Preparing your Agency for a Digital Twin

Jon Liberzon

Emerging Technologies Process Engineering Lead, Black & Veatch
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A Digital Twin is a:

- ...**dynamic** digital representation
- ......of **real-world** entities and their behaviors
- ....using **models** with static and dynamic data
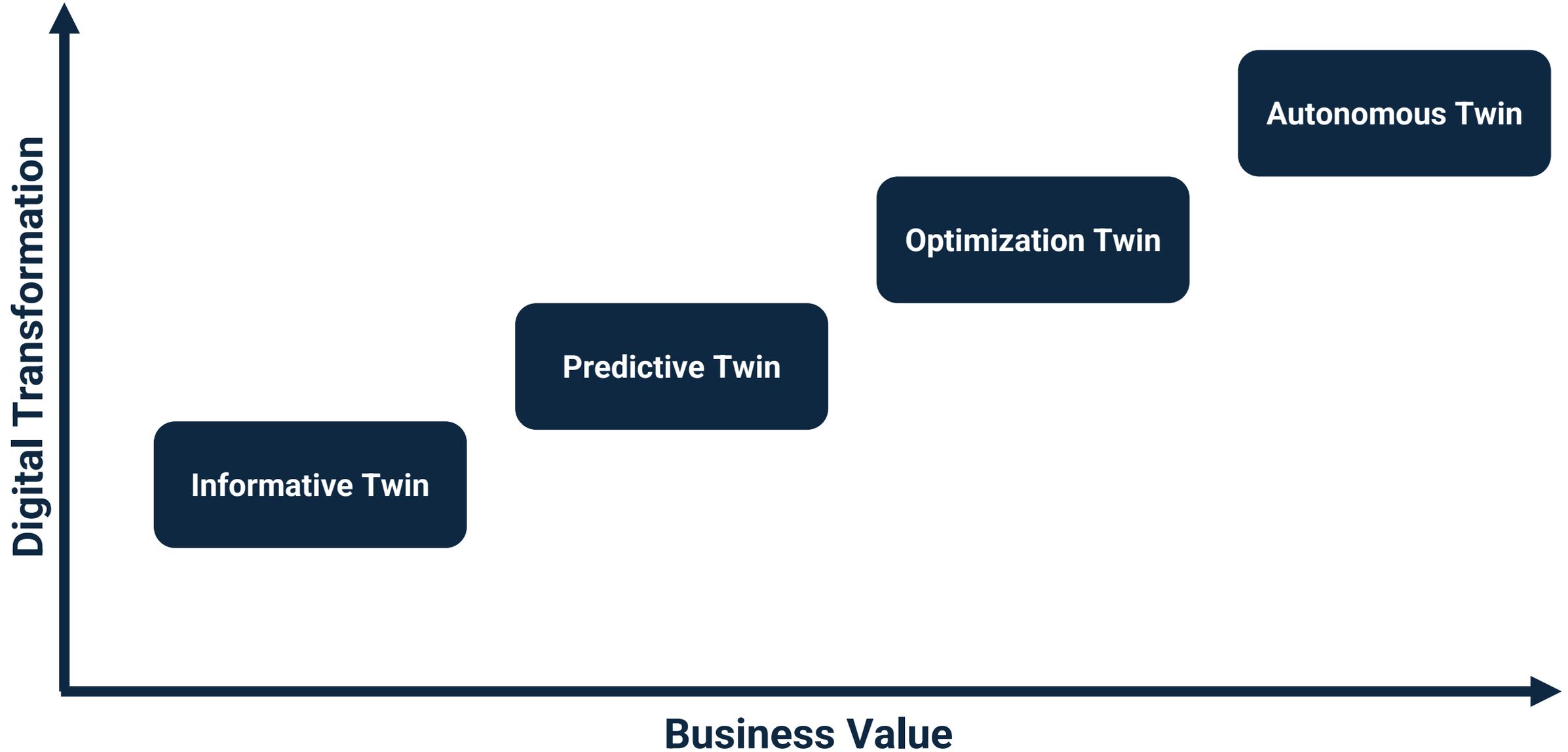- ....that enable **insights and decisions**

(Can be *spatial* or *operational*)

Industry aligned definition led by SWAN Digital Twin Working Group and "American Water Works Association Digital Twins Committee

SWAN

SMART WATER NETWORKS FORUM

Digital Twin Maturity

Digital Transformation (y-axis)

Business Value (x-axis)

- Informative Twin
- Predictive Twin
- Optimization Twin
- Autonomous Twin

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Why Now for SoCal Utilities

- Extreme wet-weather & aging assets increase O&M risk

- Regulatory pressures, potable reuse adoption & public expectations require predictable compliance

- Data and tools are ready.

- Workforce challenges drive towards reducing night shifts, supporting digital-native staff

- Digital twins align people, process, and data to improve decisions & outcomes

Before you Twin:
Preparing Your Utility

1. Develop a Digital Strategy

2. Digitize *Everything*

3. Establish a **Unified Data Platform**

4. Automate Data Handling

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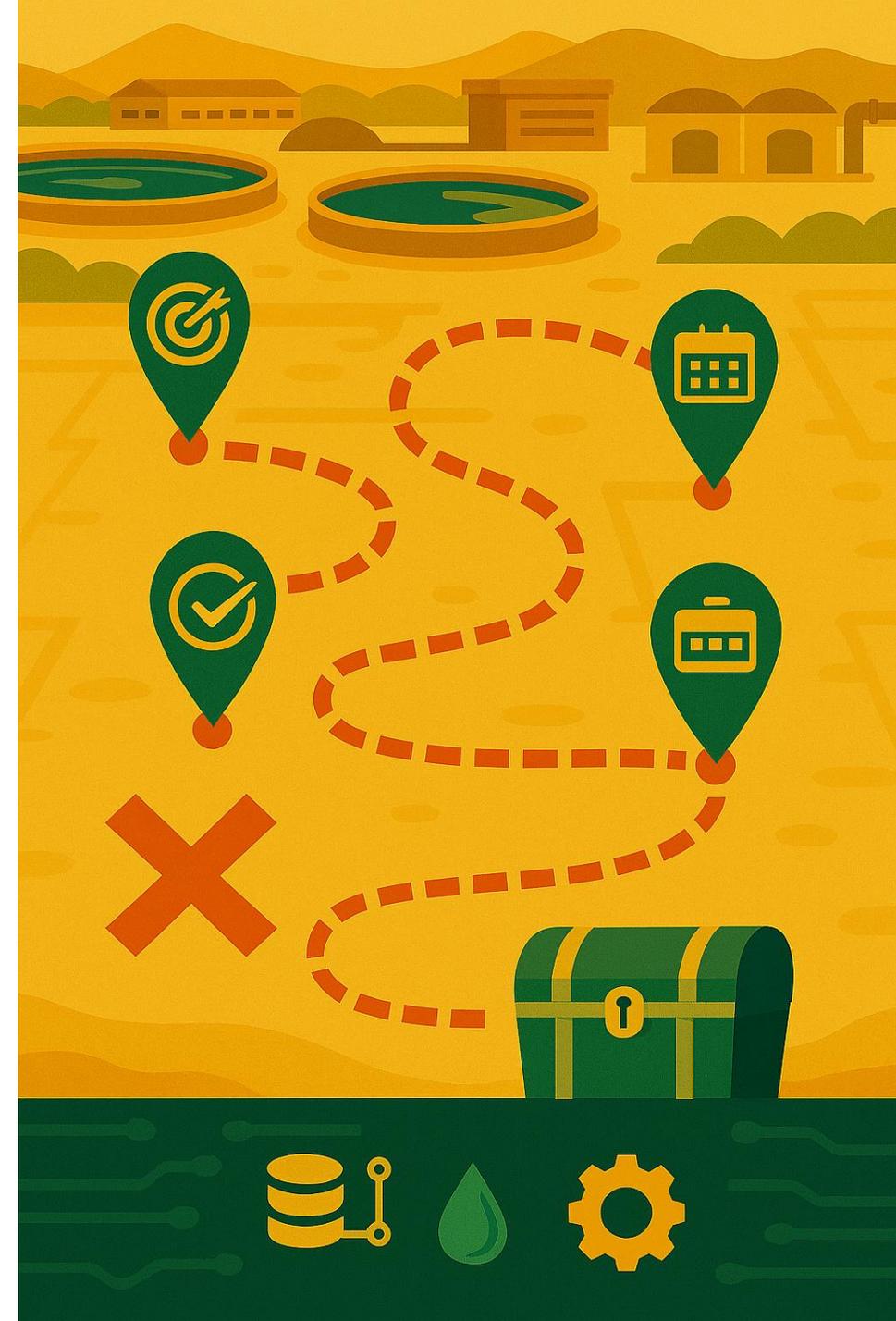**Before you Twin:**
    Preparing Your Utility

1. **Develop a Digital Strategy**
   1. Define Goals
   2. Define & Prioritize Projects
   3. Build Schedule & Budget
   4. Prepare Staff (train & explain)

2. Digitize *Everything*
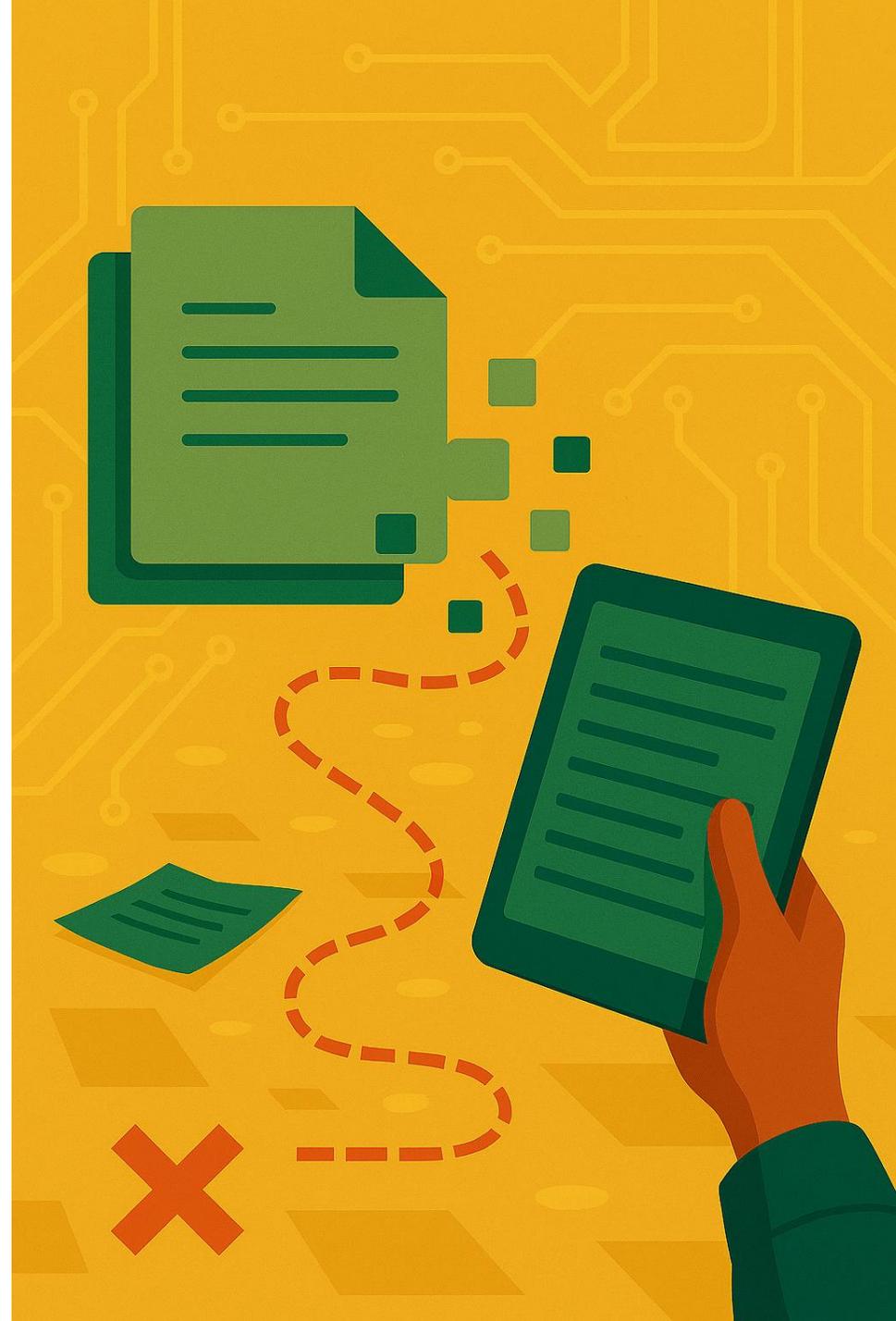3. Establish a ***Unified Data Platform*** (Break Silos)
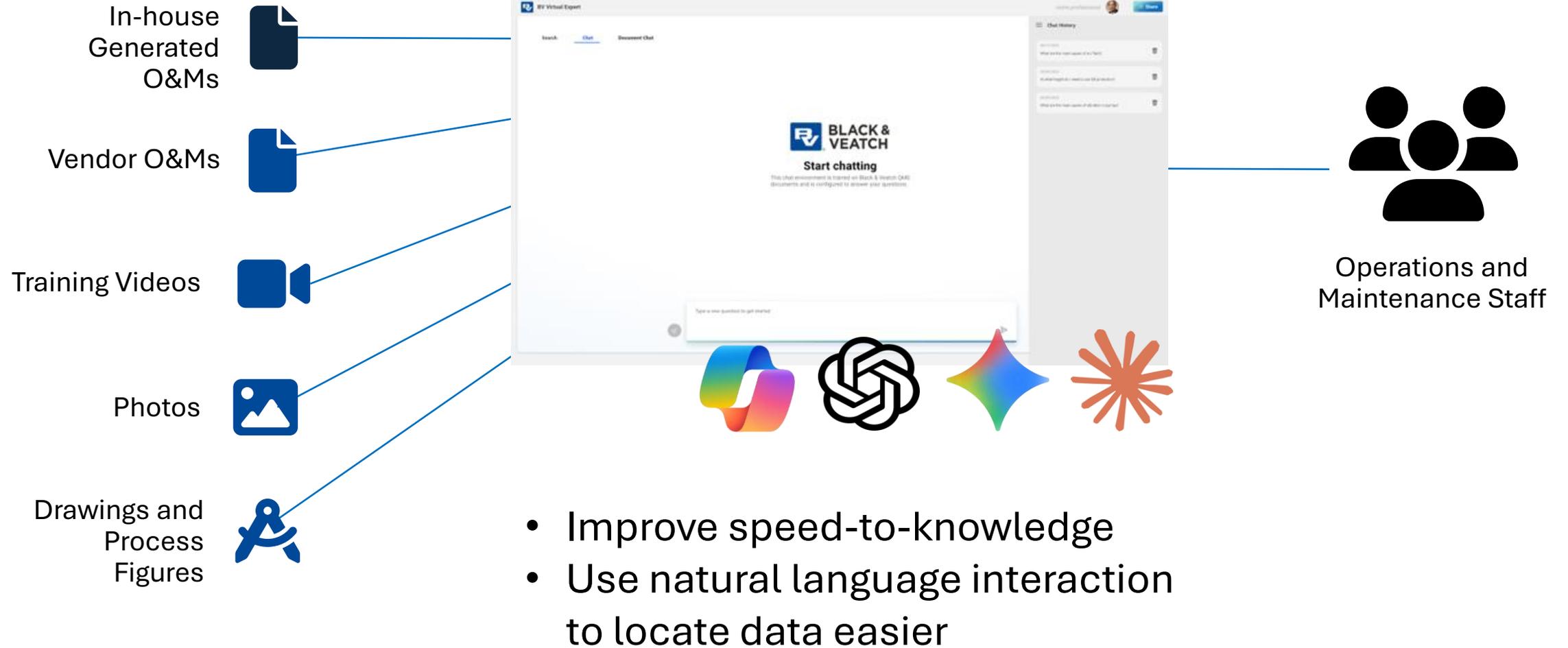4. Automate Data Handling

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Before you Twin:
Preparing Your Utility

1. Develop a Digital Strategy

2. **Digitize *Everything***
   - Logs, Forms & Checklists
   - Plant O&M & Equipment Manuals
   - SOPs, Procedures
   - Emergency Response Plans
   - Commissioning plans

3. Establish a *Unified Data Platform* (Break Silos)

4. Automate Data Handling

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Digitization Enables Chatbot O&M Assistants

In-house Generated O&Ms

Vendor O&Ms

Training Videos

Photos

Drawings and Process Figures

Operations and Maintenance Staff

- Improve speed-to-knowledge
- Use natural language interaction to locate data easier

Before you Twin:
### Preparing Your Utility

1. Develop a Digital Strategy
2. Digitize *Everything*
3. Establish a ***Unified Data Platform***

   - Independent, Single Source of Truth
   - Unify SCADA/historian/lab/CMMS/GIS/finance data
   - Copy & clean data inputs
   - Warehouse, Lake, Lakehouse, all good!

WIMS
MAXIMO   SCADA
PI

→

UNIFIED DATA PLATFORM

→

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Before you Twin:
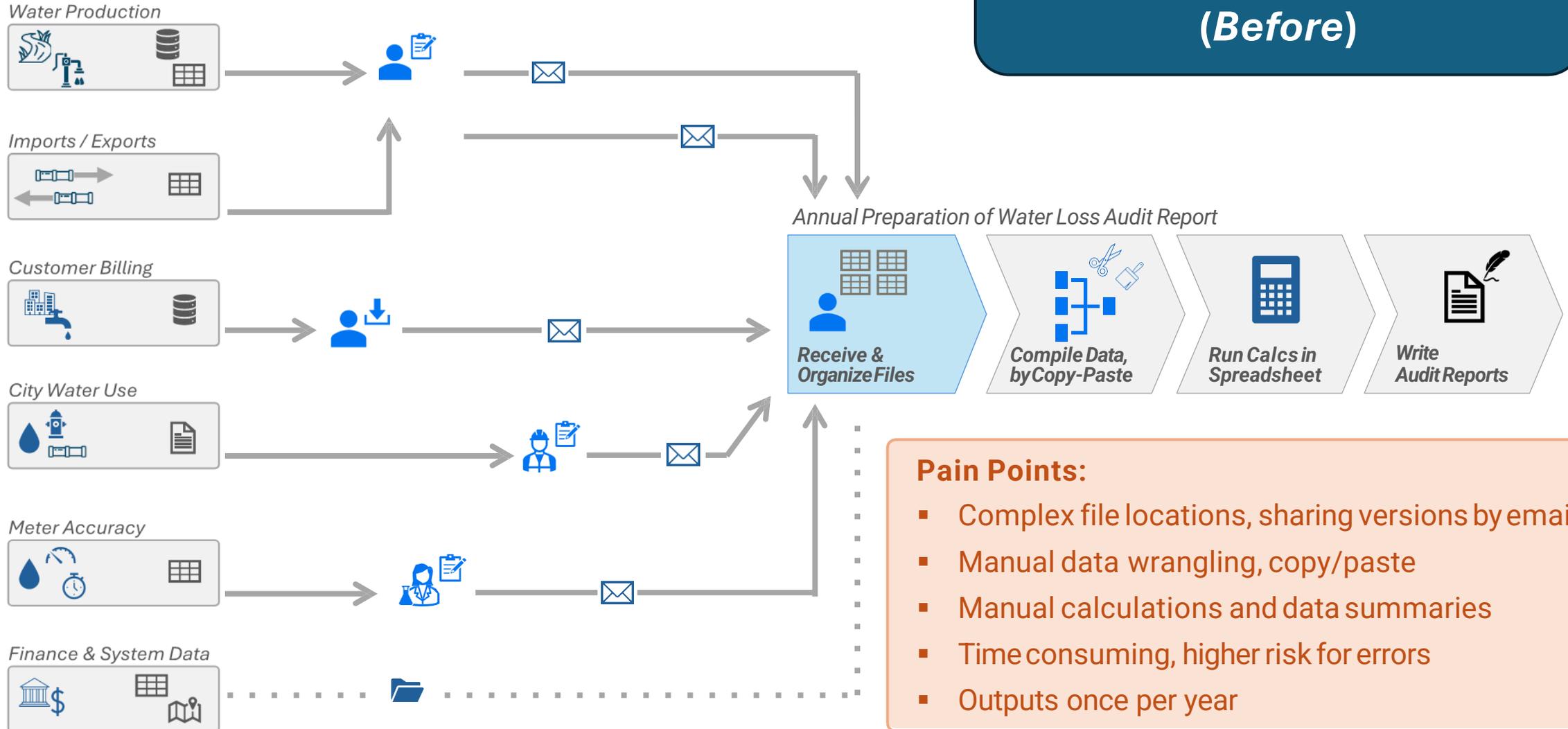## Preparing Your Utility

1. Develop a Digital Strategy
2. Digitize *Everything*
3. Establish a *Unified Data Platform*

4. Automate Data Handling
   a. Pipelines for QA/QC, cleansing, and scheduled refresh
   b. Define storage, compute & security needs
   c. Provide access thoughtfully
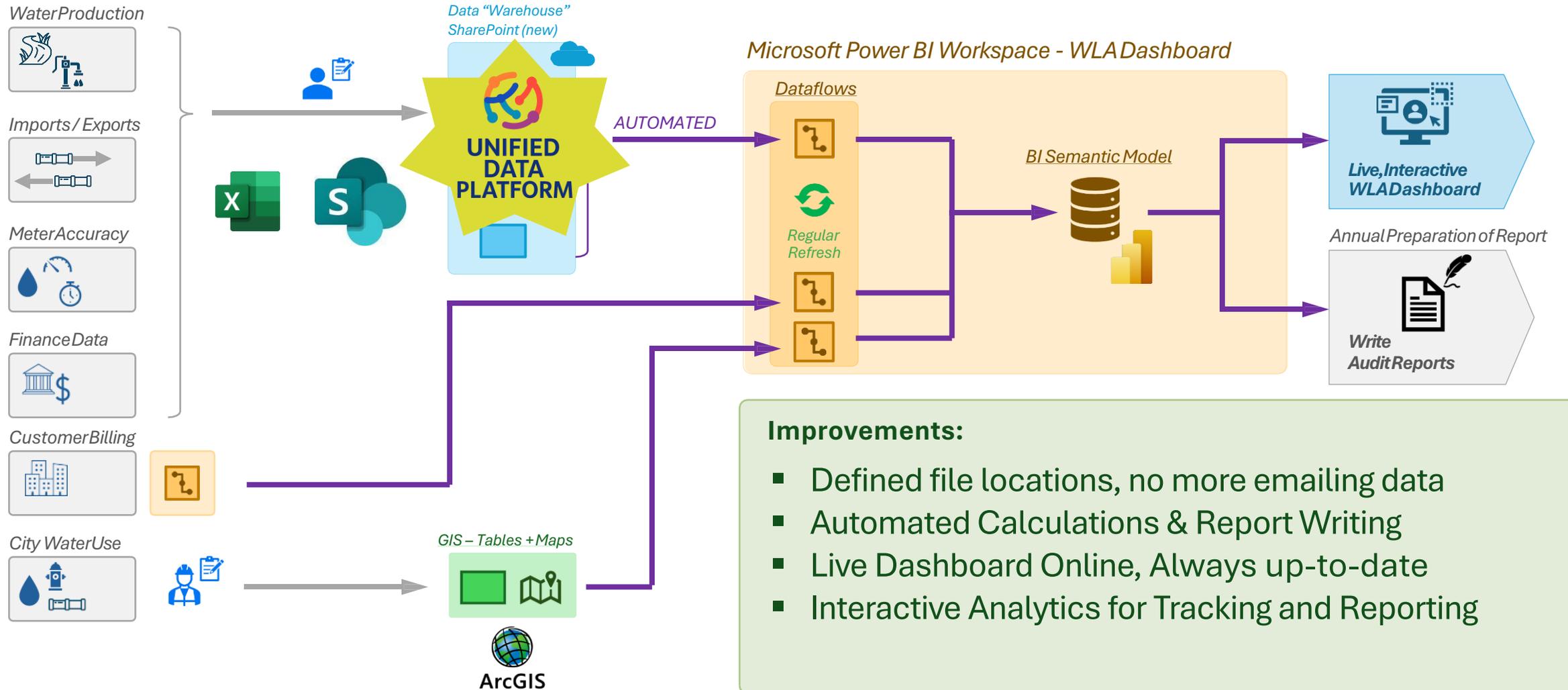   d. Avoid human bottlenecks in workflow

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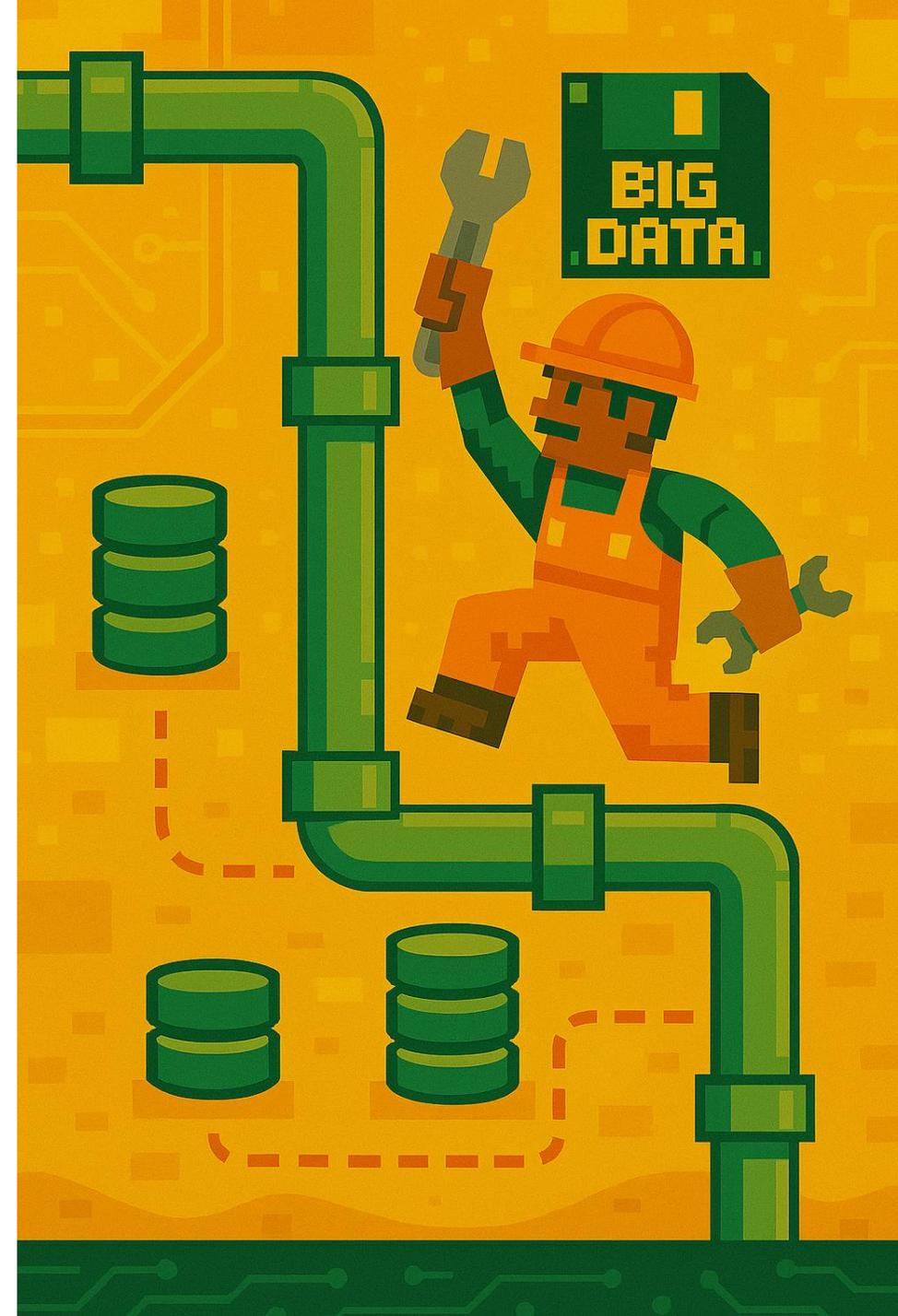
Designing Your Data Pipeline

Manual Data Collection and Annual Water Loss Reporting

Example: Sugar Land, TX Annual Water Loss Audit (*Before*)

Water Production

Imports / Exports

Customer Billing

City Water Use

Meter Accuracy

Finance & System Data

Annual Preparation of Water Loss Audit Report

Receive & Organize Files

Compile Data, by Copy-Paste

Run Calcs in Spreadsheet

Write Audit Reports

Pain Points:

- Complex file locations, sharing versions by email
- Manual data wrangling, copy/paste
- Manual calculations and data summaries
- Time consuming, higher risk for errors
- Outputs once per year

Sugar Land, TX Annual Water Loss Audit (*After*)

Integrated Data Management, Auto Refresh, Monthly Tracking

Improvements:

- Defined file locations, no more emailing data
- Automated Calculations & Report Writing
- Live Dashboard Online, Always up-to-date
- Interactive Analytics for Tracking and Reporting

Digital Transformation is Not a Standard Capital Project
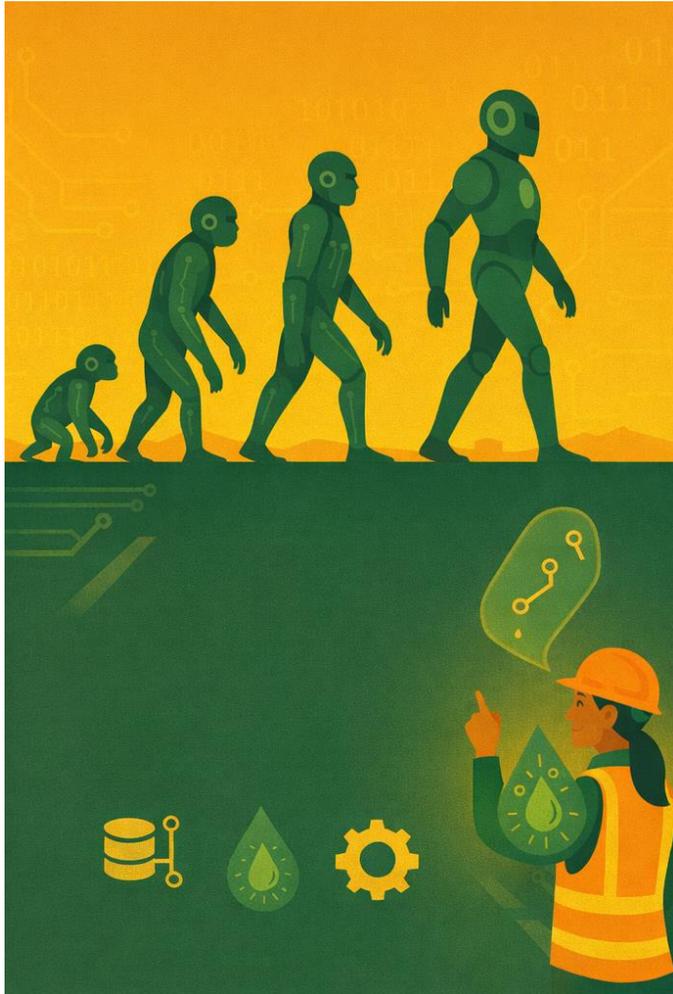
- **Adaptive Process:** Need flexible deadlines & smaller, more iterative work packages. Continuous improvement is better than big, discrete initiatives.

- **Staying Up to Date is Critical:** Digital tools require consistent updates & calibrations.

- **The Product is Not Software, *it's better decisions*.** Focus on preparing staff, building trust & adoption, and evolving SOPs. Define use cases before picking products.

- **You can start small:** Select one process (i.e. aeration, dewatering), define success metrics, and develop a proof-of-concept pilot.

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Thank You

Contact:

Jon Liberzon

LiberzonJ@bv.com

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