Urban Planning Best Practices utilizing Spatial Services at Abu Dhabi

Spatial Department
Planning and Infrastructure Sector
Abu Dhabi Urban Planning Council
Agenda

• UPC-GIS Strategic Initiatives 2016-2020
• UPC Geospatial Applications & Dashboards
  – Data Automation
  – Workflow Versioning Manager
  – Smart Geoplanner Web Mapping Applications
  – Business Process Automation
  – Data Translation
  – Data Quality Check
  – Spatial Analysis
  – Automating 3D Visualization for Master Plans
  – Application Performance Monitoring

• Future Plans
  – UPC Online Portal: 3D on the fly Generation
  – Workflow Manager Integration with Smart Geoplanner “Spatial Web editing and versioning”
The smart government is the post-e-government stage where we want to reach people. We will reach them via their smartphones.

UPC Vision

Ensure citizen satisfaction via creating complete and sustainable communities that meet the needs of the citizen while enhancing the quality of life.
**GIS Strategic Initiative (2017 – 2021)**

- **Automate geo-spatial analysis** for planning through database management and development of planning tools that facilitates decision making.

- **Implement spatially outreach application** system that reflects core business processes and integrates with UPC’s Stakeholders feedback and approval mechanism.
## Spatial Data Department: Functions & Roles

- **Via GIS/PTMS Request System**

### Spatial Data Management
- Business Process Automation & data synchronization
- Versioning Workflow Manager
- Data Modeling
- Map services and theme creation

### Technology Enablers
- **Smart GeoPlanner**
- **Strategic Dashboard**
- Map Services and Themes
- Navigation and plotting proposals
- Buffering and Catchment Area
- Printing and Statistical Reports
- Search and Spatial Query analysis
- Editing Capabilities
- Automation of Check Conflict Analysis

### Geo-design Spatial Analysis GIS/CAD Mapping
- Planning manuals and guidelines plugged to build Spatial Data Model
- Master plans & Urban Development
- Transportation Review
- Development Code
- Estidama & Environment
- Infrastructure & Utilities Review

### Public Outreach Portals
- Public Portal & E-majlis
- Development Code
- Plan Maritime
- Future Project Smart Majlis “Plan My City”
Geodesign/Spatial Services for Urban Planning

Planning Process

Vision, goals & objectives → Needs Analysis and Alternative Scenario → Design Plans, manuals and policies

GIS Technology

Spatial Data Management → Geospatial Analysis and Services → Geo-design through Geospatial Enablers

Enablers

GIS Technology

Geodesign/Spatial Services for Urban Planning
Geo-design and Smart Geospatial Services Requirements:

Smart Geoplanner Application

- Handling Urgent Tasks
  Please complete today

- Regular Master Planning GIS database Updates

- Smart Geoplaner providing user friendly, simple and unsophisticated software to handle planning tasks

- Constraints: Implementation of the Planning Guidelines Manuals

- Daily Planning Requirements for Geospatial/Mapping Services
Data Received from Other Government Entities and Developers

**Municipalities**
- Base Map
- Plot Ownership
- Building Permits
- Tenancy Data (Tawtheeq)
- Transport Framework
- Proposed Transport

**Utility Providers**
- Existing/Proposed Major Utilities

**Transport Department**
- Transport master plan
- Road network

**Statistics**
- Census Data

**Environment Agency**
- Environment Base Line
- Environment Policy and constraints

** Developers**
- Development Proposals

**External Data Providers**
- Municipalities
- Utility Providers
- Transport Dept
- Environment Agency
- Developers

**External Data Customers**
- Public Users
- ADIBC
- Developers
- Transport Dept.
Business Process Automation (Daily / Weekly / Monthly)
Data Translation, Processing and Loading (external data)
Daily Quality Check (external data)

Data Quality Check

- BuildingNotCoveredByPlot
- DuplicatePlots
- OverlapPlots
- PlotsMismatchSectorNum
- PlotsMismatchZoneNum
- PlotsNotCoveredBySector
- SectorMismatchZone
- SectorIsNotCoverZone
- UndefinedCategoryPlots
- UndefinedCategoryTypeBuild
- UndefinedUsagePlots
- UndefinedUsageTypeBuild

**Output**
- Excel (report)
- File Geodatabase

**eMail notification to Data Source**
- Data quality report
Feedback and notification

Dear Team,

Would you please look into the data, there seem to be duplicates.

Thanks,
Spatial Analysis

Total GFA (Gross Floor Area)

- Zone/Sector/Plot Layer
  - Building (No. of Floors)
  - Plots
  - Sector
  - Zone

Output
- Excel (report)
- File Geodatabase
Integration of FME Server with PTMS (Project and Tasks Management System)

Project Boundary
- User Defined boundary link to the Project / Task
- Existing / On going Project Status
Workflow Manager

- Task Initiation
- Assigner
- QC Admin
- Editor
- Database Administration
• QC group will be notified once the job assigned ready for QC.

• User will be notified if the QC is not passed

• User will be notified when the job is posted
Special Project Work Flow

- Editor selects or assigner assigns jobs to editors based on editor expertise.
- Editor names are assigned automatically.
- Due date is assigned automatically based on our three days Service Level Agreement (SLA).
- Parent version is always set to a staging workspace and the version of each user is different.
- Automatic opening of predefined mxd with all the required layers and symbology.
- Using task assistance to define repetitive tasks, start editing, save edits, close ArcMap, open data reviewer table and many more automations.
- Automatically create a version for the editor, to keep production intact.
QC Editor Data

- From task assistance editor can check and QC data
- List of error appeared based on QC check list
- Easy to select zoom to feature geometry
- From task assistance editor can start/edit/save the data
- Editors might run the QC again or submit changes to QC admin
QC Admin Role

- QC data for verification.
- Post and reconcile editor version to Map Production database.
- Send notification to the users
Key Benefits

- **Improve** user productivity by automating common activities
- Ensure **standardization** and **consistency** across operations
- **Easily track** work status using reports
- **Integrate** GIS and other business applications
- Using **same mechanism** to QC data from web using the same workflow
- Model your business processes using intuitive visual tools
- **Quickly assign** work to resources based on expertise
- **QC data** based on **predefined rules** using data reviewer
Technology Enablers
Smart GeoPlanner Services Enablers for Geodesign

Technology Enablers

Smart Spatial Tools

Smart Spatial Dashboard

Responsive Design

Scenario Solution Examples
Smart Spatial Tools

Smart GeoPlanner Application
### Basic & Navigation

#### Identify

Point identify in which you will select data, users will have option to do identify by point using buffer, users will also have option to select the Identifiable layer.

<table>
<thead>
<tr>
<th>Show Layers</th>
<th>Show Table of Content</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Point identify in which you will select data, users will have option to do identify by point using buffer, users will also have option to select the Identifiable layer.</td>
</tr>
</tbody>
</table>
Basic & Navigation Continuation

Open
Open previously saved project

Save
Save current project

Save as
Save as the current project
Draw Plot Proposal Continuation

<table>
<thead>
<tr>
<th>Function</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Load plots documents</td>
<td>Attach document to existing plots</td>
</tr>
<tr>
<td>Plot Mapping</td>
<td>Get the demission and GPS photo of selected plots if any</td>
</tr>
</tbody>
</table>
Scenario Solution

Re-Planning of School Plots In Smart GeoPlanner
Google & Search Continuation

- **Search GPS Photos**: Search for GPS photo on the visible extent.
- **View Charts**: View Total land use area and count by searching or drawing polygon.
- **Time Slider**: Get all changes on ADM and WRM on different intervals.

Select additional parameters of search:
- Select From List
- Type in the sector Name
- By Zone Name
- By Drawing

Zone

Sector Name

Search plots Cancel

Delta

Time Extent: 1yr 4mo 0d

Oct 1, 2014 2:22 PM To Feb 1, 2016 2:22 PM

Time Slider

Play Timeline Step Back Step Forward More Settings Hide Timeline
Maps & Data Sources

Show Layers | Show Table of content
Add CAD File | Upload CAD File
Upload Data | Upload Shape, CSV, Excel
Upload GPS Photos | Upload GPS photo
Add Layers | Add data from online
Layer Catalog | Add predefined data
Upload Geodatabase | Upload Geodatabase
DSS Summary | Get DSS summary from UPC data model submitted by developer

CAD uploader

Choose File

No file chosen

Add Data To Map

Choose files to upload from your computer, and they will become temporarily available on the map.

Supported file types include: .csv, .xlsx, .kml, .shp, .gpx, or a .zip shapefiles

Choose Files

No file chosen

Upload | Cancel
Masterplan Compare
- Compare masterplan with previous achieved masterplan

Masterplan compare with Municipalities
- Compare masterplan with ADM data

ADSIC POI
- Generate Excel report on ADSIC POI

Population
- Generate Excel report on population

PlanLandUse
- Generate GFA and plot land use and count on ADM, WRM and AAM

Dashboard
- Users will receive it by Email

Open Community facility dashboard
Spatial Analysis

Total GFA (Gross Floor Area)
• Zone/Sector/Plot Layer
  – Building (No. of Floors)
  – Plots
  – Sector
  – Zone

Output
• Excel (report)
• File Geodatabase
Scenario Solution

Response Time & Conflict Check In Smart GeoPlanner
Catchment Analysis Continuation

Routing
- Routing between multiple points

Catchment Area
- Service area
Check Conflicts & QC

<table>
<thead>
<tr>
<th>Draw Geometry</th>
<th>Check conflict by drawing geometry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Check Conflict Upload</td>
<td>Check conflict by uploading shape file</td>
</tr>
</tbody>
</table>

Check conflict by drawing for selected theme

- Utility
- Transportation
- Environment
- Planning
- All

Remark *

**ok**  **Cancel**

Test
Integration of FME Server with Dashboard

Community Facilities Report
By Region / Sector

Existing / On going Project
Status

Population Report (Census data)
Scenario Solution

Project Conflict In Project Task Management System
Smart Geoplanner Integration with the Project Task Management System
3D Visualization
Future Master Plans
Direct Transformation from 2D MP to 3D Enablement

3D Web Model for Zayed City
Direct Transformation from 2D MP to 3D Enablement

Ability to compare between two scenarios or before and after scenario
Ability to visualize/Accept the GFA and FAR
Future Work

- Online integration of the workflow manager with Smart Geoplanner that can be accessed internally or by our stakeholders.
- A planner or a Stakeholder will have editing capability.
- Subsequently QC will be done on the SDE via web-based window instead of using Arcmap software.
- Generalize 3D to be part of the business process for all planning approval submission to better utilize the existing GIS datasets and enhance our ability to 3D visualize and analyze the master plans quickly.
- Add this capability to be part of Smart Geoplanner as 3D tool. Where the planner can add the 2D file and 3D visualization will be extruded, generated and visualized in an automated process for his assessment and decision making process.
- The 3D Visualization project would be unique in the region. Few planning departments in the Middle East are currently using ESRI City Engine and even fewer have commissioned a project like this before.
Performance Monitoring
Performance Monitoring Dashboard

Smart GeoPlanner
Performance Overview

Dashboard Links:
- IT Resources
- Business Services Transactions
## Applications IT Resources Performance Monitoring

### UPC GIS Applications IT Resources

<table>
<thead>
<tr>
<th></th>
<th>Smart Geoplanner</th>
<th>Strategic Dashboard</th>
<th>PTMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU</td>
<td>![Green Icon]</td>
<td>![Green Icon]</td>
<td>![Green Icon]</td>
</tr>
<tr>
<td>Free Disk Space</td>
<td>![Green Icon]</td>
<td>![Green Icon]</td>
<td>![Yellow Icon]</td>
</tr>
<tr>
<td>Memory</td>
<td>![Yellow Icon]</td>
<td>![Yellow Icon]</td>
<td>![Yellow Icon]</td>
</tr>
</tbody>
</table>

*Note: The icons indicate the performance status of the applications.*
Summary

• **UPC-GIS Strategic Initiatives 2016-2020**
  • Smart Geoplanner is short listed for the Abu Dhabi Excellence Award for Technical Projects Category
  • EGI Awards 2010 and 2014 for Geolanner and Smart Geoplanner

• **UPC Geospatial Applications & Dashboards**
  – Data Automation
  – Workflow Versioning Manager
  – Technology Enablers: Smart Geoplanner
  – Automating 3D Visualization for Master Plans
  – Application Performance Monitoring

• **Future Plans**
  – UPC Online Portal:
    » 3D on the fly Generation
    » Integration with Smart Geoplanner
  – Workflow Manager Integration with Smart Geoplanner “Spatial Web editing and versioning”
Thank You