



Fusion of PI System and GIS in Dashboard Visualizations Provide Industry-Best Decision Insight

Ed Riegelmann, Chief Geospatial Officer
Stefan Orehovec, Spatial Technologist

CRITIGEN

Agenda

- About Critigen
- How PI System and GIS Solve Business Challenges
- Example Client Solutions
- Key Processes for Successful GIS for PI Deployments
- Technology Improvements and Lessons Learned
- Benefits of PI System and GIS Together



About Critigen

About Critigen

Critigen is a Global Leader in Geospatial Integration

We help our clients *transform geography into action* to improve lives, increase transparency, and yield better business outcomes

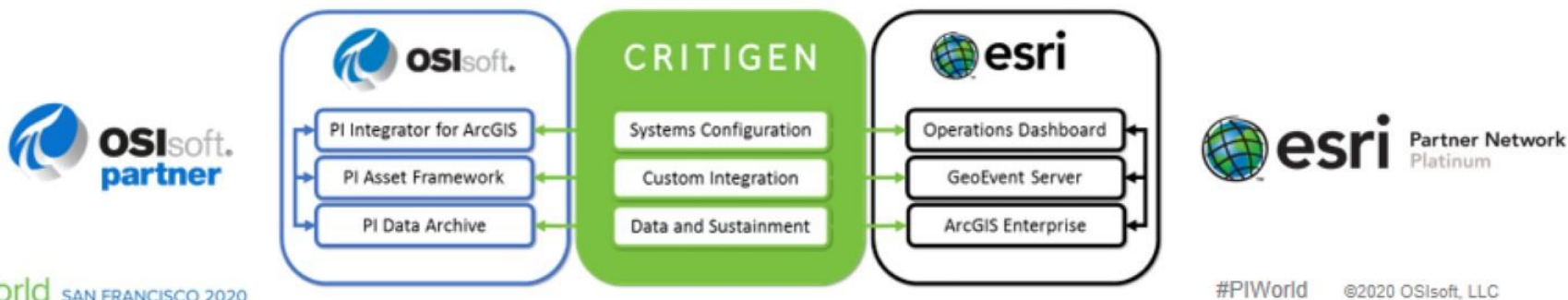


- Critigen has been mapping client assets since 1947, providing GIS solutions since 1987, and has been an OSIsoft Partner since 2014
- Critigen brings map-based, integrated GIS dashboards and mobility solutions to OSIsoft's operations intelligence and analytics



Critigen, OSIsoft and Esri

- The PI System by **OSIsoft** provides the ability to collect, analyze, and visualize large amounts of high-fidelity, time-series data from multiple sources and share that information with people and systems across all operations
- **Esri** is the world's largest maker of geographic information systems (GIS) software that allows users to combine mapping and analytics to reveal deeper insight into their data.
- **Critigen** is a GIS systems integrator. As an OSIsoft Integration Partner and an Esri Platinum Partner, Critigen is uniquely positioned to help organizations integrate their operational and spatial data to make better decisions, faster.

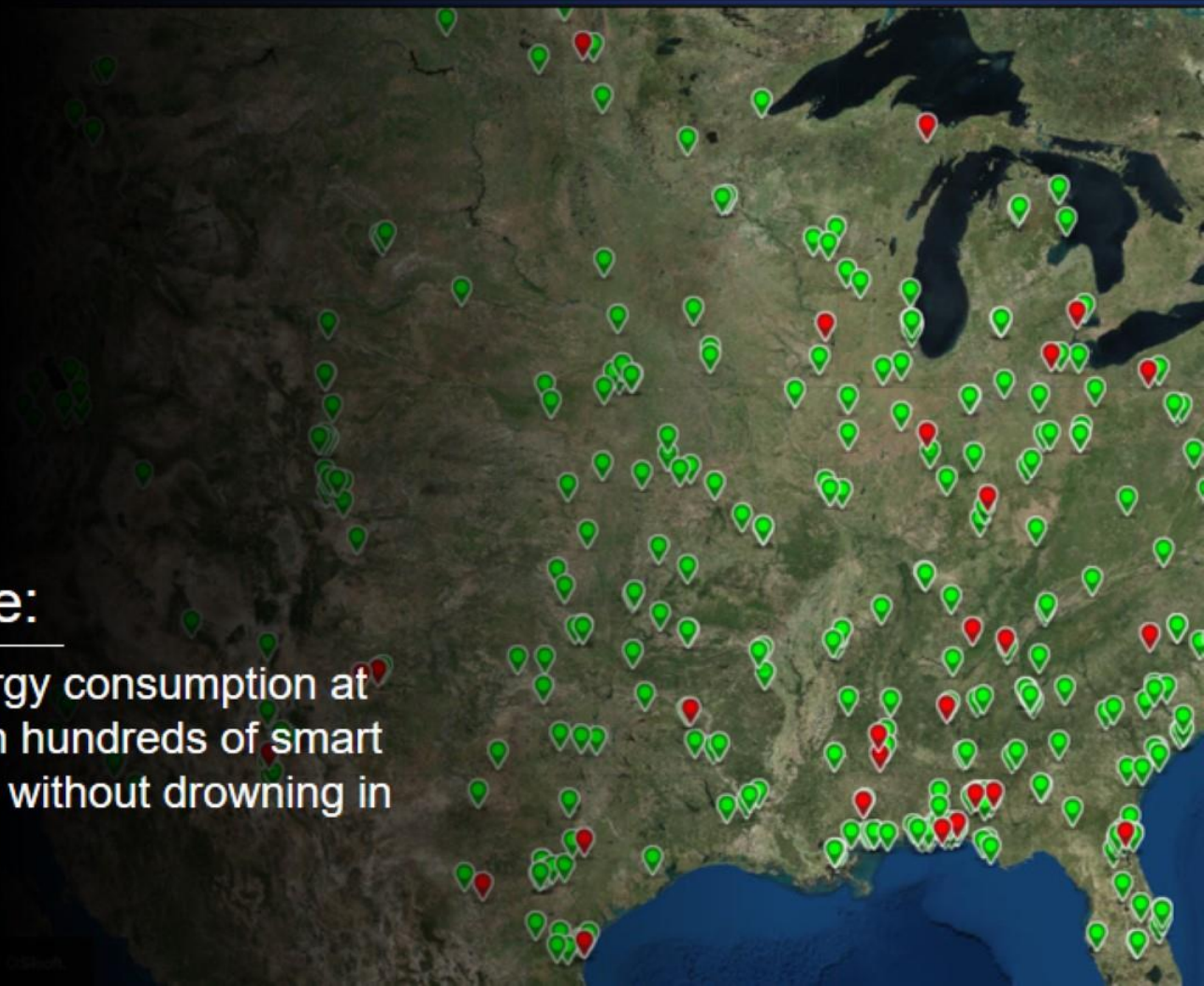




How PI System and GIS Solve Business Challenges

Business Challenge:

How can we monitor energy consumption at over 200 installations with hundreds of smart metered buildings each – without drowning in the data?





PI System and GIS Solution:

Aggregate PI System meter data from 100s of buildings per installation in GIS to create summarized national and regional situational awareness dashboards

300mi

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CRITIGEN Energy InSite

ENERGY CONSUMPTION VISUALIZATION

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Name

ANTL_436



PI Analysis

ANTL_421

ANTL_420

ANTL_361

ANTL_339

ANTL_338

ANTL_325

ANTL_161

ANTL_154

ANTL_105

ANTL_679

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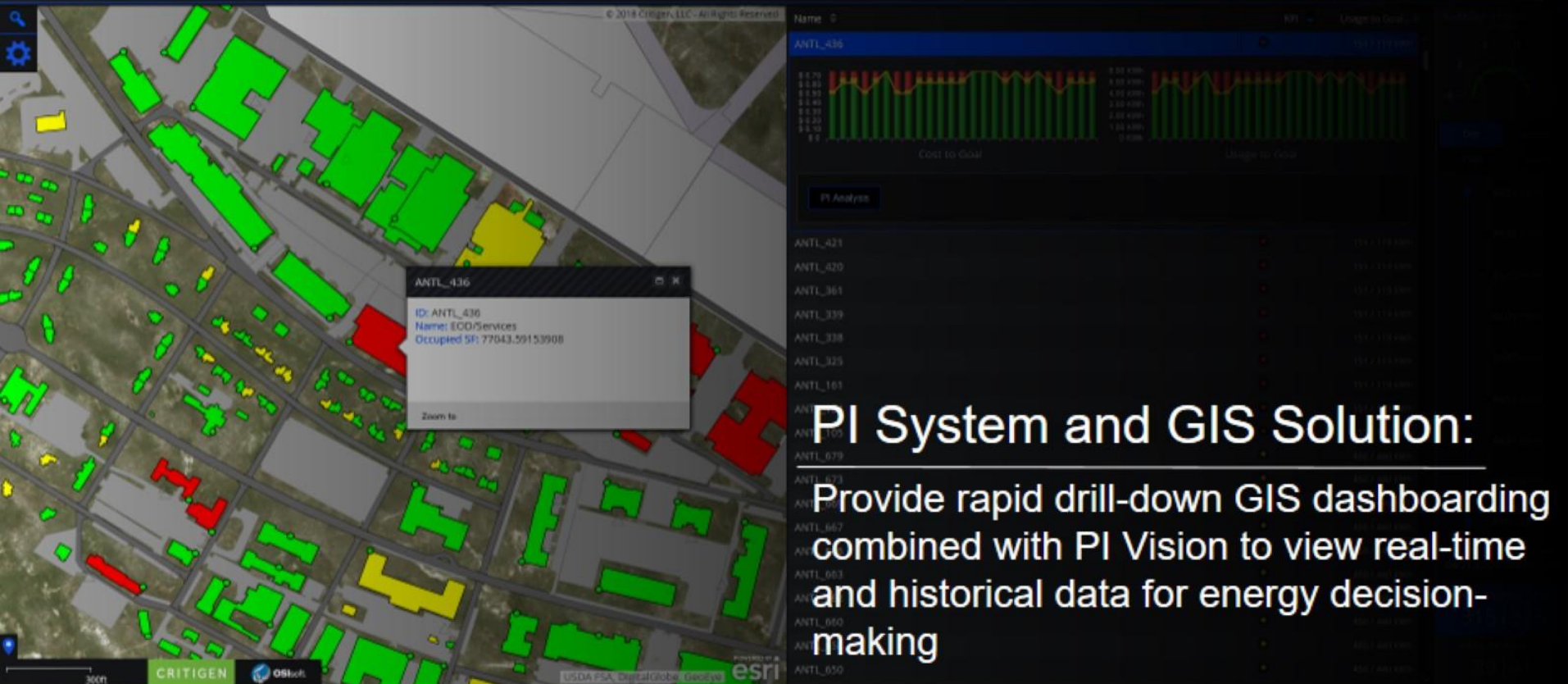
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Business Challenge:

How can our energy/facility managers quickly identify problem buildings 'at a glance' where energy consumption exceeds goals?



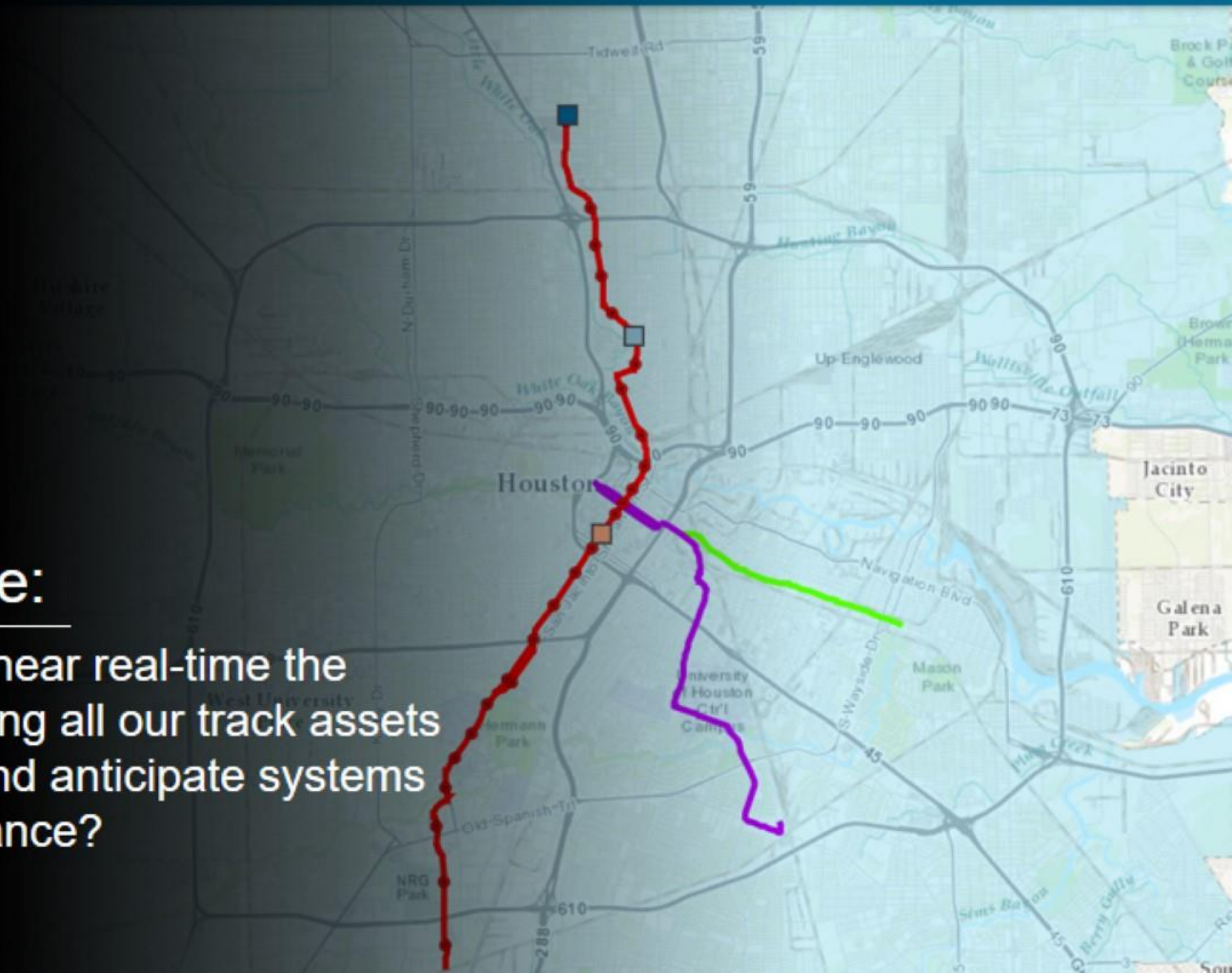
PI System and GIS Solution:

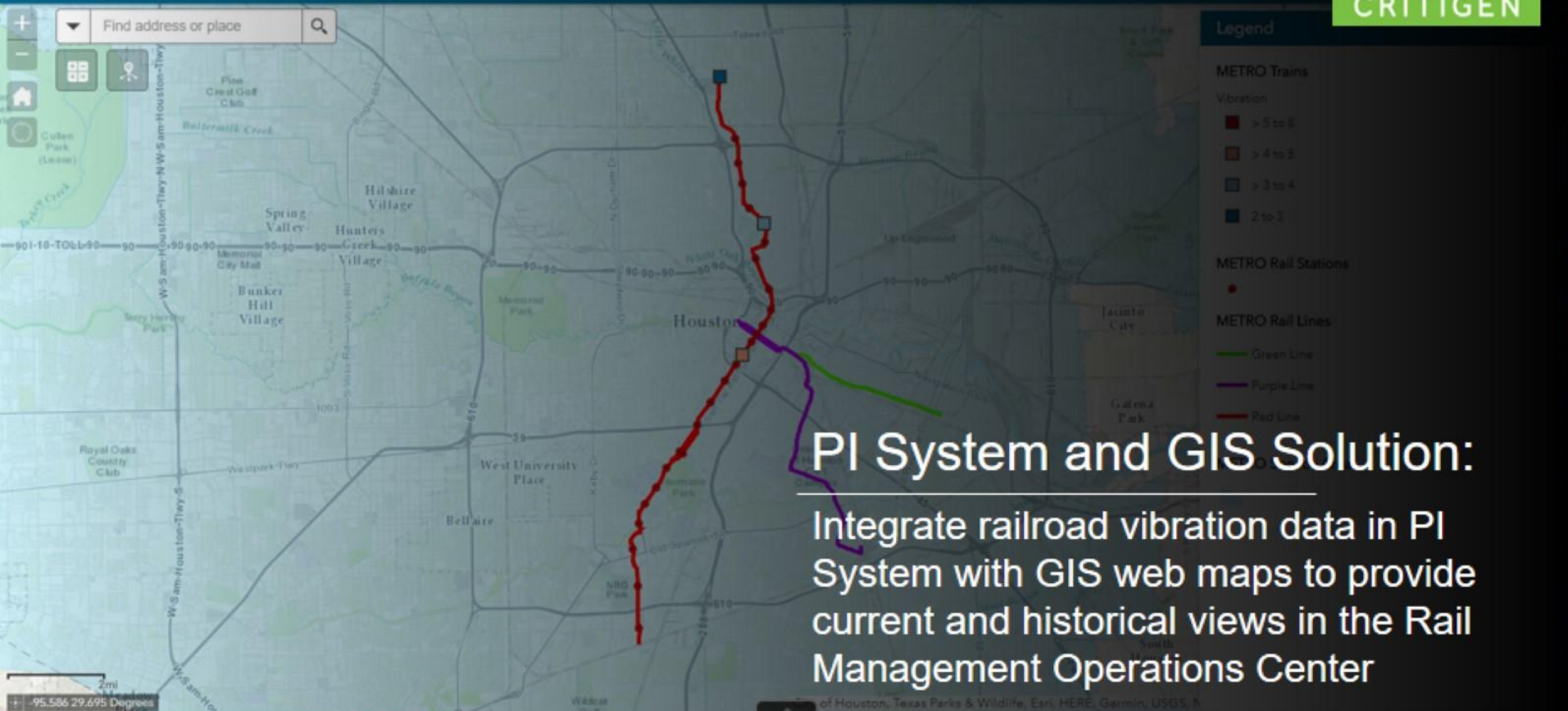
Provide rapid drill-down GIS dashboarding combined with PI Vision to view real-time and historical data for energy decision-making

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Business Challenge:

How can we visualize in near real-time the status of rail vibration along all our track assets to ensure public safety and anticipate systems breakdown and maintenance?





PI System and GIS Solution:

Integrate railroad vibration data in PI System with GIS web maps to provide current and historical views in the Rail Management Operations Center

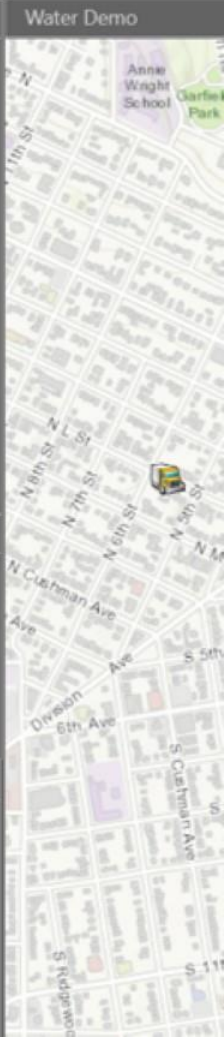
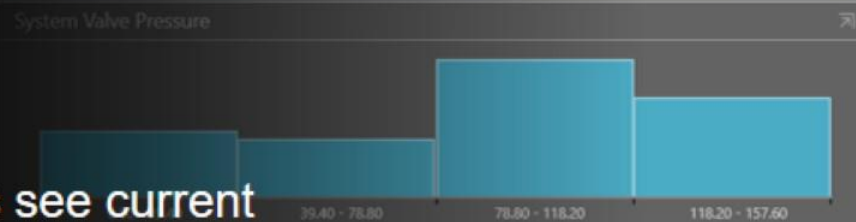


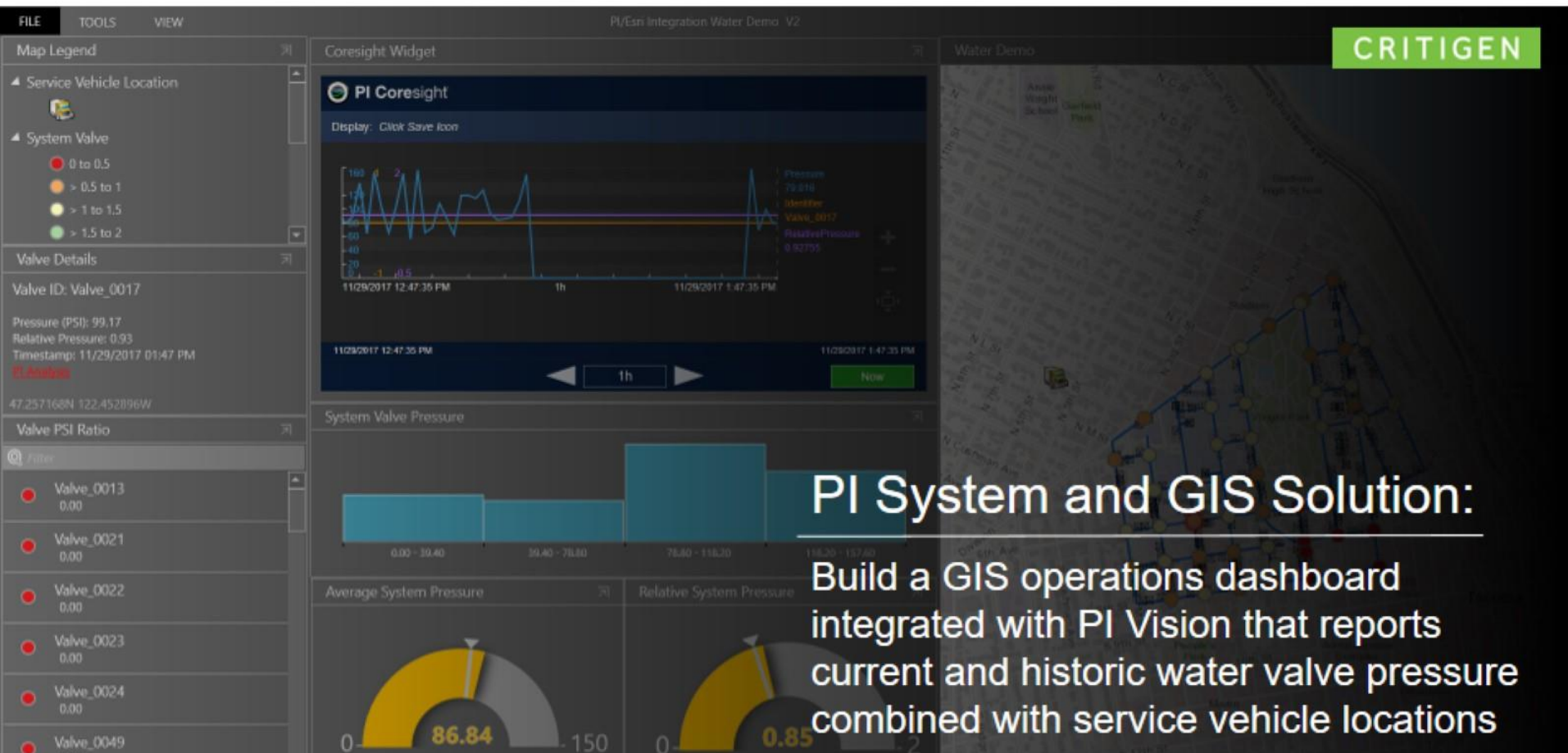
Business Challenge:

How do we identify gas utility infrastructure that historically fails or performs marginally to support our decision-making to replace before failure?



How can our operations engineers see current and historical data on water pressure combined with the location status of our field crews on repair/replace operations?





PI System and GIS Solution:

Build a GIS operations dashboard integrated with PI Vision that reports current and historic water valve pressure combined with service vehicle locations

Work Orders

Order Number

440101

Name

Service Line Dent Replacement

Description

Replace dented section of service line where
operating impacted by heavy equipment

Due Date

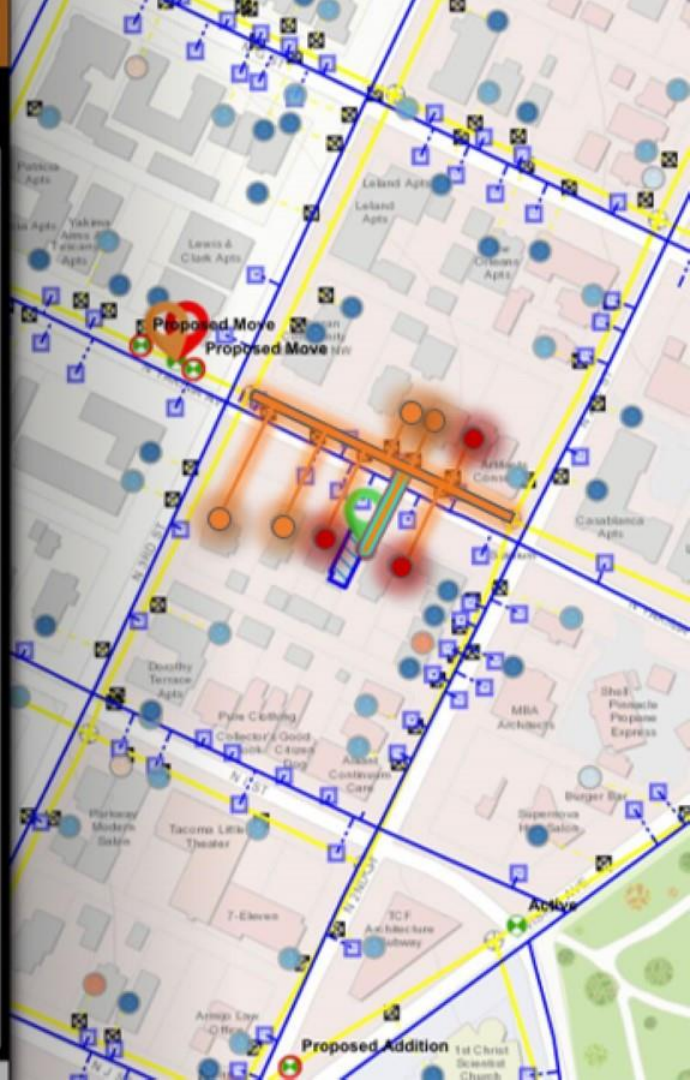
2020 10:10 MST

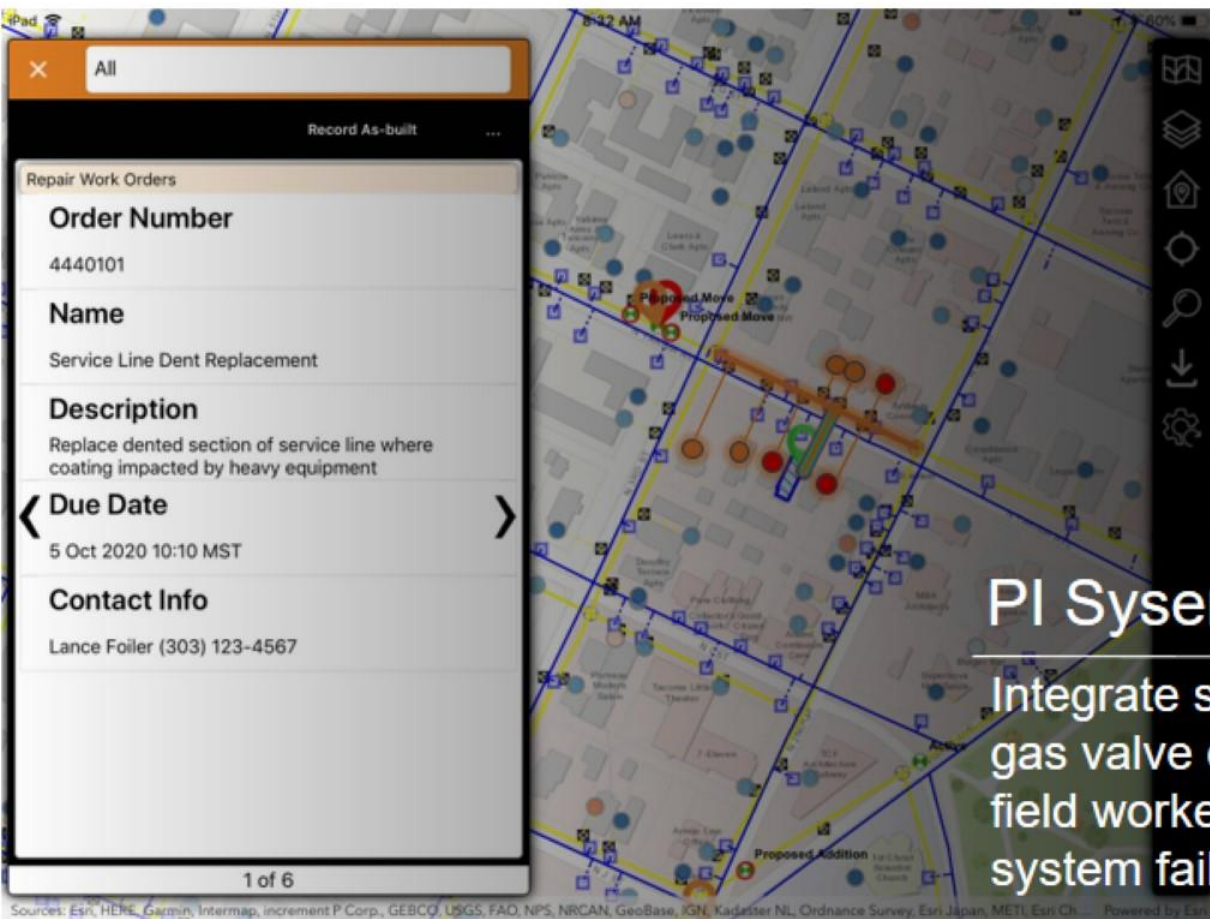
Contact Info

Phone (360) 123-4567

Business Challenge:

How can our gas mobility workforce see and diagnose system failures in the field, and then fix issues before customers ever report a problem?





PI System and GIS Solution:

Integrate streaming or cached PI System gas valve data in a Mobile GIS app to help field workers visually identify and analyze system failures

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China... Powered by Esri



Example Client Solutions

Example Client Solutions

- Client: US military service
- Challenge: Reduce facilities energy consumption
- Region and Installation level GIS dashboards for monitoring Building, Meter and Utility data
 - Deploying in secure enclaves at 10 regions worldwide
 - Specialized users and display environments
 - Uniform solution across all deployments utilizing GIS and PI System

Example Client Solutions

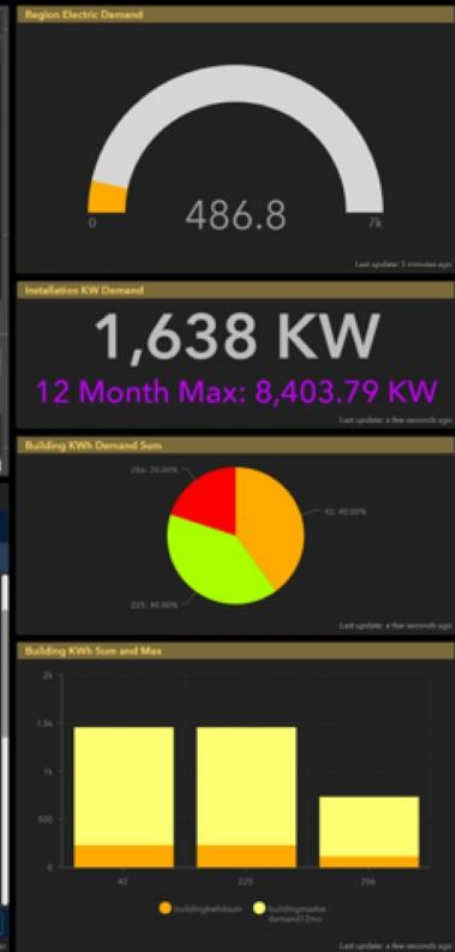
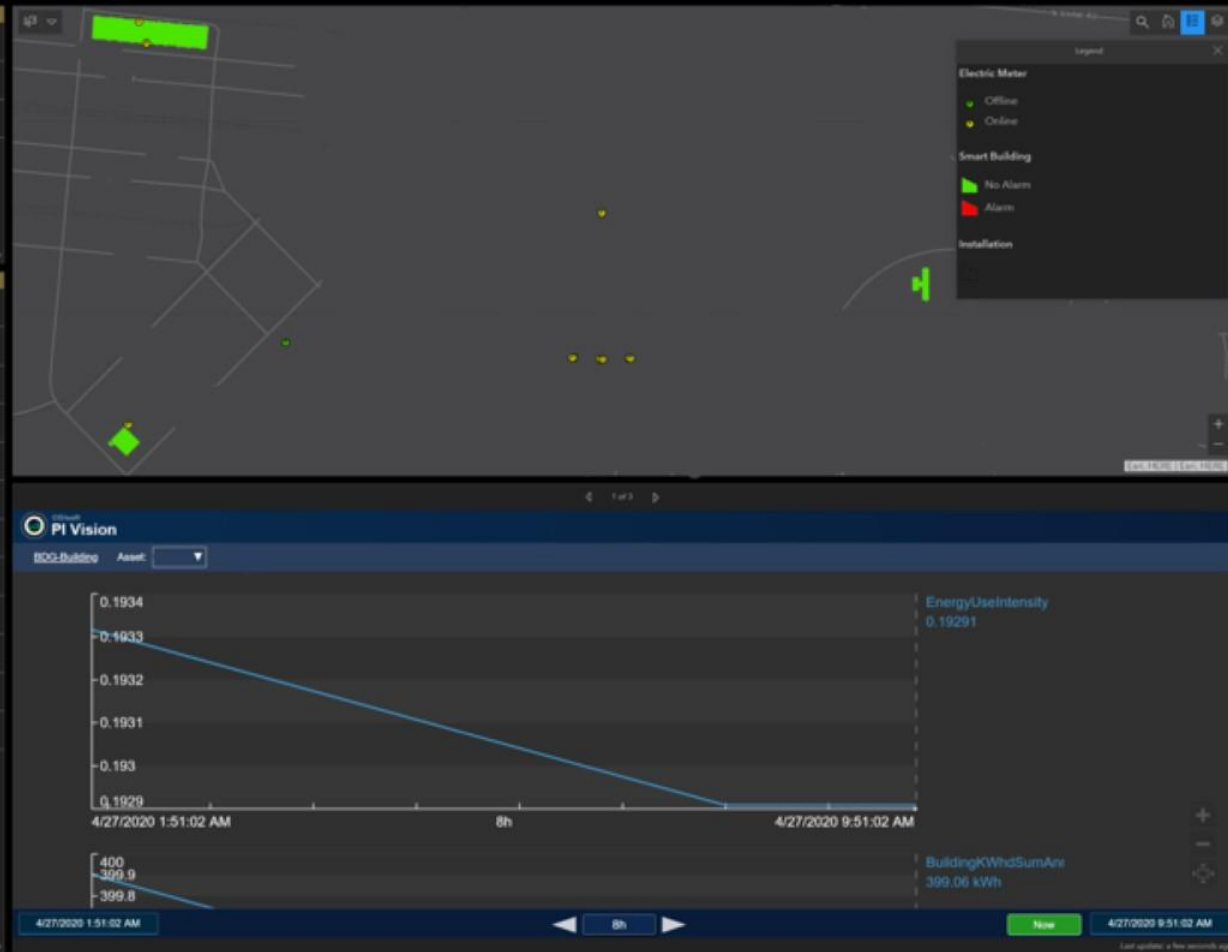
- Client: US military service
- Challenge: Support predictive-based maintenance and monitor facilities energy consumption
- Installation and Building level GIS dashboards for monitoring Building and Equipment data
 - Pilot project
 - Limited enterprise network access
 - Equipment and Building Space metrics
 - Maximo work order integration
 - Diverse set of users and use cases

Smart Building	Fault Count
42	34
225	34
286	34

Last updated: a few seconds ago

Electric Meters
7
8
32
38
55
74
95
96
97
98
136
137

Last updated: a few seconds ago



Variable Air Valve	Zone Temp	SA Temp	DA Temp
VAV-1-1	72	70	71
VAV-1-10	73	71	72
VAV-1-11	78	76	77
VAV-1-12	72	70	71
VAV-1-13	72	70	71
VAV-1-14	72	70	71
VAV-1-15	73	71	72
VAV-1-16	74	72	73
VAV-1-17	74	72	73

Last updated: a few seconds ago

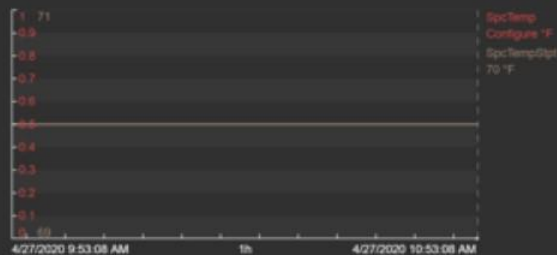
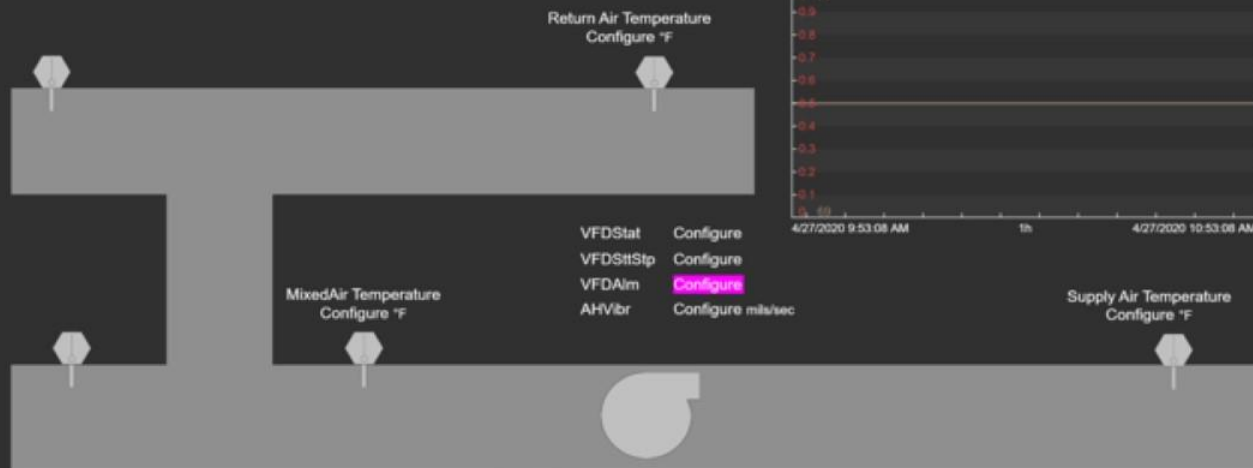
Air Handler Units	
AL-AHU-1 - First floor plenum	
AL0002261 - Mezzanine	
AL0001628 - Roof	
AL0001629 - Roof	
AL0001630 - Roof	
AL0001632 - Roof	
ALM001105 - Ground	
ALM001147 - Roof	
AL0005274 - First floor plenum	
AL0005275 - First floor plenum	
AL0004208 - Mezzanine	
AL0003310 - Mezzanine	

Last updated: a few seconds ago



Points Locked
Configure

AHU-03 OccStat Configure



VFDStat Configure
VFDSstStp Configure
VFDAIm Configure
AHVlbr Configure min/sec

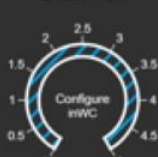
MixedAir Temperature
Configure °F

Supply Air Temperature
Configure °F

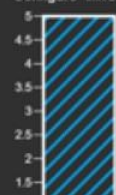
FiltDiffPress



SFDiffPress



Building Stati...
Configure inWC



4/27/2020 9:53:08 AM

1h

Now

4/27/2020 10:53:08 AM

PI Vision Installation Faults Fault Diagnostics



Key Processes for Successful GIS for PI System Deployments

Key Processes for Successful GIS for PI System Deployments

- Data acquisition and evaluation
 - Identify the available data within GIS and PI System
 - Assess data quality and reliability
 - Determine connectivity between GIS and PI System (ID's)
- Use Cases and User Stories
 - Work with owners to identify value
 - Work with users to write stories and use cases
- Display environment
 - Where will the dashboards be shown? (Ops Ctr walls, large monitors, laptops, mobile)
 - Decide on user groups (public, enterprise, managers, skilled technicians)

Key Processes for Successful GIS for PI System Deployments

- Technical Limitations
 - Internet and internal network access
 - User rights on workstations
 - User access to GIS data and embedded applications (PI Vision, Maximo, SkySpark, others)
- Development Testing and Deployment
 - Licensing
 - Development and Test environments
 - Deployment to the Production environment



Technology Improvements and Lessons Learned

New Technology

- Upgraded capabilities at ArcGIS 10.7.1
 - Web-based Operations Dashboard
 - More flexible data architecture
 - More stability in GeoEvent Server and Portal
 - More support for High Availability
 - Unlimited viewer licenses (dependent on client license)
- Upgraded version of PI Integrator for Esri ArcGIS
 - Data Relay and PI Integrator on the same server

Lessons Learned

- Architecture

- Isolate the live data from the GIS
- Clear the live data on a regular basis
- Browser-based GIS dashboards are much easier to deploy

- Interface

- Embedded PI Vision provides a much more unified experience
- Dark themes are better for wall mount displays
- GIS dashboard integration of a data table and the map enables quick, at-a-glance viewing
- Value of asset location data within buildings



Benefits of PI System and GIS Together

Benefits of PI System and GIS Together



We can connect real-time sensor status to time and location



We can provide situational awareness of performance of fixed and mobile assets



We can perform location-based analyses not possible without GIS



We can provide access to real-time data for mobile workforces while in the field



From a single feature location, we can dig deeper into PI System historical data

Benefits of PI System and GIS Together



Aggregated PI System data can be used to create multi-level GIS dashboards



PI Vision integrated in GIS dashboards enables accelerated decision-making



PI System and GIS provide new ways to monitor and quickly respond to assets



It can provide location-based visibility of progress towards operational goals



Predicting performance can be modeled using geospatial analytics like heat maps

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Ed Riegelmann

Chief Geospatial Officer

Critigen

Ed.Riegelmann@critigen.com



Stefan Orehovec

Spatial Technologist

Critigen

Stefan.Orehovec@critigen.com

謝謝 KEA LEBONA
 TAPADH LEIBH 고맙습니다
 БАЯРЛАЛАА MISAOTRA ANAO
 DZIĘKUJĘ CI NGIYABONGA TEŞEKKÜR EDERIM
 OBRIGADO شڪرا
 DANKON TANK TAPADH LEAT SALAMAT
 DANKIE TERIMA KASIH
 KÖSZÖNÖM
 СПАСИБО
 PAKMET CIZGE
 GO RAIBH MAITH AGAT
 БЛАГОДАРЯ GRACIAS
 TI БЛАГОДАРАМ
 TAK DANKE MAHADSANID
 RAHMAT MERCI
 HATUR NUHUN
 GRAZZI PAKKA PÉR
 PAXMAT CAĞA
 CẢM ƠN BẠN
 WAZVIITA
 FALEMINDERIT
 ありがとうございました
 SIPAS JI WERE TERIMA KASIH
 UA TSAUG RAU KOJ
 ТИ БЛАГОДАРАМ
 СИПОС
 MULTUMESC
 FAAFETAI
 ESKERRIK ASKO
 HVALA ХВАЛА ВАМ
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