SESSION GOALS

Share our process of implementing and developing a cloud based GIS-centric asset management system for a park and recreation district:

- Amazon Cloud Server
- Cityworks asset management software
- Google + site
- ArcGIS Online Organizational Account
  - Local Government Web App Templates
  - ArcGIS Collector maps
- Story maps

Lucinda Dykes
Web GIS

The GIS Lab, Willamalane
WHO ARE WE?

- Located in Springfield, Oregon
- Park and Recreation Special District (serve over 60,000 people)
- 40 parks and open spaces - 1,500 acres, hiking & biking trails
- 23 playgrounds
- 5 recreation facilities (sports & activity centers, swim centers)
- 15 sports fields
- 12 waterfront areas
WHO ARE WE?

District Outline with Parks
WHO ARE WE?

Park Services Center
- Parks & facilities maintenance center, and home to the GIS Lab
  • Joel Miller - Park Services Director
  • Ben Grieger - GIS Analyst/Developer
  • Lucinda Dykes - GIS Developer
  • Randi Zimmer - Administrative Analyst/Cityworks
WHO are WE?
GIS for Asset Management

With special thanks to Ken Kato, U of Oregon InfoGraphics Lab for the inspiration
Why Implement GIS?

I need an efficient, centralized maintenance management system.
MAINTENANCE MANAGEMENT GOALS

We can do some awesome stuff, to make our maintenance better while saving money on resources and vehicle use!

- Manage all assets
- Track maintenance history for assets
- Automate repetitive or routine jobs such as generating and tracking work orders
- Plan jobs and resources
Our GIS Timeline : Overview

2007 - 2009
- Desktop ArcGIS with file geodatabase and no ArcGIS Server
- Custom Web app development

2010
- ArcGIS server added on local server

2011
- replicated geodatabase server on Amazon Cloud, but live editing continued locally
- Cityworks server added
- Google + site for GIS lab infrastructure (email, calendar, task list, updates)

2012
- full move to Amazon Cloud - stopped using local IT infrastructure
- switch to REST services for distributing geodata

2013
- ArcGIS online with eventual addition of Organizational account
- Web app development with Local Government web app templates

2014
- volunteers updating database with Collector maps
- ESRI story maps to highlights parks and events
Our GIS Timeline: Details

- **2007**
  - No GIS Staff
  - Shapefile-based GIS
  - Experimenting with Cityworks desktop

- **2008**
  - GIS staff:
    - Added one temp: .25 FTE Web GIS
    - .5 FTE GIS Tech
    - File geodatabase
    - Completed surface maps of all properties
    - 3D modeling of facilities
    - Added custom Web app for public access

- **2009**
  - GIS staff:
    - Added one temp: .25 FTE Web GIS
    - .5 FTE GIS Tech

- **2010**
  - Upgrade to ArcGIS 10.0
  - Replication of geodatabase on Amazon Cloud server, but no live editing on the cloud
  - Cityworks Server running live on Amazon Cloud
  - ArcGIS web applications for interface/public access

- **2011**
  - Local IT infrastructure abandoned, founding of 'The GIS Lab'
  - Completed full move of GIS system to Amazon Cloud
  - ArcGIS 10.1
  - REST services for distributing geodata
  - CW Server 2012
  - Internet browser apps & maps

- **2012**
  - GIS Staff:
    - 1.0 FTE Admin Analyst
    - .75 FTE GIS Analyst
    - .25 FTE Web GIS
  - ArcGIS 10.2
  - Completed 3D models of all major facilities
  - CW upgrades: 2013 R1, R2
  - ArcGIS Online Organizational Account
  - Web maps and apps: Internet, iPhone, iPad

- **TODAY**
  - GIS Staff:
    - 1.0 FTE Admin Analyst
    - .75 FTE GIS Analyst
    - .25 FTE Web GIS
  - ArcGIS 10.2
  - Completed 3D models of all major facilities
  - CW upgrades: 2013 R1, R2
  - ArcGIS Online Organizational Account
  - Web maps and apps: Internet, iPhone, iPad

- **2013/14**
  - GIS Staff:
    - 1.0 FTE Admin Analyst
    - .75 FTE GIS Analyst
    - .25 FTE Web GIS
  - ArcGIS 10.2
  - Completed 3D models of all major facilities
  - CW upgrades: 2013 R1, R2
  - ArcGIS Online Organizational Account
  - Web maps and apps: Internet, iPhone, iPad
I WANT TO BE ON THE CLOUD
WHY THE CLOUD?

• Separate our operations from a central IT department
• Data previously stored in scattered locations goes to one central location
• Data in consistent, usable formats
• Data access is improved since it is available on a server rather than in a file cabinet in someone’s office
• Data is better protected - can be backed up, user-controlled
By consulting with Lincoln County Nebraska’s GIS department, we found that we could realistically move the major components of our system to the cloud to gain advantages in reliability, speed, accessibility, scalability, and redundancy.

To do so, we needed to learn how Amazon Web Services worked, upgrade our software to ESRI 10.1 and then migrate our system from local servers to the cloud server and create a synchronization process.
Amazon Web Services Console
How much does it cost to be on the cloud?
WHAT IS OUR CLOUD CONFIGURATION?

• Windows Server 2012
• ArcGIS Server 10.2
• SQL Server 2012
• Cityworks 2013 r2

• We have these all on 1 server (AMI - Amazon Machine Image), but could have on separate servers
• We use Elastic IP, which associates an IP with a server instance
• Can have multiple server instances at the same time, e.g. to test software upgrades and see if compatible with current overall configuration
WE LOVE THE CLOUD

• More cost effective than having server locally
• Cloud is faster than our local network
• Local Control
• Available everywhere there’s a connection, including iPhone (AWS console app)
• Security rules are easy to set up --- can allow Remote desktop access, etc.

Examples

Ø Took us ~ 3 months to get a public IP address that worked from IT
    vs
Ø Took us ~ 5 minutes to get an elastic IP from cloud

Ø On the average, we had a couple outages per month prior to the cloud
    vs
Ø We have had ZERO downtime since moving to the cloud two years ago
WHY CITYWORKS?

• Efficient, centralized maintenance management system
• GIS-centric capabilities
• One central repository of all asset data
• Tracking of regular maintenance tasks and long-term CIPs
• Analytic features
ONLINE MAINTENANCE SYSTEM
**How do we use ArcGIS with Cityworks?**

On the Cloud Server ➔ Use ArcGIS Server to create a REST Web service from our Geodatabase

**REST**

**Web Service**

REST is an acronym for **RE**presentational **ST**ate transfer
- the acronym has to do with how client and server manage the state of server-side objects:
  - by sending "representations" of the objects back and forth.
HOW DO WE USE ArcGIS WITH Cityworks?

A Feature Service is one type of Web Service

Feature services allow you to serve features over the Internet and provide the symbology to use when displaying the features.

Clients can execute queries to get features and perform edits that can be applied to the server.

Feature services provide templates that can be used for an enhanced editing experience on the client.
How do we use ArcGIS with Cityworks?

- Feature Service
  - Citizen Service Request Web app
  - Cityworks SOE (Server Object Extension)
  - Editing of GIS Data in Cityworks
How do we use Cityworks?

Where do Work Orders come from?

• The public can request work by using the Citizen Service Request
How do we use Cityworks?
Where do Work Orders come from?
HOW DO WE USE CITYWORKS?

Where do Work Orders come from?

- The public can request work by using the Citizen Service Request
HOW DO WE USE CITYWORKS?

Where do Work Orders come from?

- The public can request work by using the Citizen Service Request.
HOW DO WE USE CITYWORKS?

Where do Work Orders come from?

- Staff can request work by using the Staff Service Request web app
How do we use Cityworks?

Where do Work Orders come from?

- Staff can request work by using the Service Request web app
How do we use Cityworks?

Where do Work Orders come from?

- Staff can request work by using the Service Request web app
**HOW DO WE USE CITYWORKS?**

Where do Work Orders come from?

- Staff can request work by using the Service Request web app
**How do we use Cityworks?**

**Work Orders**
HOW DO WE USE CITYWORKS?

Work Orders with map
HOW DO WE USE CITYWORKS?

Work Order detail
HOW DO WE USE CITYWORKS?
Work Order detail with map
HOW DO WE USE CITYWORKS?

Citizen Service Request is a Javascript web app from an ESRI Local Government template.
HOW DO WE USE CITYWORKS?

Citizen Service Request is a Javascript web app from an ESRI Local Government template.
How do we use Cityworks?
During an on site Cityworks training 3 years ago, we discovered Google+ and Google sites ... and the GIS Lab was born!
The GIS Lab has a private intranet on the cloud with its own storage, project tracking, backup, e-mail. Accessible anywhere. Mobile device friendly.
ArcGIS Online

Willamalane Maps

Willamalane Public Map  Parcels and Addresses  Trail Collector  Sign Collector

Maps of parks and facilities in the Willamalane Park and Recreation District in Springfield, Oregon.
ArcGIS Online
Online Interactive Maps

Available anywhere. Mobile device friendly.
Volunteers help us obtain & update GIS data using Collector maps in the field.
Story maps give us another way to interact with our community.
QUESTIONS?

Cityworks questions: Randi Zimmer
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Cloud server questions: Ben Grieger
ben@thegislab.org

ArcGIS online questions: Lucinda Dykes
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Or call us at the GIS Lab: (541) 736-4110