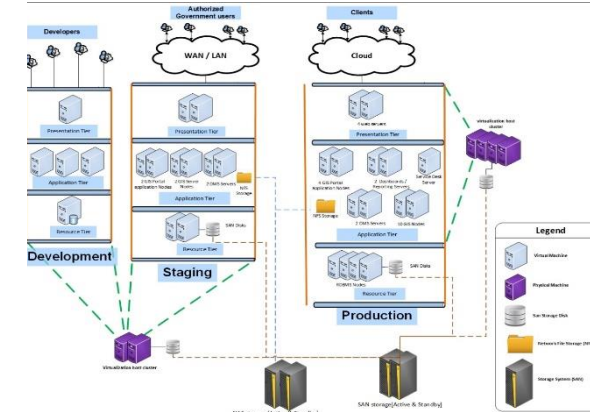
Version: 0.11

February 2019



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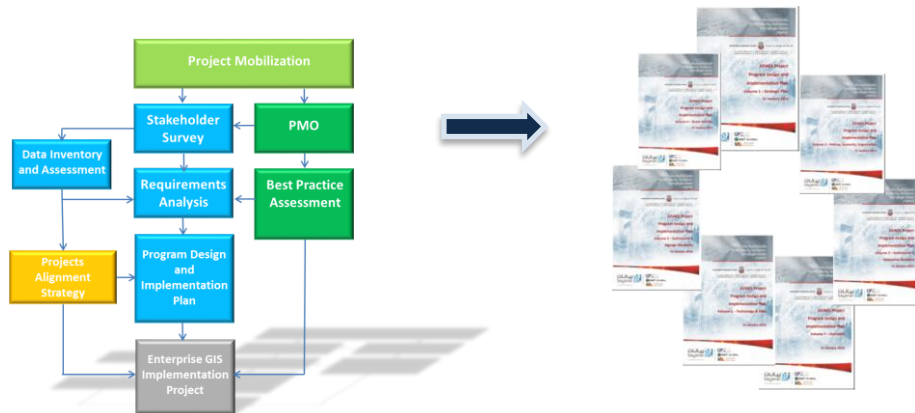
Department of Municipal Affairs (DMA) - "Onwani" Abu Dhabi Street Addressing, Geonaming and Signage System



Project scope

In delivering the ADAGS Project, there were seven fundamental components that formed the project's foundations:

1. Strategic Plan,
2. Policies, Authority and Organisation,
3. Geoname Standards,
4. Street Addressing Standards,
5. Street Sign Standards,
6. Information System and Data Production,
7. An Outreach and Awareness Initiative.





Towards a Smart Development Infrastructure for Sustainable Development and Investment (SDI++)

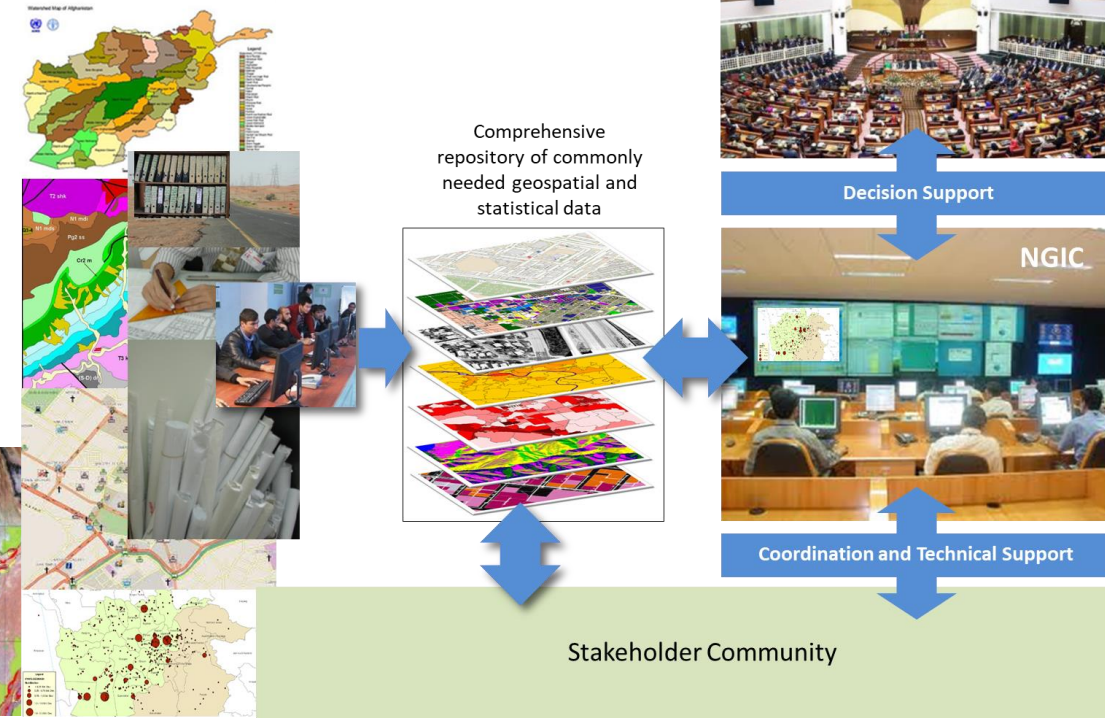
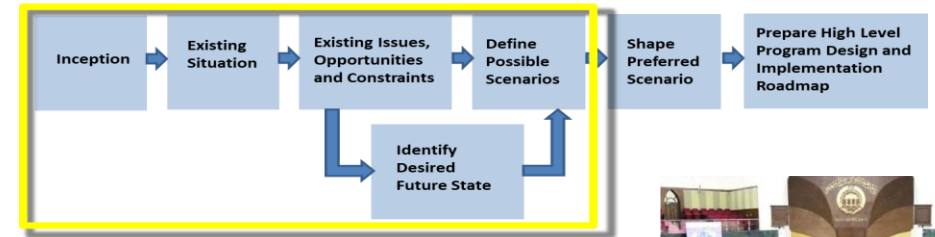
Approach

Project scope

Propose a concept to overcome the current informatics deficiencies in the Country and lead to better informed and coordinated, security, sustainable development and effective investment

Process:

- ❖ Conduct a rapid assessment of the information landscape in Afghanistan.
- ❖ Consult with administrative and technical leadership as to possible scenarios for moving forward
- ❖ Prepare a concept plan for the preferred approach and a high-level plan for its implementation



Project scope

Kuwait University committed to utilizing state of the art geographic information system (GIS) technology to support the planning, design, development and operations of the new Sabah Al-Salem campus in Shadadiya.

Intended to both strengthen and streamline the design and construction phases of the campus development process, as well as implement key applications to support ongoing operations management and establish a GIS infrastructure that could be expanded to other advanced applications areas in the future.

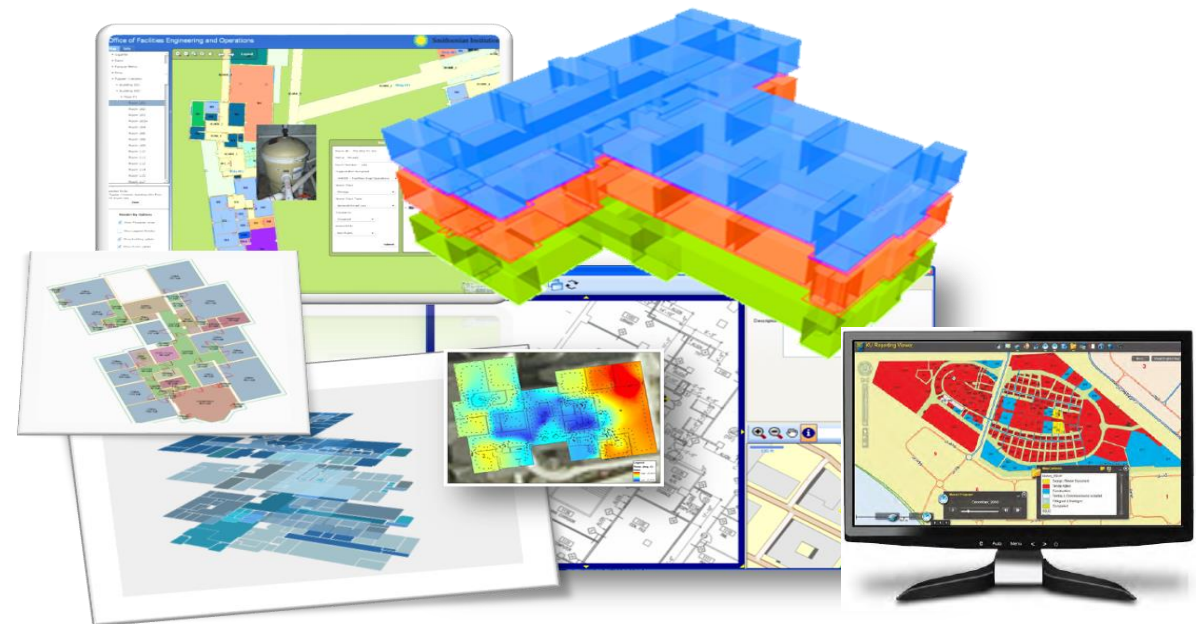
This project also offered the opportunity for the development of a campus GIS Unit that could work in parallel to building core technical capacity that would eventually take over the operational system, as well as expand it to support future academic purposes.

The vision for the Sabah Al Salem Campus GIS can be stated simply as “A **spatially enabled campus information infrastructure that optimizes state of the art geospatial information, services and technology to**

support more effective and efficient campus planning, design, construction, operations and maintenance”.

Included:

- Geospatial data modeling of the campus environment,
- Implement applications for project management, document management, vehicle tracking, facility and asset management.

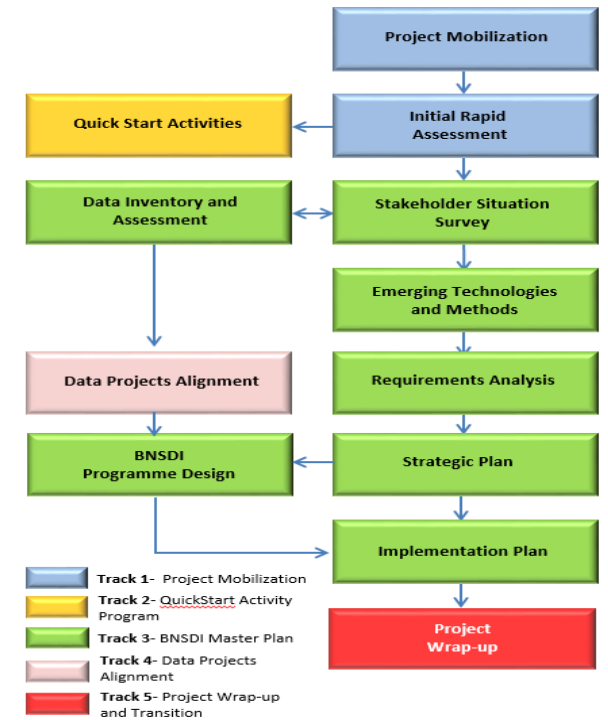




Project scope

Supporting Effective, Sustainable and Resilient National Development

Belize government and society empowered with convenient, open access to high quality, authoritative and up-to-date geographic information and spatially enabled services supporting sustainable, equitable, climate-smart development.



Belize Spatial Data Infrastructure (BNSDI)

Largely technical program based on supply-side geospatial data development and sharing



Belize Smart Development Infrastructure (BNSDI)

Next Generation SDI+ – focused on sustainable, climate smart development and positive societal impact



TOGETHER FOR A SUSTAINABLE BUSINESS...

THANK YOU!

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