“Cloud+” Experiences with New Technologies bringing GIS to the World

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Agenda

1. Introduction to Cloud Computing for GIS
2. Examples
3. The Next Step – “Multi-Tenancy”
4. Business Impact
5. Experience
6. Where Next?
What is Cloud Computing?

Cloud Computing

– Computing from the Internet – “the Cloud”.
– Scale Dynamically - “On Demand Servers”
  – Often virtual servers
– Infrastructure in the Cloud managed for you
– Example: Amazon EC2

SaaS - Software as a Service

– Subscribe to an application for use On Demand
– The application is often run in the cloud
GIS Exists in the Cloud Today

GIS software hosted in the Cloud.

– Web map publishing – Google, Bing,..
– Services / data to desktop & server GIS – e.g. WeoGeo
– Specialized applications
– GIS Servers hosted in the Cloud – e.g. esri
  • Need to write custom software to use these…
– Full user GIS over the Web

• “Ecosystem” - tools, services, hosting…
  – Cloudmade, Amazon, Skygone …
Examples – ArcGIS

Arc GIS Services (data) to existing desktop / on-premises ArcGIS installs

ArcGIS Server Hosted on Amazon EC2

- Requires ArcGIS License,
- Dedicated Server
- Need to build and deploy and maintain the user application that will access ArcGIS Server
- Pay for & manage EC2 Account and server(s) yourself, or (at additional cost) through esri
- Manage ArcGIS Server, Data, backups, support & monitoring yourself, or pay for “Managed Services”
Example - SkyGone

Skygone: Hosting of GIS Applications on private infrastructure + Services to build & deploy the applications

- Choice of GIS servers
- Dedicated Servers
- Set-up & Deployment Services Required
- Likely to need Custom Application Development…
Example – Digital Map Products

Focused on Local Government
“Full Strength” GIS (digitize, snap...) + Geographic Business Intelligence
Cloud Computing for GIS

Cloud computing promises lower cost, immediate availability, flexible scaling, and lower risk.

Cloud computing in itself is not sufficient. Server GIS in the cloud still requires for each customer:

- Software License(s)
- Server(s)
- Deployment
- Development....
Need to be Multi-Tenant

Costs per Customer are much lower:
- Share Server, License, IT costs
- Eliminate set-up & deployment time & costs

Need Multi-Tenancy to deliver the benefits of Cloud / SaaS.
Multi-Tenancy Technology

Multi-Tenancy is more than just hosting in the cloud
Multi-Tenancy is more than just multi-user
Multi-Tenancy is more than just virtual servers

Multi-Tenancy is how SaaS is built in other industries – Salesforce, NetSuite, Success factors…

Technologies Used:

- Directory services – of Tenants as well as users & groups / roles
- Partition data in the database
- Software must be built to be Multi-Tenant – Every operation checks tenant as well as user / role, every data object belongs to tenant as well as user, etc. This cannot be added on later!
- All customisation and configuration must be through a (web) user interface and be multi-tenant…
## What Multi-Tenancy Changes

<table>
<thead>
<tr>
<th>Cloud Hosting</th>
<th>Cloud + Multi-Tenancy</th>
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</thead>
<tbody>
<tr>
<td>Dedicated Server(s) per customer</td>
<td>Costs of servers shared across Customers</td>
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<tr>
<td>License software on servers – GIS, database…</td>
<td>Subscription model – GIS Software as a Service</td>
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<tr>
<td>Need to deploy servers &amp; software for new customers + to scale</td>
<td>On Demand instant deployment &amp; scaling</td>
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<tr>
<td>May need to develop end-user application</td>
<td>Configurable application ready for use</td>
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**Cloud + Multi-Tenancy = Software as a Service (SaaS)**
Business Impact…

**Old:** Desktop → Server → Hosted GIS
- Long, Costly, and Risky Enterprise GIS Projects
- Or very limited and inflexible web mapping
- Difficult to change or extend

**New:** Multi-Tenant SaaS GIS in the Cloud
- Instantly available On Demand
- Dramatically Lower costs – Initial and Ongoing
- Faster Time to Value
- From the smallest organisations to the largest
- Flexibility to scale to needs

“This will Change Everything!”
What to look for in a “Cloud” GIS

• “Full Strength” GIS on the Web
  – Full GIS Functions: View, Edit, Analyse, Chart, Report…
  – Configureable to your needs
  – Full Web Deployment – No Desktop!

• Available on-Demand, on Subscription
  – Not required to risk up-front Set-up & Development costs
  – No License, Infrastructure, Maintenance Costs
  – Pay for level of use required - Scales to your needs,
  – Always have the latest software release
  – Multi-Tenant

• Run in the Cloud
  – Infrastructure & security from a trusted and proven provider: E.g. Amazon
Add your Organization

Get started now!

- First name:
- Last name:
- Email:
- Organisation:
- Country: United States
- Password:
- Confirm Password:

I agree to the terms and conditions (Click to View).

Start Trial

We will never share these details.

NOT

Before you can start using GIS Server on Amazon EC2, follow these steps

1. Get an Amazon Web Services (AWS) account.*
2. Contact Customer Service and provide your AWS account information.
3. We'll provide you with ready-to-use GIS Server and enterprise database images in the Cloud.

OR

Talk to your local sales representative and discuss your options.
Instant Multi-User GIS
Load Data to Maps
Configure & Style Layers
Configure Maps
Add Users
## Control Permissions

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Control Access
Full-Function Web GIS
View, Edit, Analyse...
Experience

Have deployed a Multi-Tenant GIS in the Cloud…

• Self-Service, Instant, On Demand

• Full-Function GIS as a Service
  – Load Data, Create Maps…
  – Full-function GIS – View, Analyse, Edit, Plot
  – Add Users, Control access
Experience...

Free Trial: 10’s – 100’s adding daily

New Users, New Uses, New Expectations

– Want it All!
  – Full GIS functionality

– Want it My Way!
  – Flexible - Configure what’s provided & how

– Want it to be Easy!
  – intuitive

– Want it Right Now!
  – On Demand

– Want to give it to Everyone!

– New uses of GIS...
Where Next?

Move from Server GIS to SaaS “On Demand” GIS
    Multi-tenant, from the cloud

Most GIS will be on-line, not traditional GIS

New Users of GIS, New Uses of GIS...

More Integration into business

Ongoing Technology Changes
    Mobile, Html5, integration services...
Conclusion

GIS can be provided as an On Demand service at low cost to organizations ranging from individuals to thousands of users.

This needs more than just the Cloud - Need Multi-tenancy.

This will have major business impact on users and vendors.

This change has already begun, and is bringing new adopters to GIS.

This will accelerate over the next few years.
Thank You

Questions?

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Multi-Tenancy v Multi-Server

Costs are much lower with Multi-Tenancy
Set-up / Deployment time & Costs are eliminated by multi-tenancy

Each tenant's data kept secure & private