City of Los Angeles

LA DWP — Los Angeles Department of Water & Power

LADWP
Intelligent Water Utility Implementation

WIN — WATER INFORMATION NETWORK

IoT
Analytics
AI
Notification
Reporting

Integration

Business Case

benefits strategic costs project activity benefits risks justification viability operational timescales risks costs programme
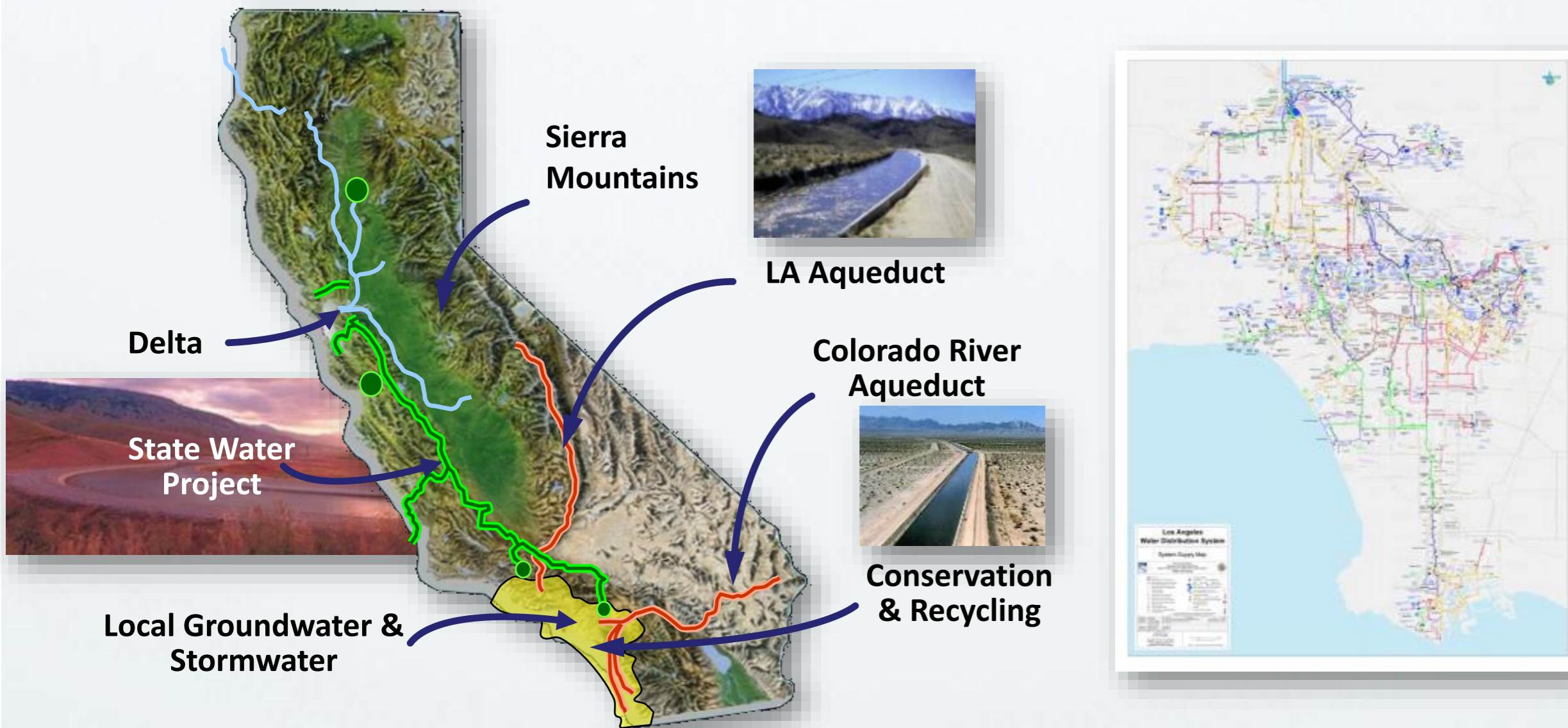
WIN Team:
Nicole Smith – Project management
Vincent Rivera – Operation Technology
Eric Kim – Project management
Charles Freeman – Information Technology

Water System Management:
Richard Harasick
Heidi Hiraoka
Dave Christensen
Louis Rubalcaba

A BRIEF INTRO OF THE WATER SYSTEM & GOALS

Sierra Mountains

LA Aqueduct

Delta

Colorado River Aqueduct

State Water Project

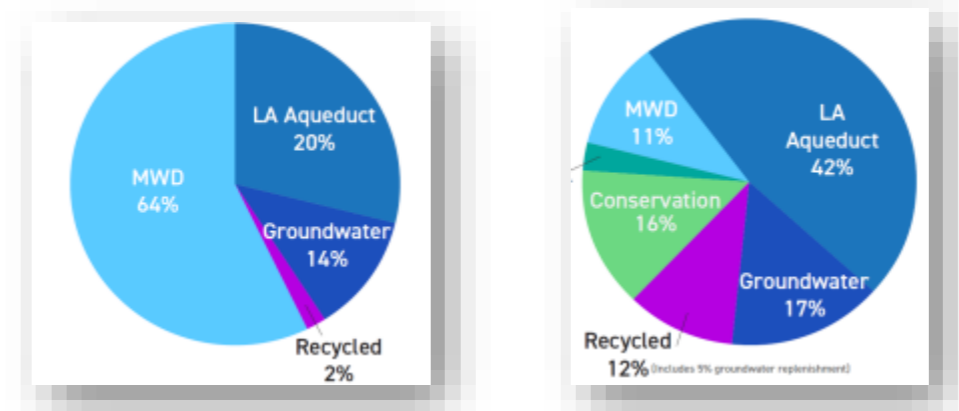Local Groundwater & Stormwater

Conservation & Recycling

- ❖ 4 million customers served & 465 square mile service area
- ❖ 2,806 large valves
- ❖ 60,714 fire hydrants & 681,000 service connections
- ❖ 7,337 miles of distribution mains (distance from Los Angeles to Sydney)
- ❖ 95 pump stations
- ❖ 29 treatment stations
- ❖ 328 regulation stations
- ❖ 118 reservoirs & tanks
- ❖ 70 water wells

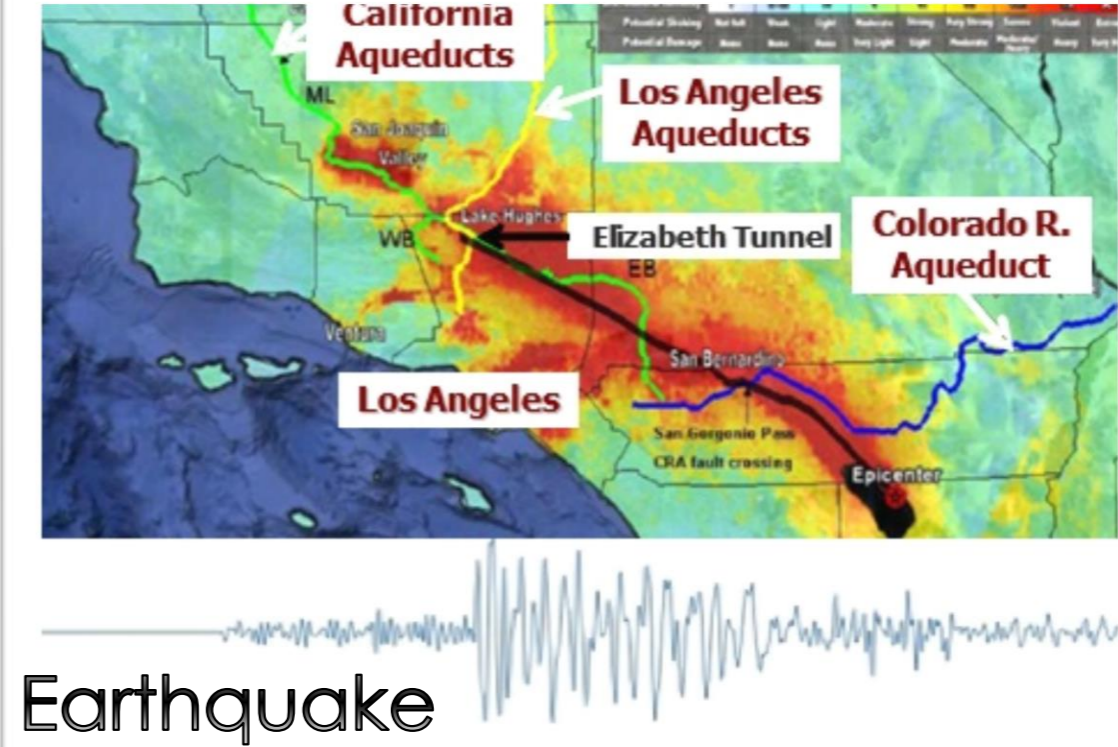## OPERATIONAL STRATEGIC GOALS

- • MANAGE INFRASTRUCTURE OPTIMALLY
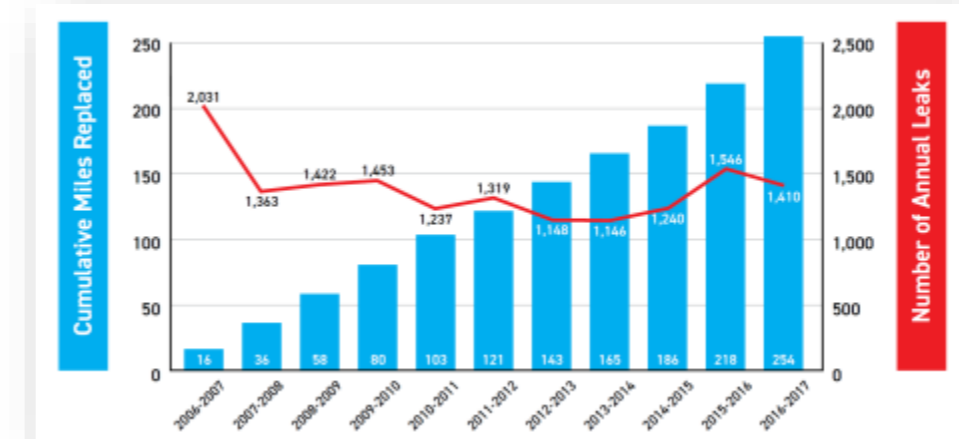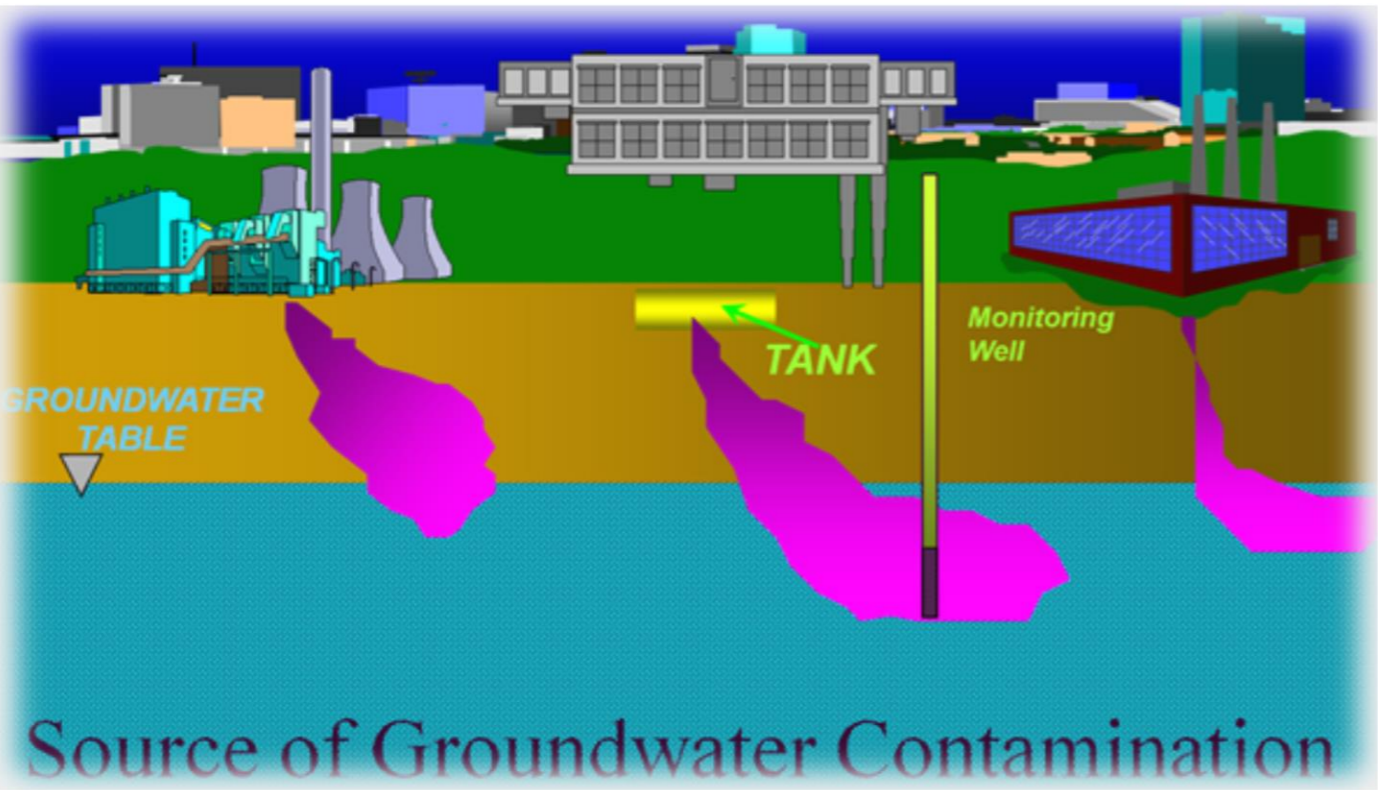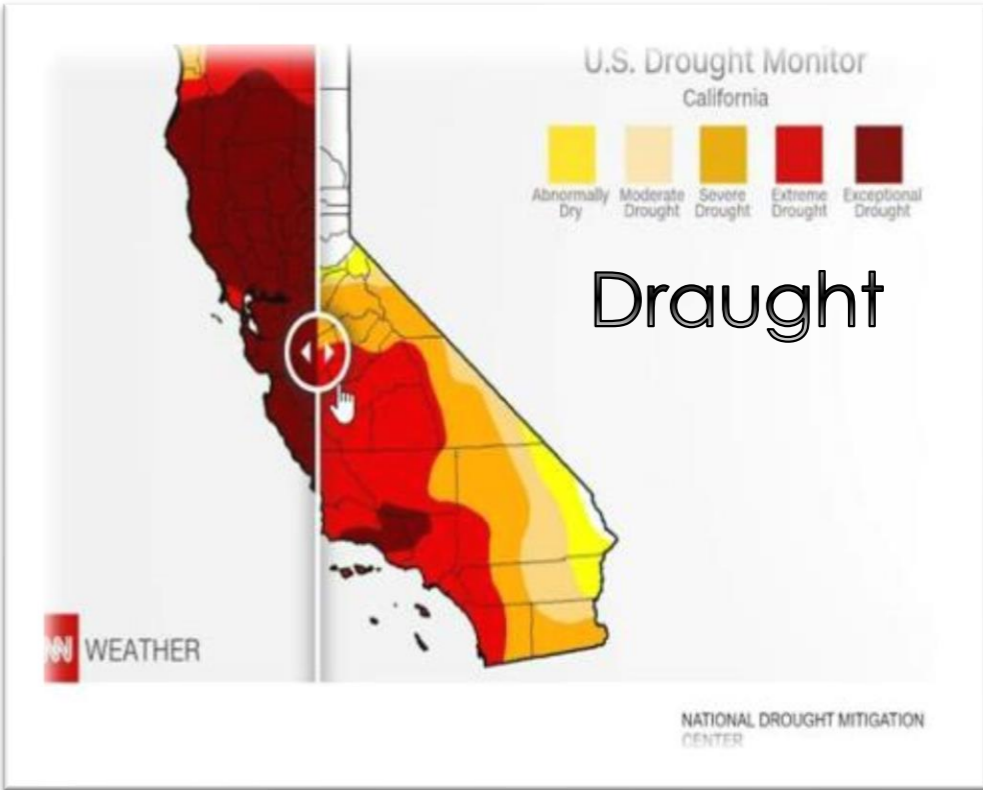

- • DIVERSIFY WATER SUPPLY PORTFOLIO

- • PROVIDE SAFE, HIGH QUALITY WATER

LA'S DRINKING WATER QUALITY REPORT

Water Quality

Sufficient Fire Flow

California Aqueducts
Los Angeles Aqueducts
Elizabeth Tunnel EB
Colorado R. Aqueduct
Los Angeles
San Bernardino
Epicenter

Earthquake

Infrastructure

DUTIES & CHALLENGES

U.S. Drought Monitor
California
Abnormally Dry   Moderate Drought   Severe Drought   Extreme Drought   Exceptional Drought

Draught

WEATHER

NATIONAL DROUGHT MITIGATION CENTER

GROUNDWATER TABLE
TANK
Monitoring Well

Source of Groundwater Contamination

Sustainability

Dam Safety

Intelligent Water Utility
Solution to Water System Challenges – The Data Component

HOW?

Quick & Informed Decision Making

Real Time Analytics

Real Time Notification

Live Data Collection & Sharing

Sensor Data Automation Data System Integration
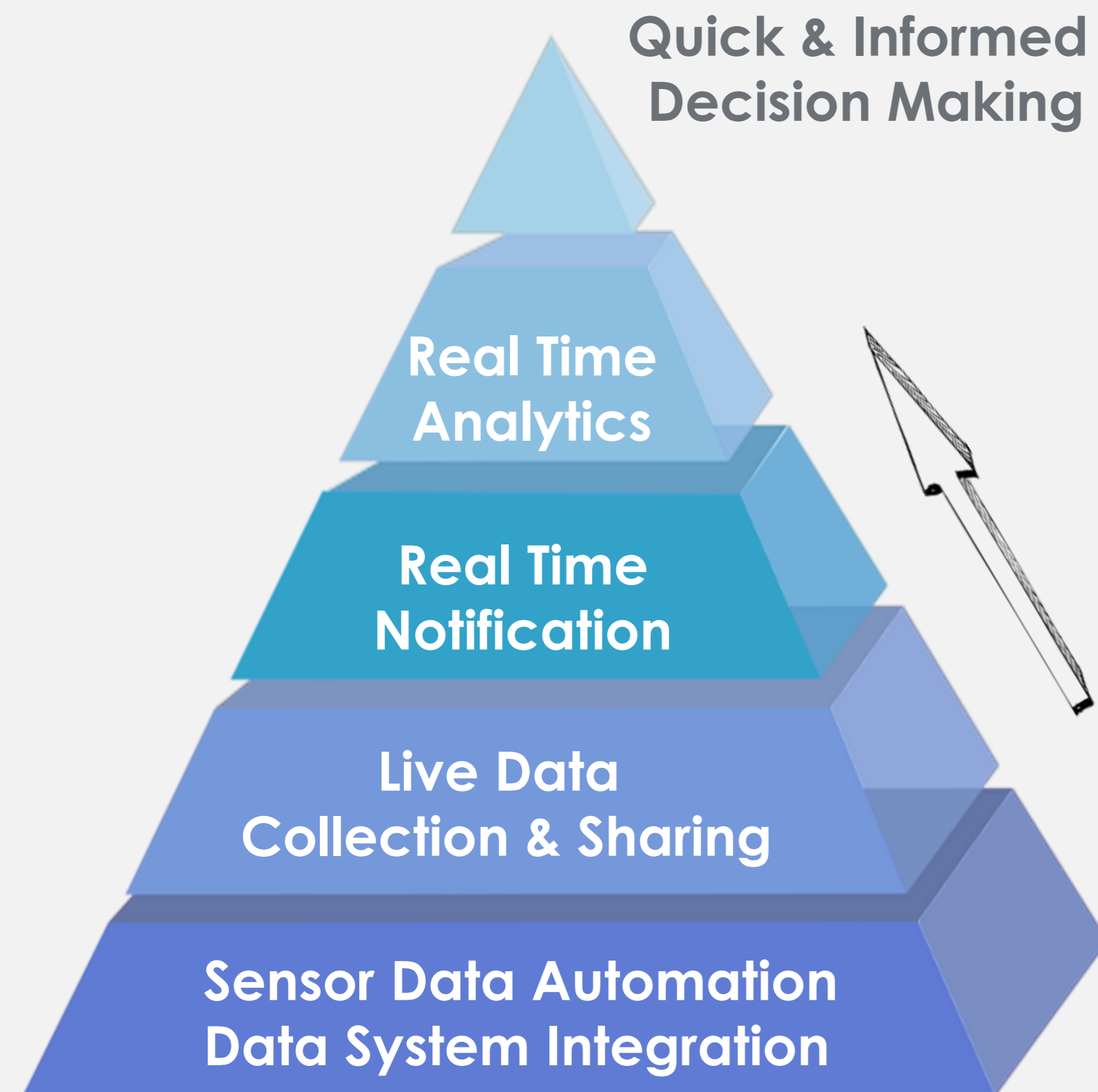
Identified LADWP Water System Technology Goals

➢ Automated online monitoring and data collection

➢ Innovative methods to capture knowledge

➢ Improved communication with customers on leads and conservation

➢ Analytical decision support tools for data driven decision-making

WIN
WATER INFORMATION NETWORK

Water Information Network (WIN) Project is an important component to achieve the goals.

WATER SYSTEM CURRENT DATA SYSTEMS

- ❖ Best of Breed
- ❖ Both New Tech & Legacy
- ❖ Both In-House & Vendor Customizations
- ❖ Both On-Premise & Cloud
- ❖ Not Fully Integrated

Time Series Data

Proficy Historian

OSIsoft

SCADA
- Control Functions
- Critical
- Operational
- High Security

PI Historian
- Non Control Functions
- Critical & Non Critical
- Operational
- Low Security

Relational Data

IBM maximo

ORACLE

LIMS

CMMS
- Work Order Tracking
- Asset Management
- High Security

Customer Billing System

Spatial Data

esri

Spatial Data
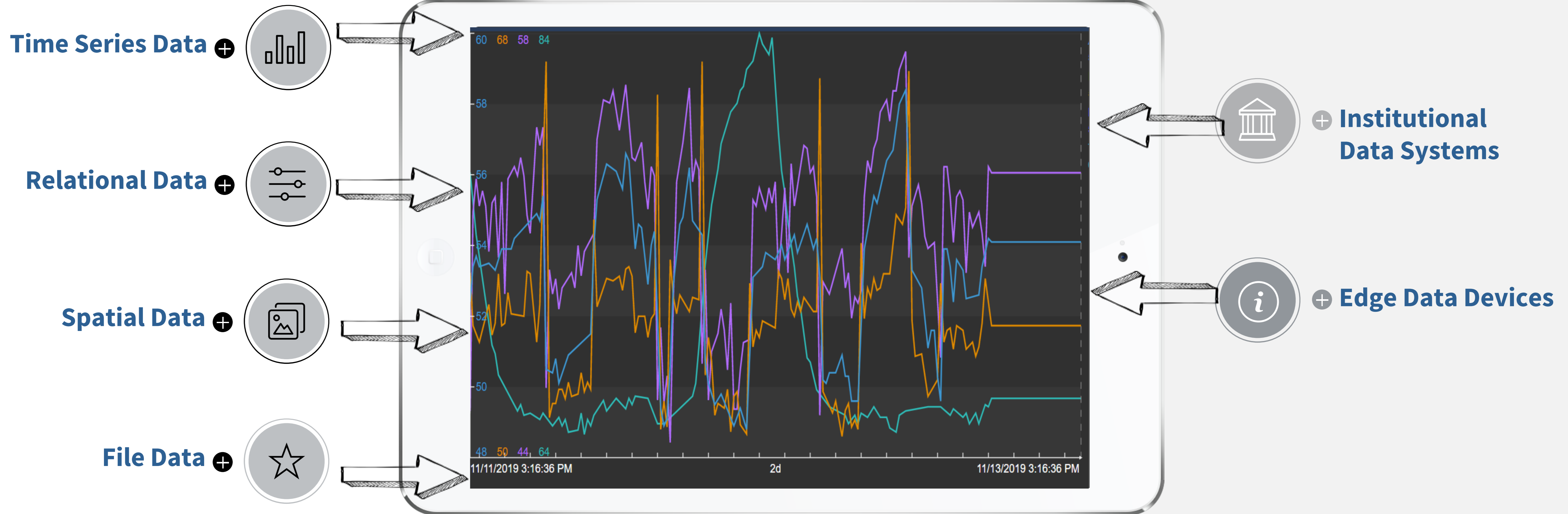- Maps & Locations

File Data

Microsoft

IBM Content Navigator
ICN IBM

In-House Development

Any Type of Applications

Reports, Logs, Paper Charts

Data Type

Time Series Data ⊕

Relational Data ⊕

Spatial Data ⊕

File Data ⊕

Data Collecting System

⊕ **Institutional Data Systems**

⊕ **Edge Data Devices**

Scenario: Equipment Repair

1. SCADA or Historians detect sensor reading anomalies
2. Analytics are performed to determine equipment needs repairing
3. SCADA or Historian then trigger Maximo work order
4. Crew is dispatched to inspect and repair the damage, and is able to access records and drawings of the equipment as well as to navigate and log findings using GIS Apps
5. Work is done and closed out in real time, all field and office data is logged onto system

Water Information Network (WIN) Project

GOALS – Centralize All Water System Data, Remove Data Silos, Collect New Edge Data, and Integrate Systems

| Deliverables (June 2020)	As of Now
USER REQUIREMENT STUDY & GROWN PLAN	**120+ Use Cases identified, started growth estimates**
INTELLIGENT WATER UTILITY ROAD MAP	**Initiated research and internal investigations**
ESTABLISH A PI SYSTEM	**Built PI system with 30,000 data points**
5 + PILOTS FOR FIVE DIVISIONS	**Initiated 3 Pilot Use Cases**

Discoveries

- **Internal and external talents, many technology projects are already on-going**
- **Multiple stakeholders and complex work flows**
- **Needs both creativity & technology governance**
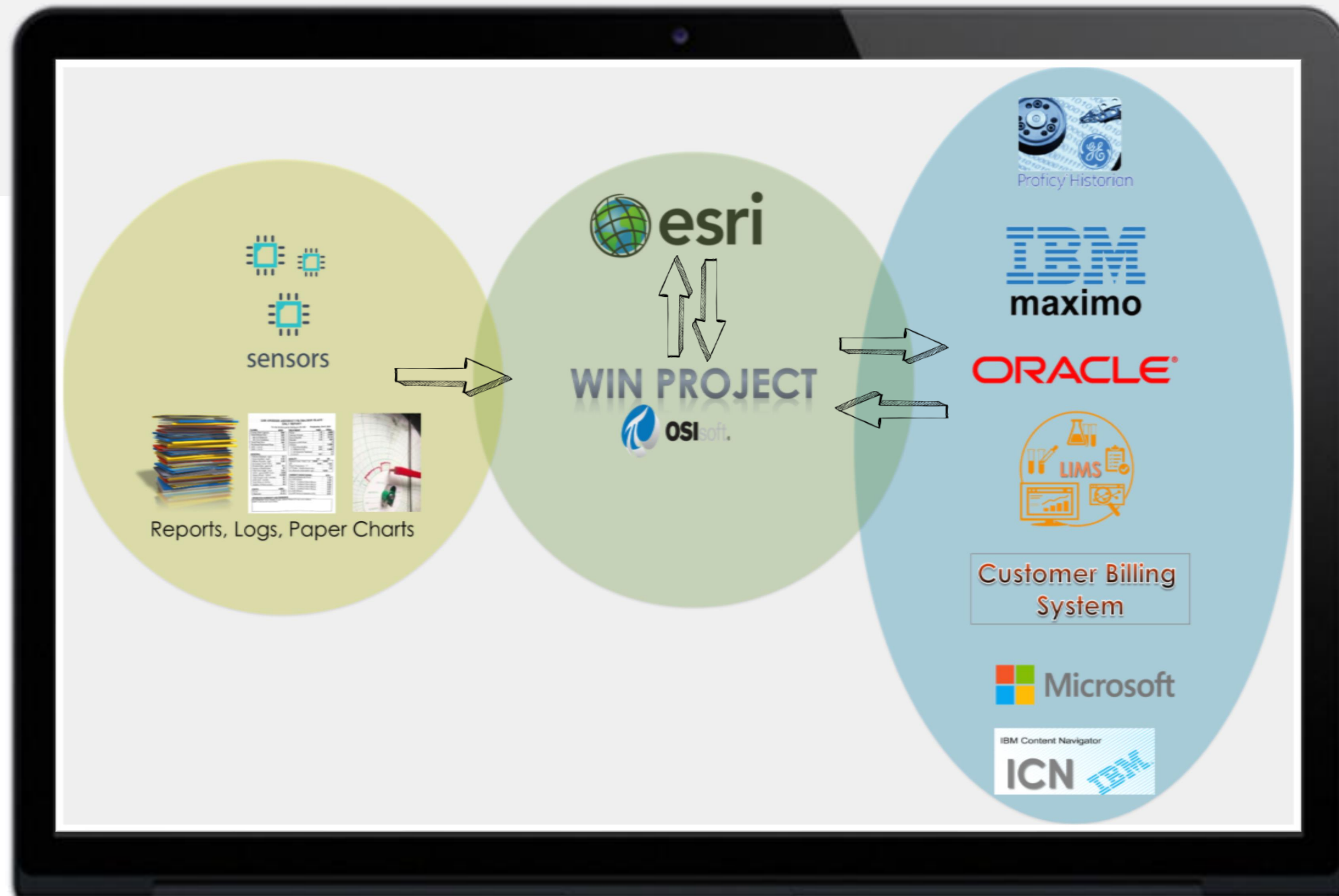- **System integration is still in its infancy**

PI System Infrastructure
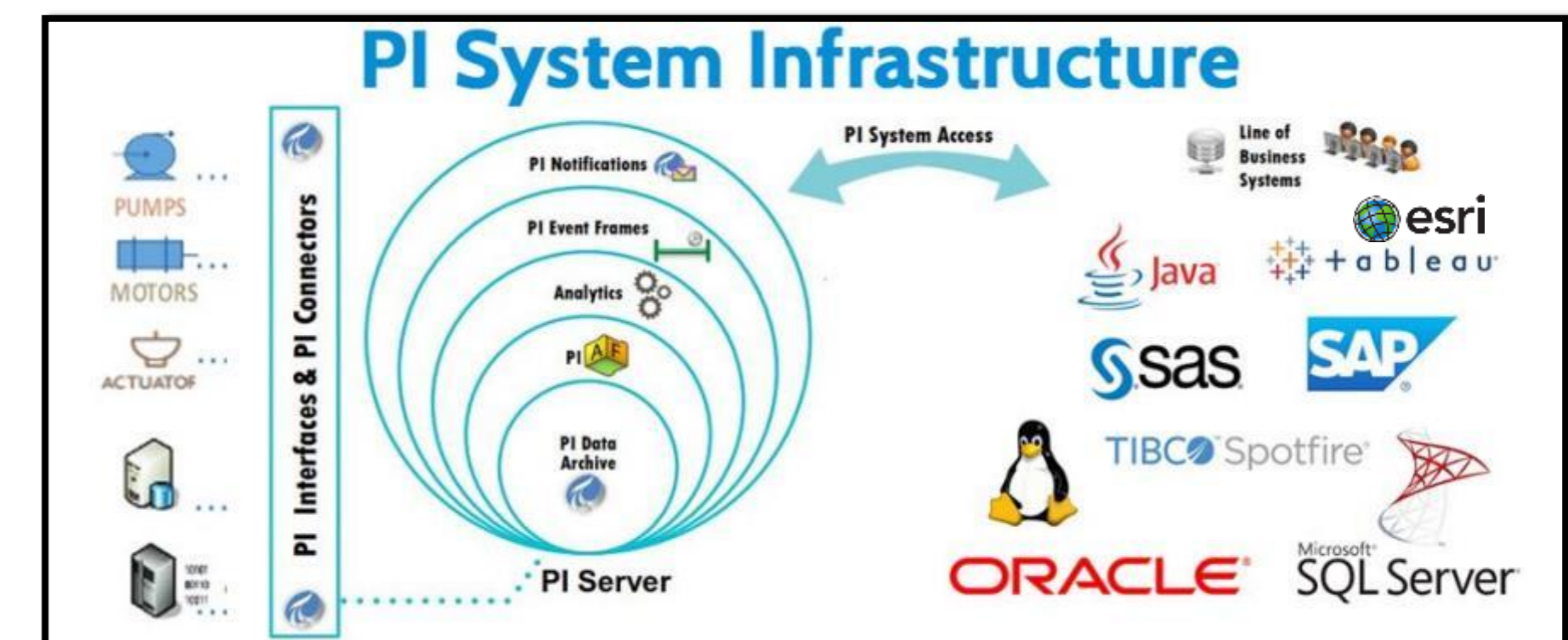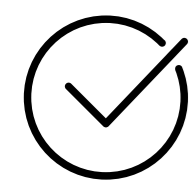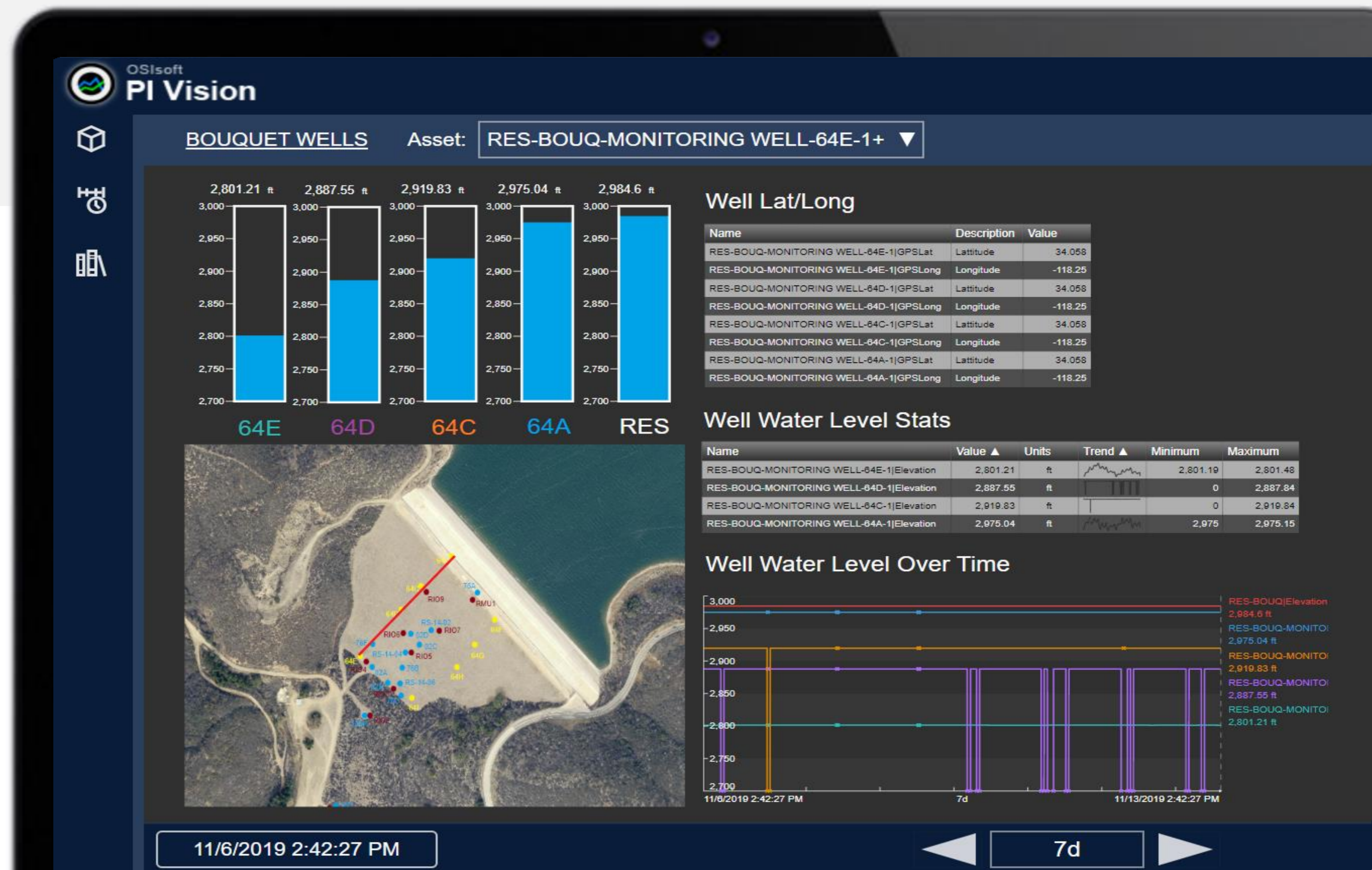
WIN Project Demo
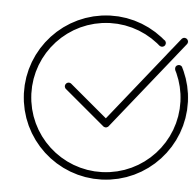
WHY WHAT WHO HOW

✓ **Connect Data Systems**

WIN Project Demo

WHY WHAT WHO HOW

✓ **Connect Data Systems**

✓ **Pilots**

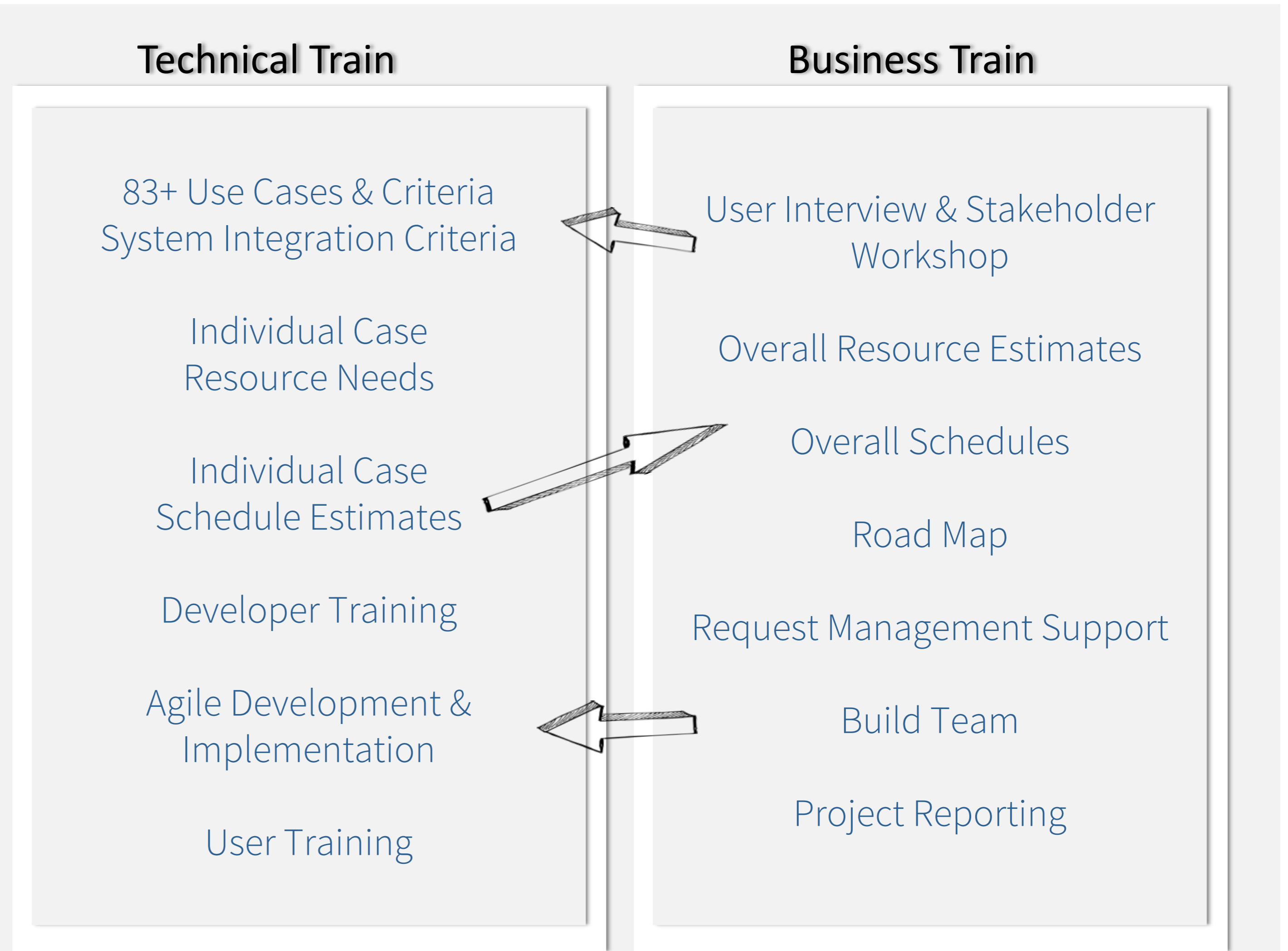# WIN Project Demo

WHY WHAT WHO HOW

✓ **Connect Data Systems**

✓ **Pilots**

✓ **OT to IT Process** ▶

IMPLEMENTATION

The Two-Train Approach

Technical Train

83+ Use Cases & Criteria
System Integration Criteria

Individual Case
Resource Needs

Individual Case
Schedule Estimates

Developer Training

Agile Development &
Implementation

User Training

Business Train

User Interview & Stakeholder
Workshop

Overall Resource Estimates

Overall Schedules

Road Map

Request Management Support

Build Team

Project Reporting

THE WAY FORWARD

Complete WIN Phase I
- **Create Full-Scale Implementation Plan**

Automate Edge Data Collection

Develop AI & Advanced Decision Making Processes

Start

Intelligent Utility

Start Next Phase
- **Establish Technology Governance**
- **Resource & Team Building**
- **Implement All Use Cases**

Integrate All Data Systems & Omni-Channel Data Sharing