Implementing ESRI's LGIM in a Cloud Production Environment

MIKE BROWN

GEOGRAPHIC SYSTEMS SPECIALIST II, CITY OF SAN JOSE

Capital of Silicon Valley

Serve 1,015,785 residents

3rd largest city in CA; 10th in U.S.

Cover 180 square miles

Located on the southern shore of San Francisco Bay

Annual budget of $3 billion

Workforce of 6,000+ in 10+ Departments

Vision

Modernize GIS production environment in order to provide accurate and up-to-date data/tools to facilitate informed decision making

What is the LGIM?

Local Government Information Model

Set of predefined standards

Common workflows for local/county/state governments and utilities

Apps, tools and templates based on the LGIM

Why the LGIM?

Out-of-the-box ESRI (and 3rd party) apps, tools and templates

Built-in quality assurance

Interagency collaboration and seamless data sharing

Ready trained employees

Migrating to the LGIM

Phase I: Project Implementation Plan: Needs Assessment

Phase II: System Architecture Design

Phase III: Data Modeling

Phase IV: Pilot and Final Data Migration and QA/QC

Phase V: ArcGIS Local Government Map Template and Data Maintenance Tool Deployment

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System Architecture

OUT WITH THE OLD…

Oracle Spatial/Intergraph GeoMedia environment

On-premise

6 year-old software

Intelligence built into the database

One OS/DB update away from breaking

…IN WITH THE NEW

SQL Server/ESRI environment

Cloud production

Less time investment and training

Large user community

Scalable and flexible

Simplified integration

Why the Cloud?

Redundant

Scalable

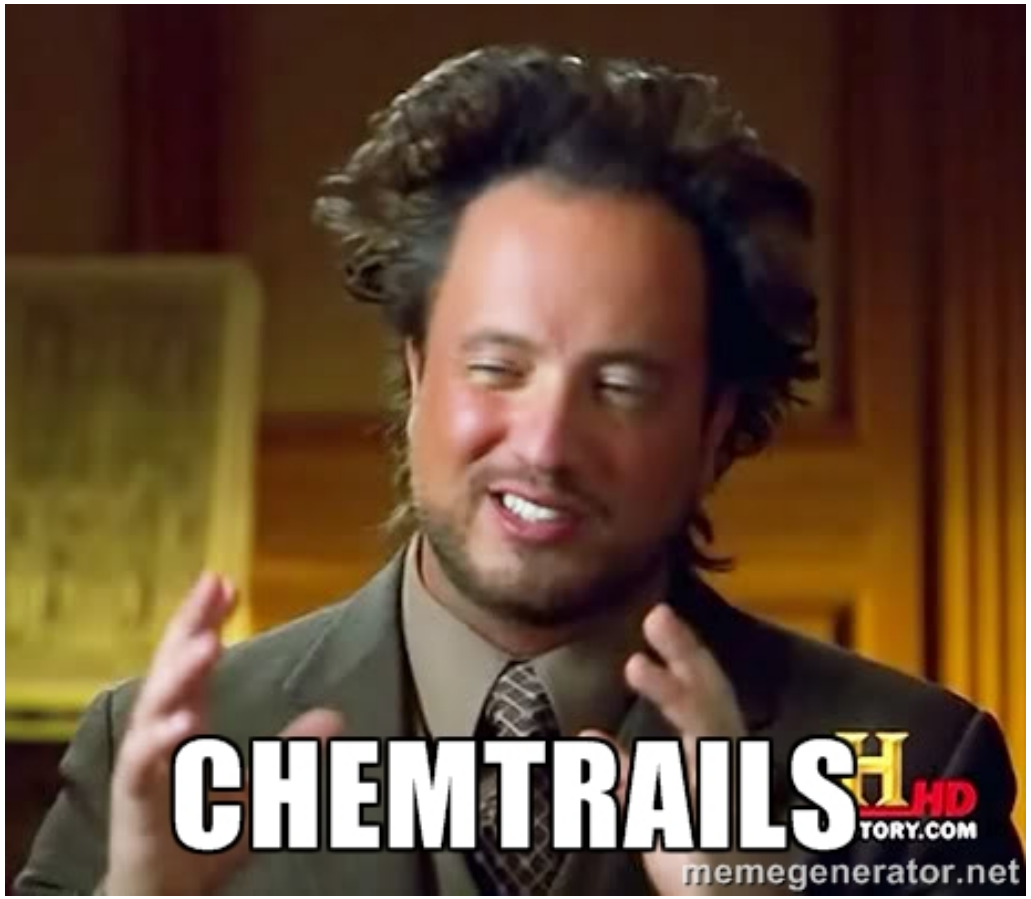
Accessible

Fast (less bureaucracy and red tape)

New software

Flexible

What is Cloud production?



What is Cloud production?

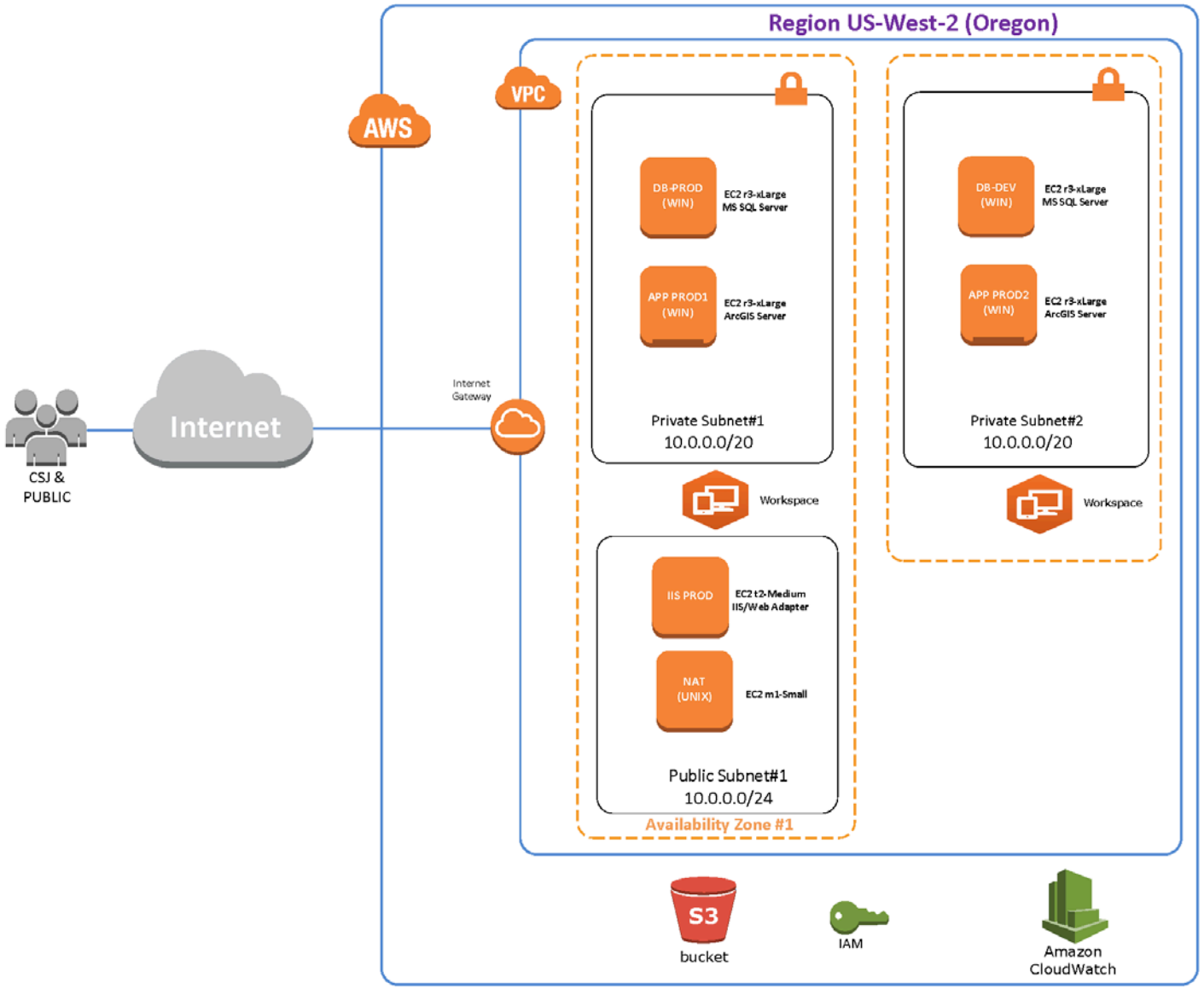
Amazon Workspaces

Microsoft SQL Server 2014 database

Running alongside secure ArcGIS Server 10.3

Web server/Web Adaptor machine to distribute traffic and publish custom mapping applications

All secured within distributed, redundant Amazon Web Services(AWS): Virtual Private Cloud (VPC)


Region US-West-2 (Oregon)
AWS
VPC
DB-PROD (WIN)
EC2 r3-xLarge MS SQL Server
APP PROD1 (WIN)
EC2 r3-xLarge ArcGIS Server
Private Subnet#1
10.0.0.0/20
Workspace
DB-DEV (WIN)
EC2 r3-xLarge MS SQL Server
APP PROD2 (WIN)
EC2 r3-xLarge ArcGIS Server
Private Subnet#2
10.0.0.0/20
Workspace
Internet Gateway
Internet
CSJ & PUBLIC
IIS PROD
EC2 t2-Medium IIS/Web Adapter
NAT (UNIX)
EC2 m1-Small
Public Subnet#1
10.0.0.0/24
Availability Zone #1
S3
bucket
IAM
Amazon CloudWatch

Migrating to the LGIM

Data modeling/crosswalk using X-Ray

Datasets

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	**FeatureClassName**	ssManhole											
2	**DatasetType**	FeatureClass											
3	**Description**	Manhole features connect two or more pipes and control the flow of water in the network through pipe elevations. Manhole invert elevations are stored on the pipes, instead of the manholes themselves.											
4	**FeatureDataset**	SanitarySewer											
5	**Tags**	SanitarySewer, Manholes											
6	**ShapeType**	Point											
7	**FeatureType**	Simple											
8	**AliasName**	Sanitary Sewer Manholes											
9	**HasM**	false											
10	**HasZ**	false											
11	**SubtypeFieldName**	null											
12	**DefaultSubtype**	null											
13	**DSID**	1019											
14													
15	**Fields**												
16	**FieldName**	**Type**	**Length**	**Description**	**AliasName**	**DomainName**	**DefaultValue**	**IsNullable**	**Precision**	**Scale**	**Required**	**DomainFi**	**Mapped Field: DPW.SAN_MANHOLE_**
17	FACILITYID	String	20	Locally assigned Facility Identifier	Facility ID	null	null	false	0	0	null	null	SAN_MANHOLE_ID
18	INTID	Integer	10	Populated with ID stored in GeoMedia. For new	Integer ID	null	null	true	10	0	null	null	SAN_MANHOLE_ID
19	COMPKEY	Integer	10	Matching Hansen ID for asset in SSMS Hanser	Hansen Key	null	null	true	10	0	null	null	COMPKEY
20	COMPTYPE	Integer	10	Matching Hansen asset type identifier in SSMS	Hansen Type ID	null	null	true	10	0	null	null	COMPTYPE
21	DEMELEV	Double	8	Digital elevation model elevation in feet	DEM Elevation	null	null	true	8	2	null	null	DEM_RIM_ELEV
22	RIMELEV	Double	8	The elevation of the manhole rim in feet	Rim Elevation	null	null	true	8	2	null	null	RIM_ELEVATION
23	HIGHELEV	Double	8	High pipe elevation inside manhole in feet	High Pipe Elevation	null	null	true	8	2	null	null	
24	INVERTELEV	Double	8	The lowest invert elevation of the manhole in fee	Lowest Invert Elevation	null	null	true	8	2	null	null	LOWEST_INVERT
25	BOTELEV	Double	8	The bottom elevation of the manhole in feet	Bottom Elevation	null	null	true	8	2	null	null	
26	MHTYPE	String	3	The type of manhole	Manhole Type	piManholeType	STD	false	0	0	null	null	TYPE see domain
27	CVTYPE	String	4	The type of sewer manhole cover	Cover Type	piManholeCoverTy	null	true	0	0	null	null	TYPE see domain
28	WALLMAT	String	6	The manhole wall material	Wall Material	piPipeMaterial	RCP	false	0	0	null	null	MATERIAL
29	OWNEDBY	String	5	Indicates which organization owns the asset	Owned By	AssetOwner	SJ	false	0	0	null	null	IF STATUS = 'Private' THEN PVT, IF STATUS= 'EXISTIN
30	REHAB	String	3	Indicates if manhole has been rehabilitated	Rehab	YesNo	null	true	0	0	null	null	
31	REHABYEAR	SmallInteger	4	Year manhole was rehabilitated	Rehab Year	null	null	true	0	0	null	null	
32	INSTALLYEAR	SmallInteger	4	The year the asset was installed	Install Year	null	null	true	4	0	null	null	
33	SOURCEYEAR	String	4	The source of the year for the asset	Source Year	piSourceYear	null	true	0	0	null	null	
34	ACTIVEFLAG	SmallInteger	2	Indicates if the feature is in use/active	Active Flag	BooleanDomain	1	true	2	0	null	null	IF STATUS = 'EXISTING' OR 'PRIVATE' OR 'PROPOSED' OR 'LINED' OR 'REPLACE' THEN Yes, IF STATUS = 'ABANDONED' OR 'REMOVE' THEN No
35	LASTUPDATE	Date	8	The date the feature was last updated in the ma	Last Update Date	null	null	true	0	0	null	null	Grreater of GEO_MOD_DATE OR ATTR_MOD_DATE
36	LASTEDITOR	String	50	The user who performed the last update	Last Editor	null	null	true	0	0	null	null	
37	PLANCRT	String	25	Reference for the plan or permit number that cre	Plan Created	null	null	true	0	0	null	null	
38	PLANMOD	String	25	Reference for the plan or permit number that mo	Plan Modified	null	null	true	0	0	null	null	
39	NOTES	String	255	Miscellaneous notes pertaining to the feature	Notes	null	null	true	0	0	null	null	MESSAGE

ETL Creation

ESRI Professional Services

Developed ETLs using SAFE Software's FME

ESRI modeled existing database, and tested before pilot

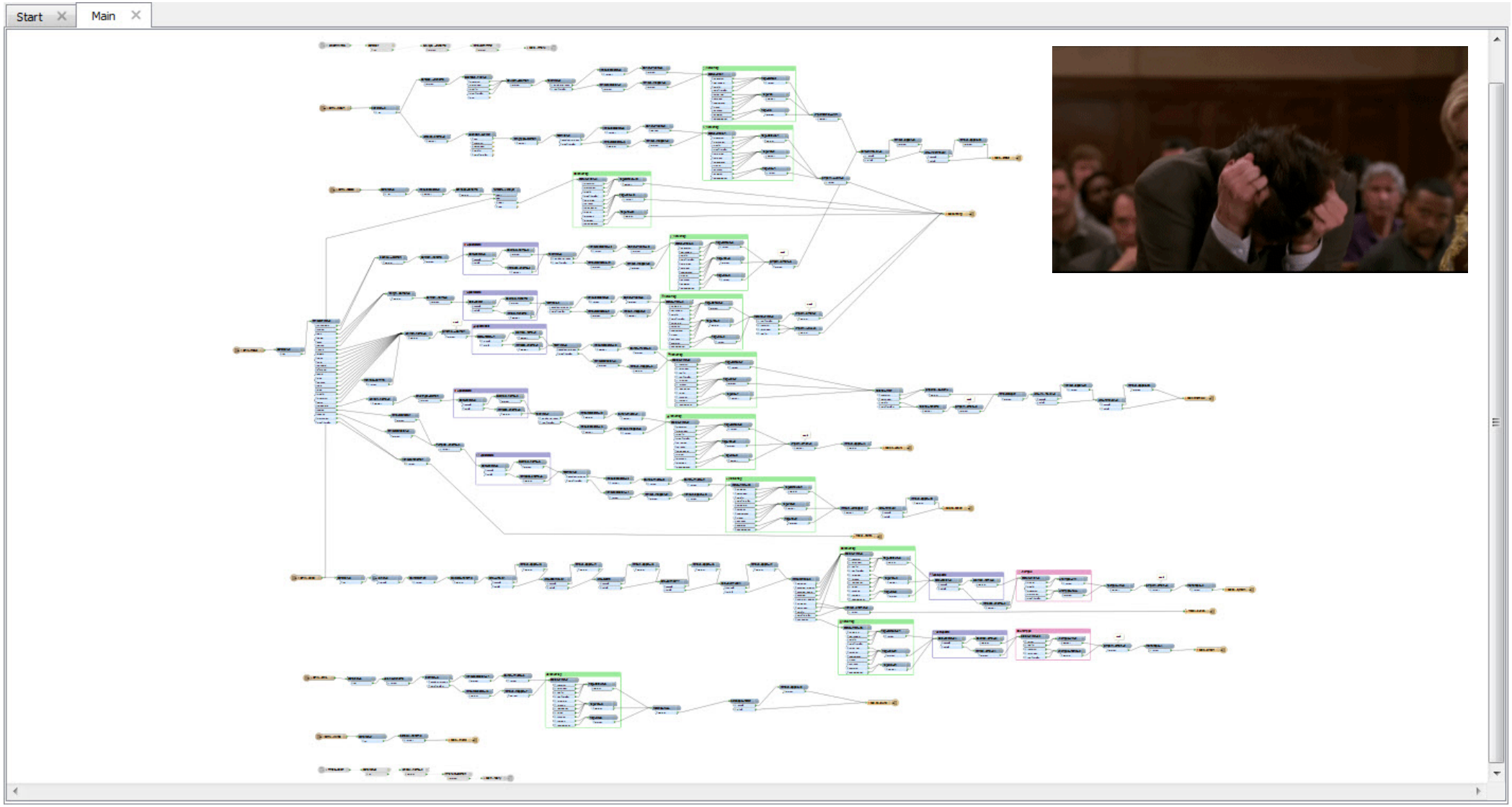
Developed and modeled workflows for complex migration tasks

Pilot Migration

Uploaded to SQL Server database in AWS

QA/QC: Updates and feedback given to ESRI, changes made and process repeated

Shared FME Workspaces with the City


Start
Main

Final Migration

1. Push data directly to Cloud using FME
   - minimal downtime
2. Configure production environment
3. Data cleanup
4. New mapping applications

Lessons Learned

Integration

- Consider target systems, streamline

Team participation

- Identify key resources both internally and externally
- Use qualified leads to ensure consistency and minimize education process

Management buy-in

- "Build once, utilize often"
- Inter-departmental coordination and support

Questions?

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Shameless plug

ESRI Professional Services

http://www.esri.com/apps/company/profservices

GISi

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