2013 Esri International User Conference
July 8–12, 2013 | San Diego, California

IT & GIS Collaboration: Improving Productivity for GIS Staff

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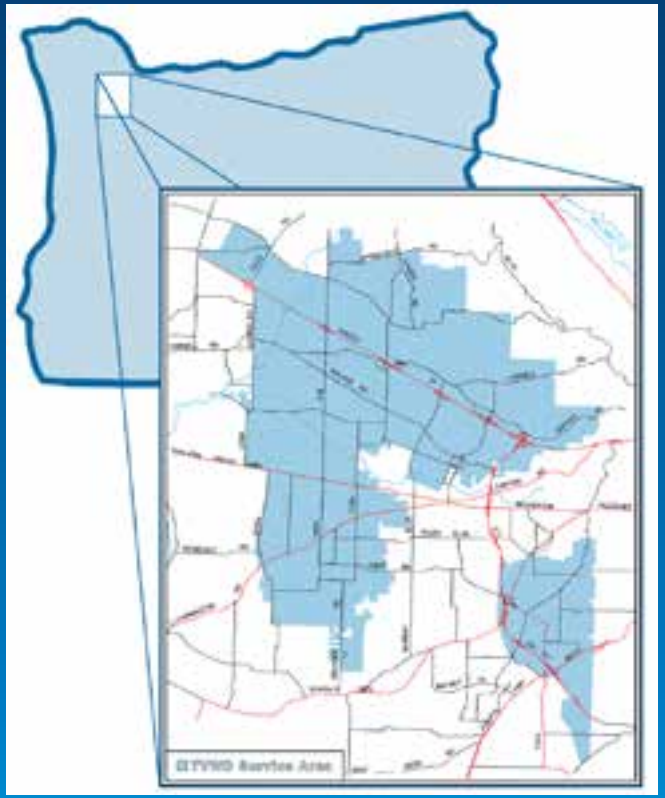
Tualatin Valley Water District

Tualatin Valley Water District

- Beaverton, Oregon
- Formed in 1938
- Approximately
  - 59,000 Service Connections
  - 44.2 Square Miles
  - 770+ Miles of Pipe
  - 120 Employees



TVWD's GIS Environment

- Mobile Field Units
- GPS

- GIS Team

"I don't do SQL"

- IT Team

"I don't do ArcMap"

GIS-Centric Implementation

- The Rule of Work: locate work where it belongs
  - Distribute GIS data entry
  - Distribute GIS integration points
  - Distribute Access to GIS Information
- Extend GIS Team Capabilities
- Ensure Integrity of GIS Program

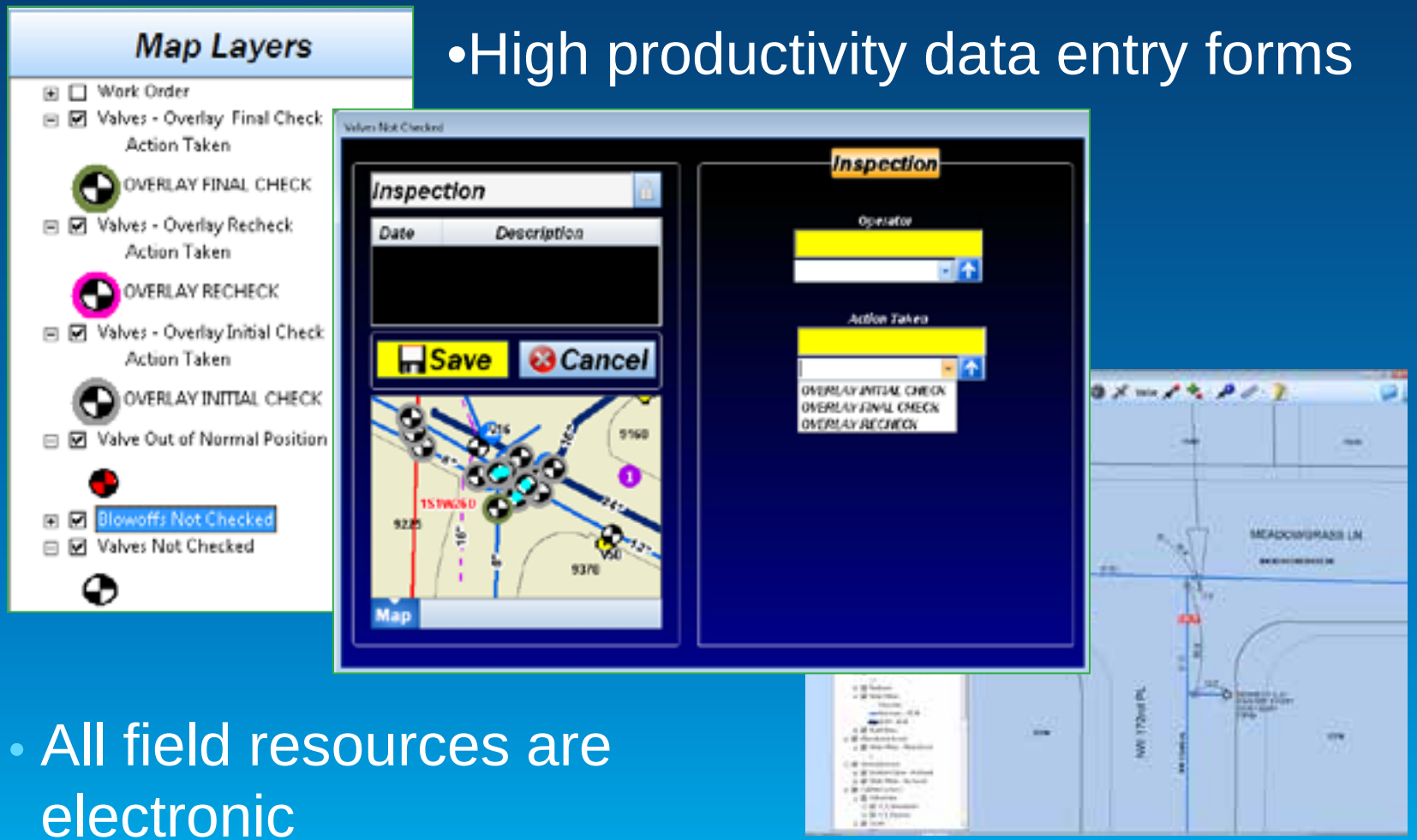
Case Study: Field Operations

Distribute Data Entry

- Field crews create and maintain asset data
  - Disconnected Editing with InfraMap (replicas)
- Self-Service Tools
- Quality Assurance & Control

Case Study: Field Operations

Distribute Data Entry

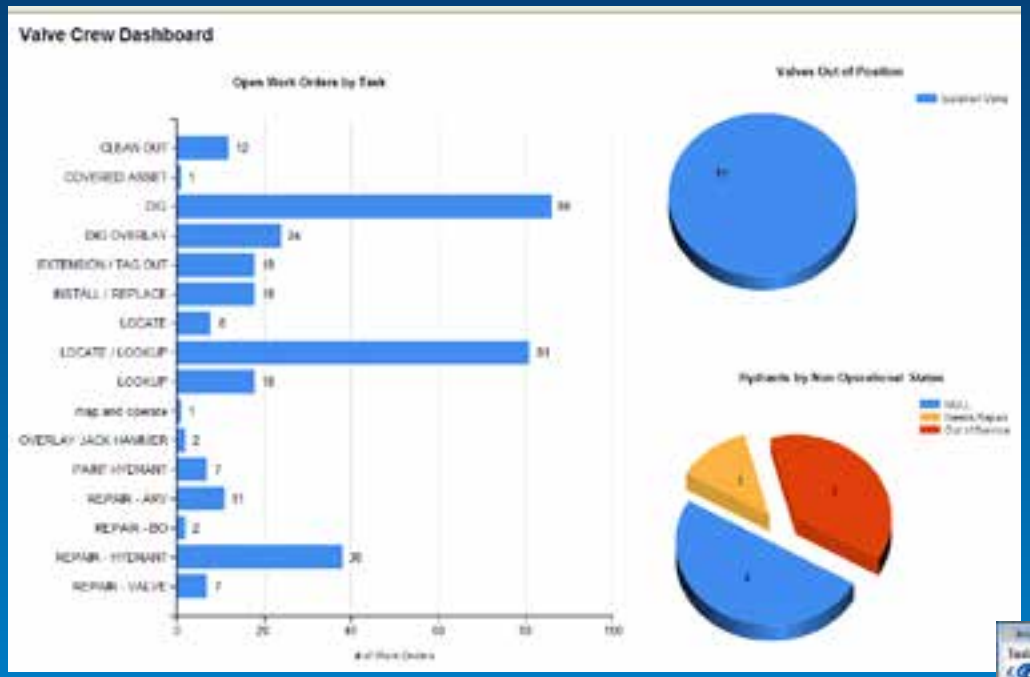


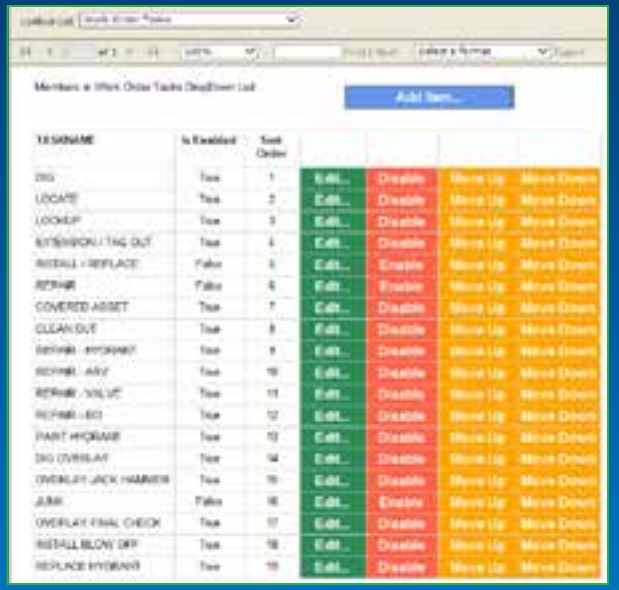
- High productivity data entry forms

- All field resources are electronic

Case Study: Field Operations

Distribute Data Entry



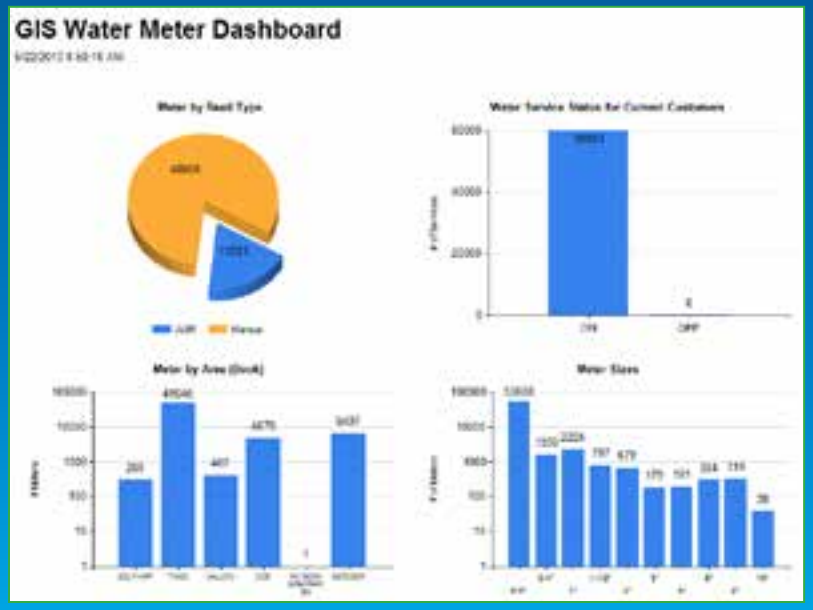


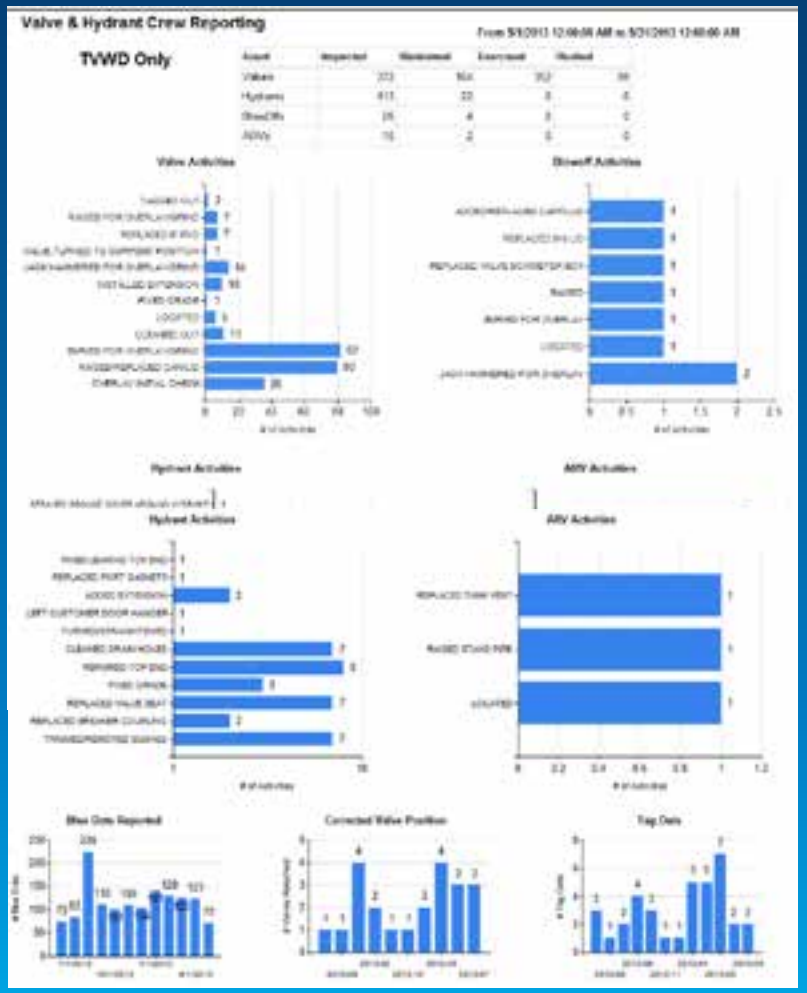
- Work group manages their own business process

Case Study: Field Operations

Distribute Data Entry

- Inventory Validation
- Provide Feedback

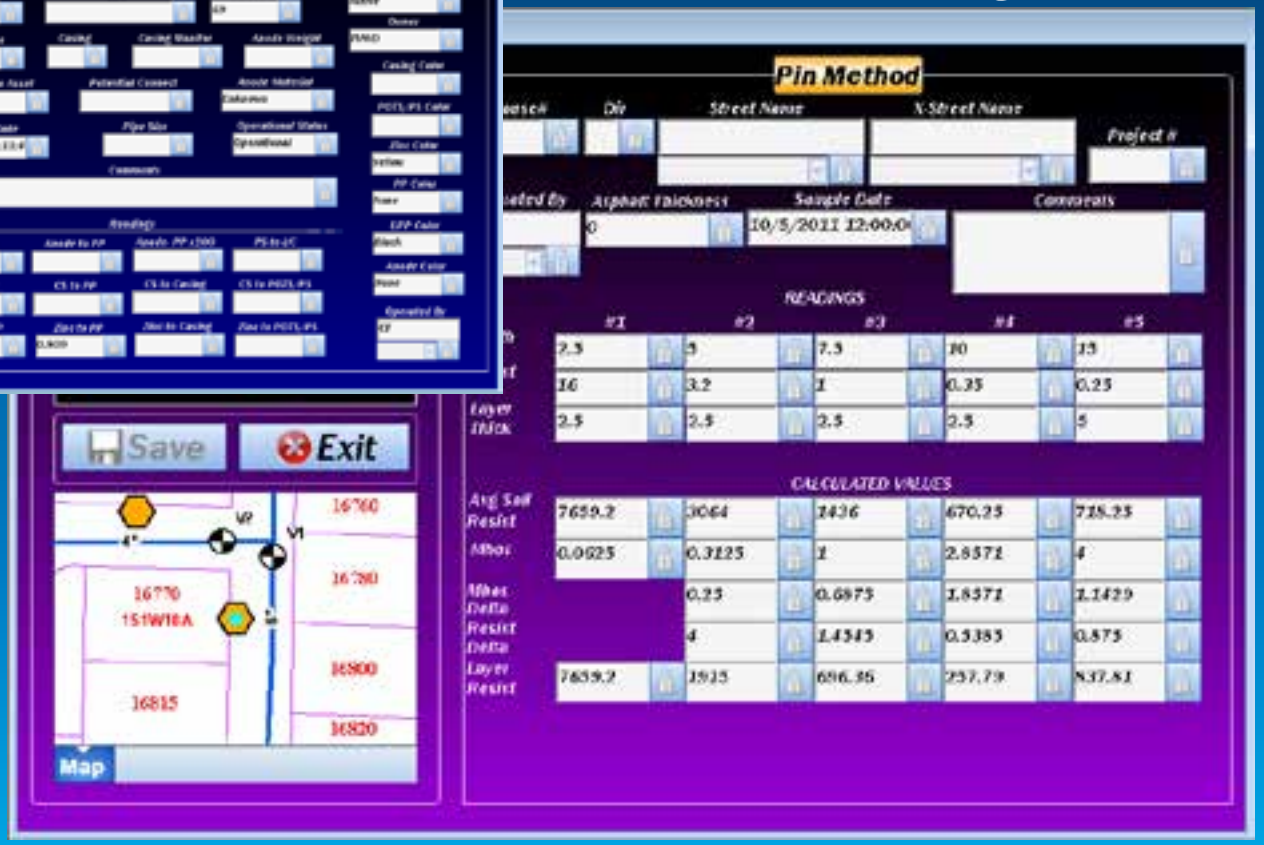




Case Study: Engineering

Distribute Data Entry

- Cathodic Protection Anode Readings



- Soil Resistivity

Case Study: Customer Service

Distribute Integration Points

- Customer Service maintains customer addresses for water meter services
- Automate Address Validation
- Quality Assurance & Control

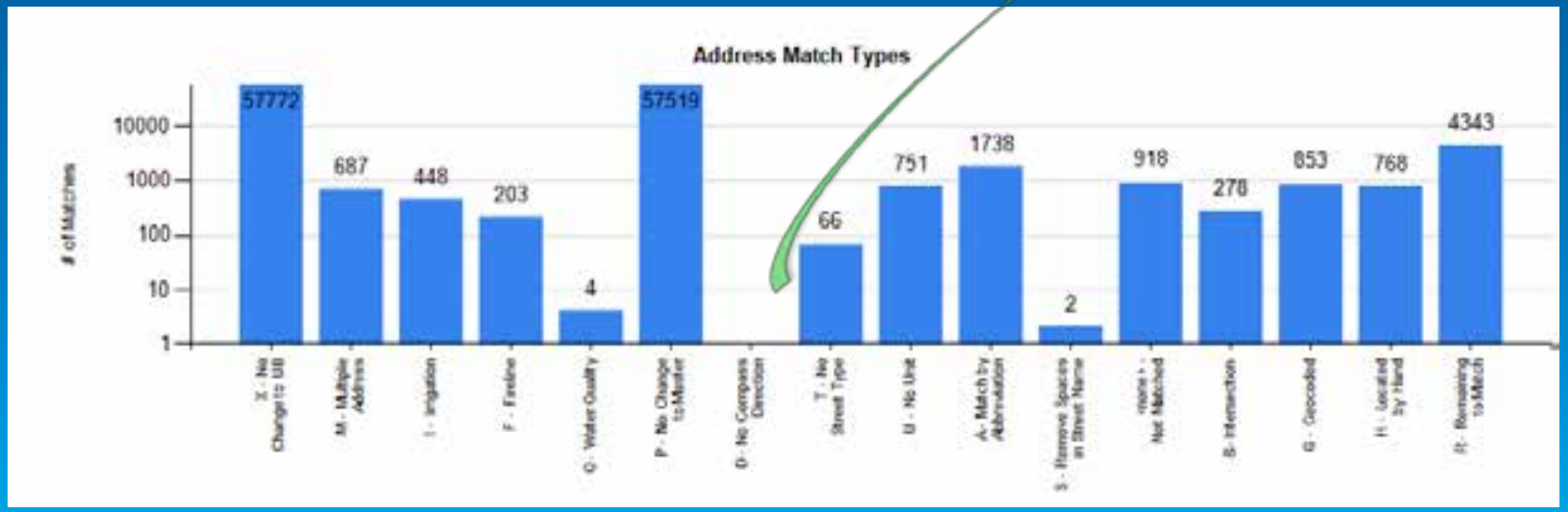
Case Study: Customer Service

Distribute Integration Points

- Address matching algorithm
- Provide Feedback

UB & Master Address Cross-Reference 6/11/2013 3:22:29 PM

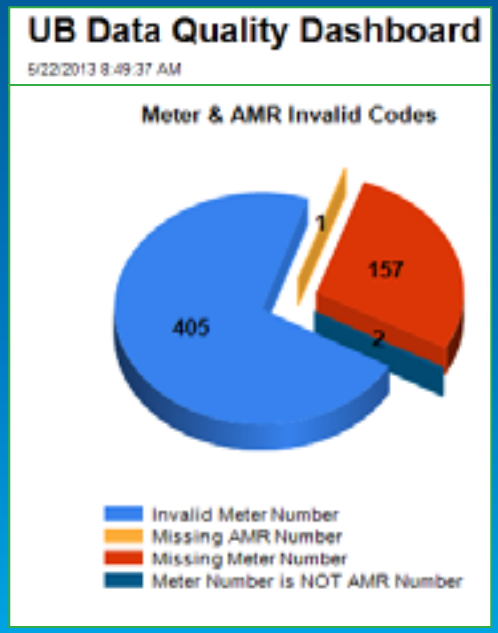
UB Match Address	UBSite Address	Master Address	Master Match Address	Match Code	Date Updated
20280 SW SKIVER	20280 SW SKIVER DR	20280 SW SKIVER ST	20280 SW SKIVER	X-T	6/10/2013 9:13:57 PM
8930 SW OAK	8930 SW OAK ST	8930 SW OAK LN	8930 SW OAK	X-T	6/10/2013 9:13:57 PM
8325 SW 71ST	8325 SW 71ST AVE	8325 SW 71ST PL	8325 SW 71ST	X-T	6/10/2013 9:13:57 PM

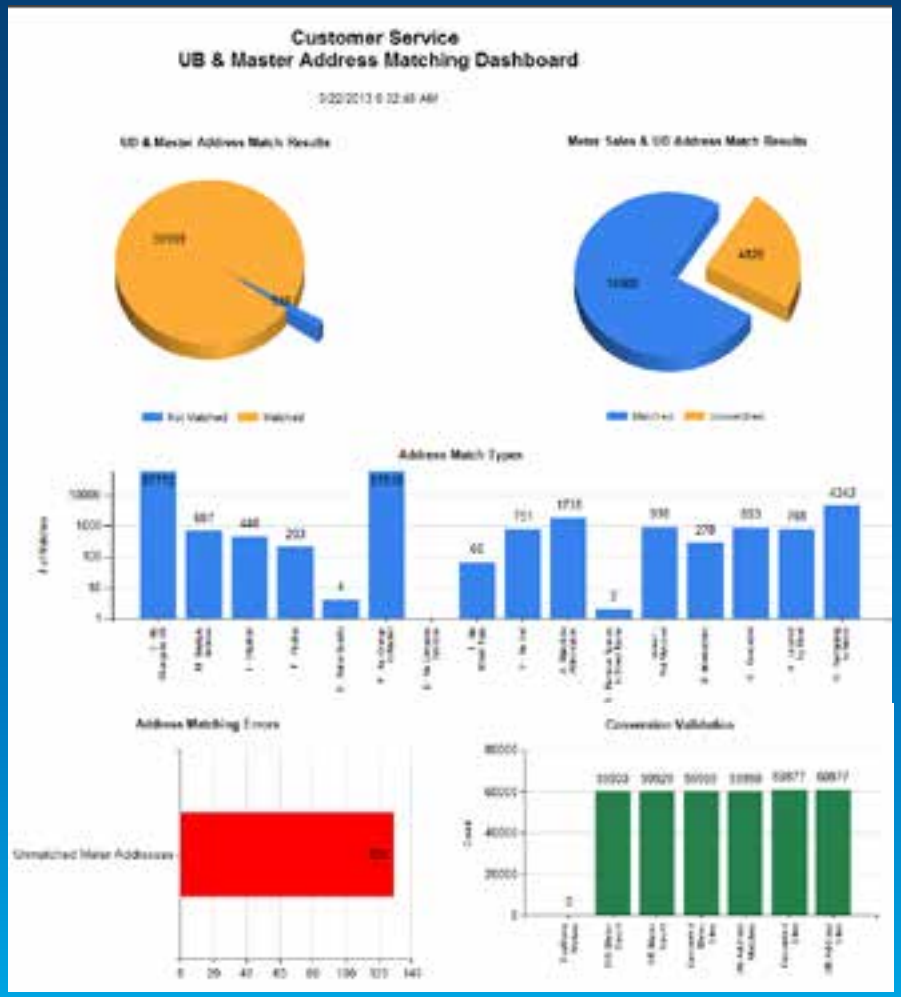


Case Study: Customer Service

Distribute Integration Points

- Business Rule Validation
- Provide Feedback





Case Study: TVWD Enterprise

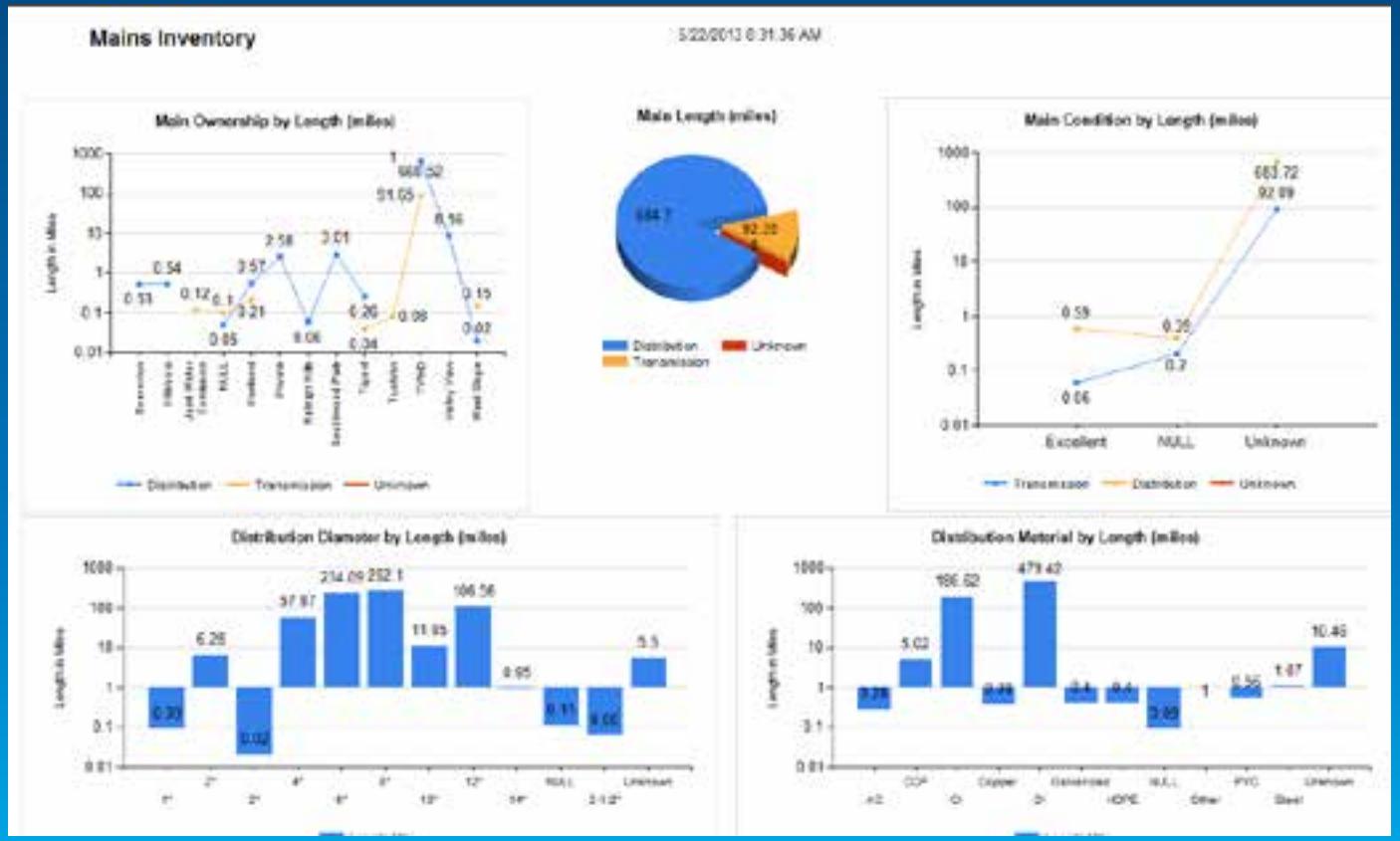
Distribute Access to GIS Information

- Reduce Data Requests
- Provide Self-Service Tools
- Provide One Version of the “Truth”

TVWD Enterprise

Distribute Access to GIS Information

- **Reduce Data Requests**



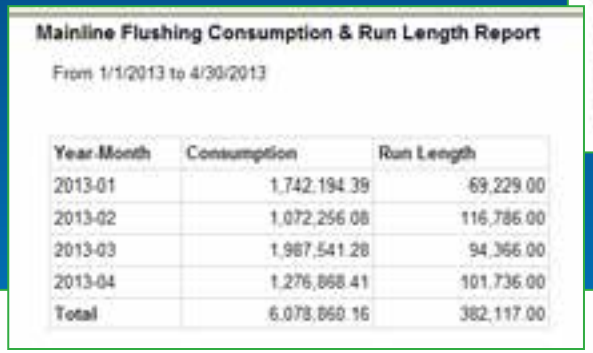
TVWD Enterprise

Distribute Access to GIS Information

- One version of the “Truth”
- Self-Service

Water Meter Service is OFF

Site Address	Service Status	Site ID	Book Number	Book Desc
2655 NW ROBINIA LN	OFF	2621	216	TVWD
13555 SW BUTTER RD	OFF	7555	648	TVWD
SW ANTHONY DR	OFF	14583	1241	TVWD
RT 1 BOX 582	OFF	23073	1782	TVWD
4732 NW BETHANY BLVD	OFF	62161	342	TVWD
6309 SW 198TH AVE	OFF	81445	1649	TVWD

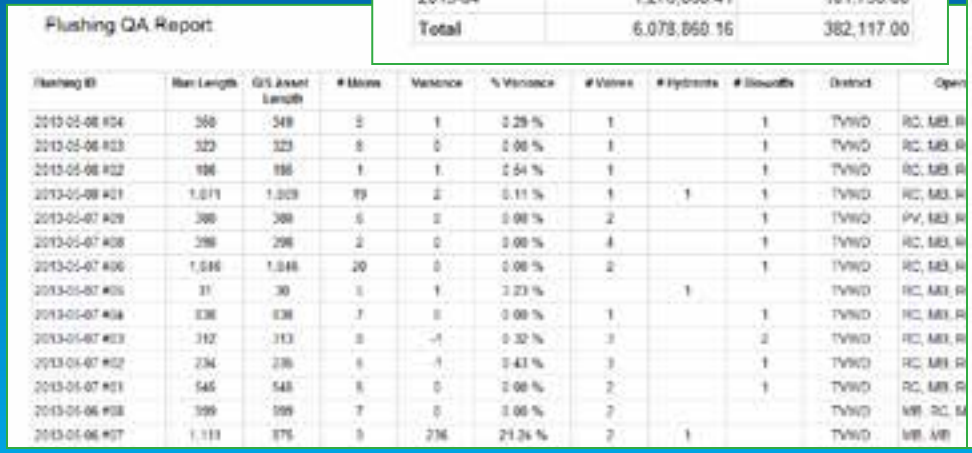


Mainline Flushing Consumption & Run Length Report

From 1/1/2013 to 4/30/2013

Year-Month	Consumption	Run Length
2013-01	1,742,194.39	69,229.00
2013-02	1,072,256.08	116,786.00
2013-03	1,987,541.28	94,366.00
2013-04	1,276,868.41	101,736.00
Total	6,078,860.16	382,117.00

AMR Completion List by Book



Flushing QA Report

Flushing ID	Run Length	GIS Asset Length	# Mains	Variance	% Variance	# Valves	# Hydrants	# Blowoffs	District	Open
2013-05-08 #24	350	349	3	1	0.29 %	1		1	TVWD	RC, MB, R
2013-05-08 #23	323	323	0	0	0.00 %	1		1	TVWD	RC, MB, R
2013-05-08 #22	186	186	1	1	0.54 %	1		1	TVWD	RC, MB, R
2013-05-08 #21	1,011	1,009	19	2	0.11 %	1	1	1	TVWD	RC, MB, R
2013-05-07 #29	388	388	6	0	0.00 %	2		1	TVWD	PV, MB, R
2013-05-07 #28	298	298	2	0	0.00 %	4		1	TVWD	RC, MB, R
2013-05-07 #26	1,046	1,046	20	0	0.00 %	2		1	TVWD	RC, MB, R
2013-05-07 #25	31	30	1	1	3.23 %		1		TVWD	RC, MB, R
2013-05-07 #24	636	636	7	0	0.00 %	1		1	TVWD	RC, MB, R
2013-05-07 #23	312	313	0	-1	0.32 %	3		2	TVWD	RC, MB, R
2013-05-07 #22	234	235	1	-1	0.43 %	3		1	TVWD	RC, MB, R
2013-05-07 #21	545	545	5	0	0.00 %	2		1	TVWD	RC, MB, R
2013-05-06 #28	399	399	7	0	0.00 %	2			TVWD	MB, RC, M
2013-05-06 #27	1,111	875	5	236	21.24 %	2	1		TVWD	MB, MB

Case Study: GIS Team

Extend GIS Team Capabilities

- Automate Manual Tasks
- Self-Service Environment
- Quality Assurance & Control

Case Study: GIS Team

Extend GIS Team Capabilities

- Automate Off-Hours Tasks
- Provide Feedback

Case Study: GIS Team

Extend GIS Team Capabilities

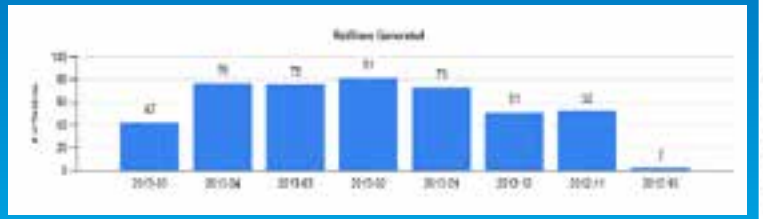
- Resolve conflicts during working hours

Conflict Data	Asset BLOWOFFASSEMBLY	2013-05-21 09:08:18.000	2013-05-21 15:53:21.000	Complete All Conflicts
AncillaryRole				
AssetID	1S1W24A38BO90	1S1W24A38BO90	1S1W24A38BO90	
BOIdentifier	1S1W24A38BO90	1S1W24A38BO90	1S1W24A38BO90	
BOFlumber	90	90	90	
BuildingNumber	6125	6125	6125	
Comments		-		
ComputerName	VALVE11	VALVE11	CONSTR2	
Condition	2	2	4	Press to Complete Conflict
CrossStreetName	SW VERMONT ST	SW VERMONT ST	SW VERMONT ST	
DistanceToValve	1.0	1.0	1.0	
Easting				
Elevation				
Enabled	1			
EnclosureType	926	926	UNK	Press to Complete Conflict
FlushingID				
FlushPosition	OPEN			
GPSDate				
GPSTime				
HasGPSLocation				
InstallDate	1900-01-01 00:00:00.0000000	1900-01-01 00:00:00.0000000	1900-01-01 00:00:00.0000000	
IntersectionNumber	38	38	38	
LastActivity	INSPECT			
LastFlushDate	2007-12-16 09:07:00.0000000			
LastInspectionDate	2013-05-21 09:00:00.0000000			

Case Study: GIS Team

Extend GIS Team Capabilities

- Support Field Editors



All Machine Definitions

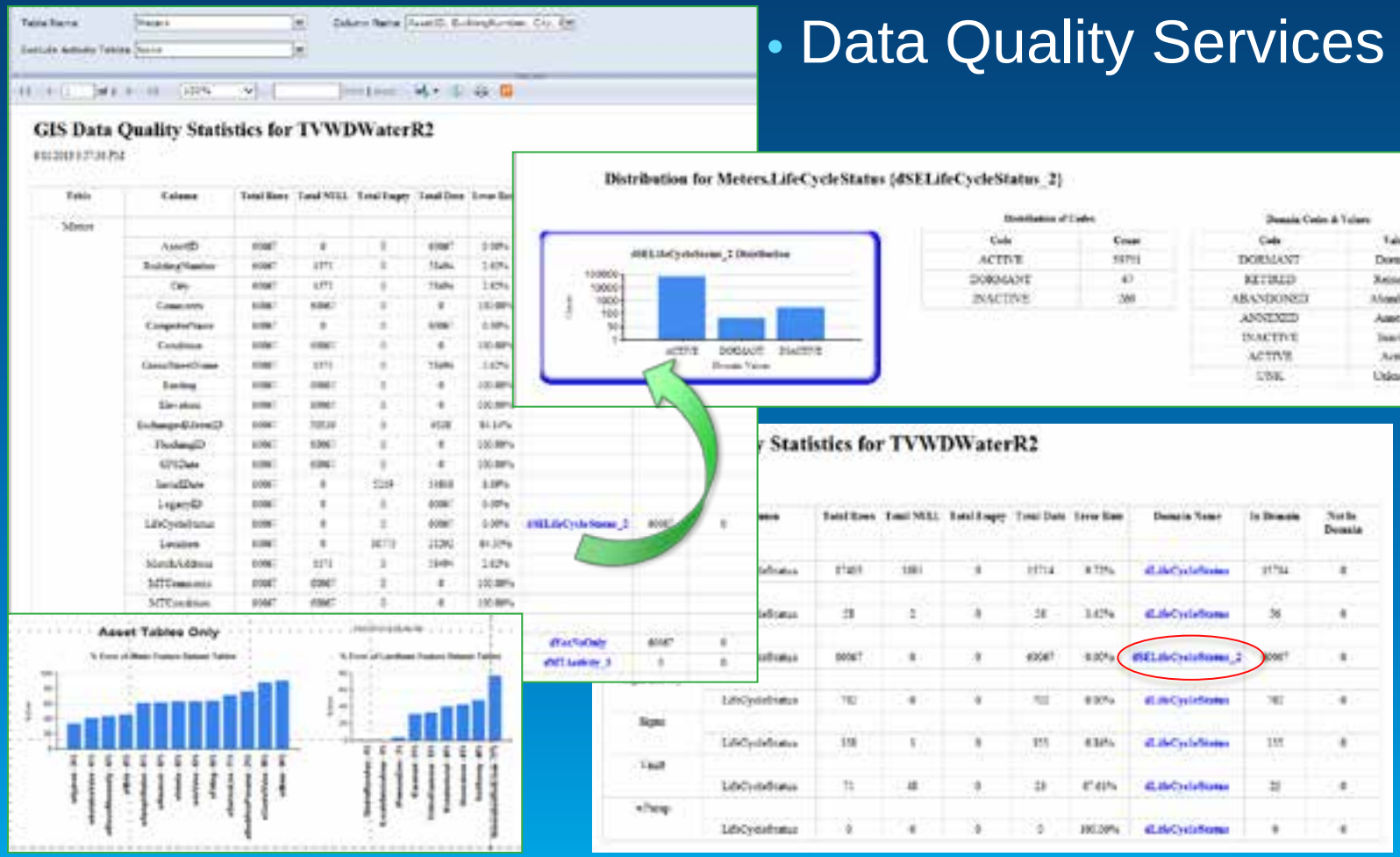
Machine Name	Machine State	Previous State	Requested State	Is Mobile	Is Read Only	Replica Name	Replica Exists	Owner Group	Add Member...	
CORISTNZ	CHECKOUT	CHECKIN	CHECKOUT	Yes	No	CORISTNZ	Yes	VALVE	Edit...	Remove...
DISTRIBUTION88	CHECKOUT	FORCECHIN	CHECKOUT	Yes	No	DISTRIB_CHUCK	Yes	DISTRIB	Edit...	Remove...
ENG14	READONLY	READONLY	READONLY	Yes	Yes	ENG14_HERR	No	INSPECTOR	Edit...	Remove...
ENG16	READONLY	READONLY	READONLY	Yes	Yes	ENG16_JAMES_1	No	INSPECTOR	Edit...	Remove...
FCS4	READONLY	READONLY	READONLY	Yes	Yes	FCS4_MONTE	No	FIELDCS	Edit...	Remove...
FIELDOPS6	READONLY	READONLY	READONLY	Yes	No	FIELDOPS6	No	VALVE	Edit...	Remove...
FIELDOPS8	READONLY	CHECKIN	READONLY	Yes	No	FIELDOPS8_KEVIN	No	VALVE	Edit...	Remove...
FO_MGR	READONLY	READONLY	READONLY	Yes	Yes	FO_MGR_DALE	No	VALVE	Edit...	Remove...
GIS_1	READONLY	READONLY	READONLY	Yes	No	GIS1	No	GIS	Edit...	Remove...
GISMaptop	READONLY	FORCECHIN	READONLY	Yes	No	GISMaptop	No	GIS	Edit...	Remove...
ISS	READONLY	READONLY	READONLY	Yes	No	ISS	No	ITTEST	Edit...	Remove...
MAINTENANCE2	CHECKIN	CHECKOUT	CHECKIN	Yes	No	MAINT2_GREG_J	No	MAINT	Edit...	Remove...
VALVE10	CHECKIN	CHECKOUT	CHECKIN	Yes	No	VALVE10	No	VALVE	Edit...	Remove...
VALVE11	CHECKOUT	CHECKIN	CHECKOUT	Yes	No	VALVE11	Yes	VALVE	Edit...	Remove...
VALVE14	CHECKIN	CHECKOUT	CHECKIN	Yes	No	VALVE14	No	VALVE	Edit...	Remove...
VALVE16	CHECKOUT	CHECKIN	CHECKOUT	Yes	No	VALVE16	Yes	VALVE	Edit...	Remove...
VALVE17	CHECKOUT	CHECKIN	CHECKOUT	Yes	No	VALVE17	Yes	VALVE	Edit...	Remove...
VALVE6	READONLY	CHECKIN	READONLY	Yes	No	VALVE6	No	VALVE	Edit...	Remove...
VALVE7	READONLY	CHECKIN	READONLY	Yes	No	VALVE7	No	VALVE	Edit...	Remove...
VALVE9	CHECKOUT	CHECKIN	CHECKOUT	Yes	No	VALVE9	Yes	VALVE	Edit...	Remove...
WINDOWS2.PC	READONLY	READONLY	READONLY	No	No	WINDOWS2PC	No	ITTEST	Edit...	Remove...

Redline Activity for REDLINEARCHUPDATE

Archive File	Archive Path	Description	Operation Type	Date Stamp	Computer Name	Old Status	New Status
4178163787.jpg	\\sanfgis\readonly\Archive\projects\Redlines\photos\4178163787.jpg	12" main through NE valve 5' x 5' to SW valve	valve	2/13/2013 12:00:00 AM	VALVE10	COMPL	NEWCT
4180993232.jpg	\\sanfgis\readonly\Archive\projects\Redlines\photos\4180993232.jpg	at tee 2400 via GIS	tee	2/13/2013 12:00:00 AM	VALVE14	COMPL	COMPL
4181443291.jpg	\\sanfgis\readonly\Archive\projects\Redlines\photos\4181443291.jpg	NEW VENTURES	valve	2/13/2013 12:00:00 AM	VALVE11	COMPL	COMPL
4181445847.jpg	\\sanfgis\readonly\Archive\projects\Redlines\photos\4181445847.jpg	NEW MANAGERS	valve	2/13/2013 12:00:00 AM	VALVE11	COMPL	NEWCT
4181447205.jpg	\\sanfgis\readonly\Archive\projects\Redlines\photos\4181447205.jpg	NEW MEASURES	valve	2/13/2013 12:00:00 AM	VALVE11	COMPL	NEWCT

Case Study: GIS Team

Extend GIS Team Capabilities



- Data Quality Services

IT Back-End Support

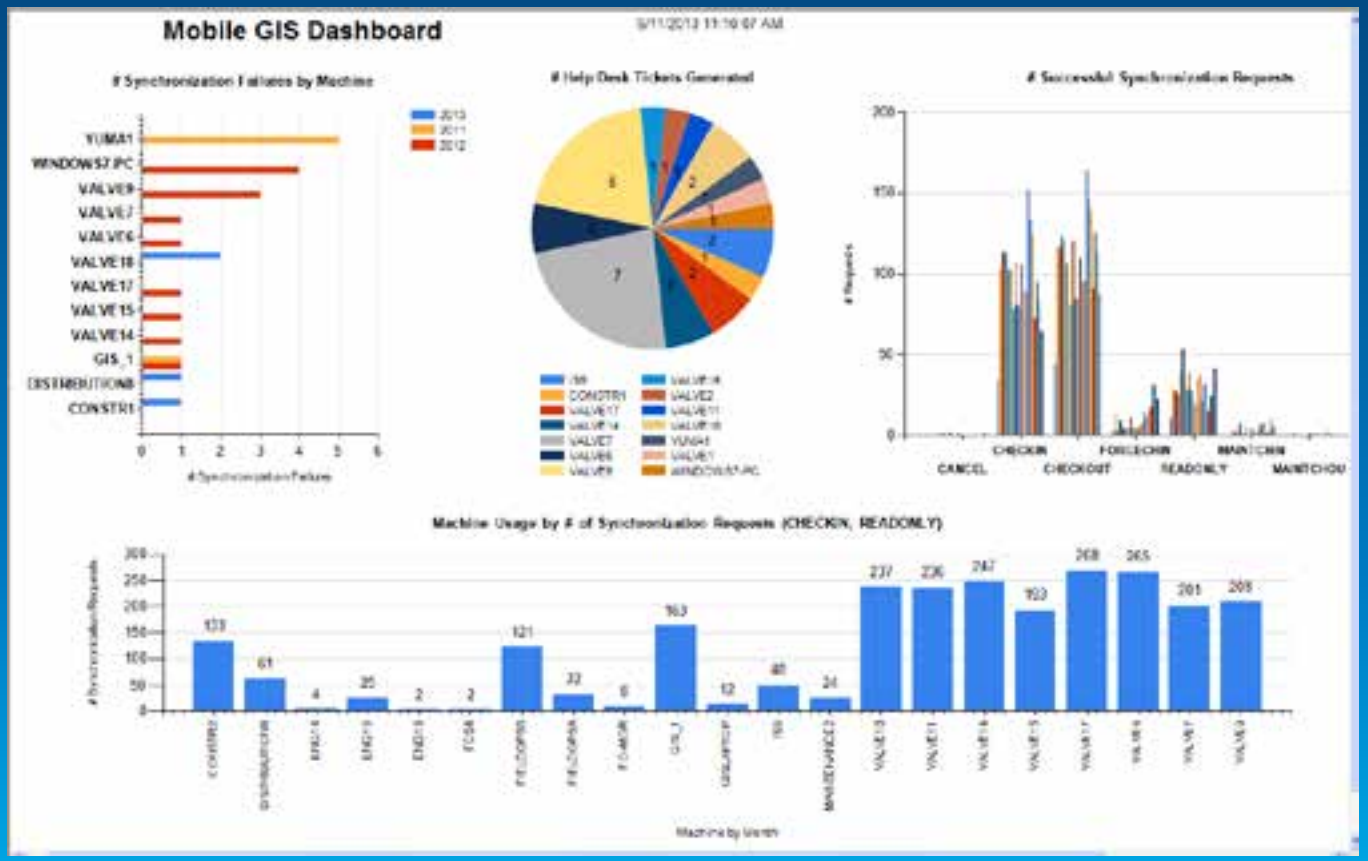
Ensure Integrity of GIS Program

- Support Field Devices & Operations
- Automate GIS Work Processes
- Quality Assurance & Control
- Integration of Enterprise Data (DW)

IT Back-End Support

Ensure Integrity of GIS Program

- **Monitor Mobile Units**



IT Back-End Support

Ensure Integrity of GIS Program

- Automate GIS Work Processes
  - GPS Points Uploaded & Features Created
  - Flushing Calculations Uploaded & Validated
  - Soil Survey Calculations
  - Cathodic Protection Calculations
  - Completed Redlines Moved to Archive
  - CAD File Conversion & Feature Extracts
  - Import Regional Data Updates (Metro/RLIS)
  - Automate Mobile Device Setup & Management

IT Back-End Support
Ensure Integrity of GIS Program

- Quality Assurance & Control
  - QA Profile of All GIS Data
  - Validation of Asset Data
  - Mobile File Generation (IXL, DBF, Read-Only GDB)
  - IXL (InfraMap), XMI (Visio), XML (GDB), Read-Only (GDB), Archive (GDB)
    - Schema Cross-Validation & Analysis
    - Domain Cross-Validation & Analysis
  - Asset ID Updates
  - Feature-Activity Validation (Orphan Activities)
  - Raw Edit Capture (prior to Reconcile-Post-Compress)
  - Extract Domains for Reporting

IT Back-End Support

Ensure Integrity of GIS Program

- Data Available for Mapping from DW
  - Customer Consumption
  - Customer Revenue
  - Meter Consumption Over Time
  - Meter Routes
  - Customer Layer
  - Safety Layer
  - Critical Customer Layer

GIS-Centric Implementation

Outcomes

- Redline backlog is no longer than 2 weeks
- GIS team's work is progressing
- Data owners provide better data quality
- No duplicate data entry
- GIS is integrated into all departments
- Saving 10,000 intersection pages per year
- Integration with DW creates larger GIS-enabled data pool for mapping

Questions?

Thank You

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