A digital approach to managing and automating high frequency/high volume environmental data

Presented by: Caleb Worthman

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The business of sustainability

ERM

Today’s discussion

- Overview of “high frequency/high volume” data
- Sources of high volume data
- Challenges in managing high frequency/high volume data
- Digital solutions
- System automation scenarios
- Value
- Future work

Overview, data sources, and challenges

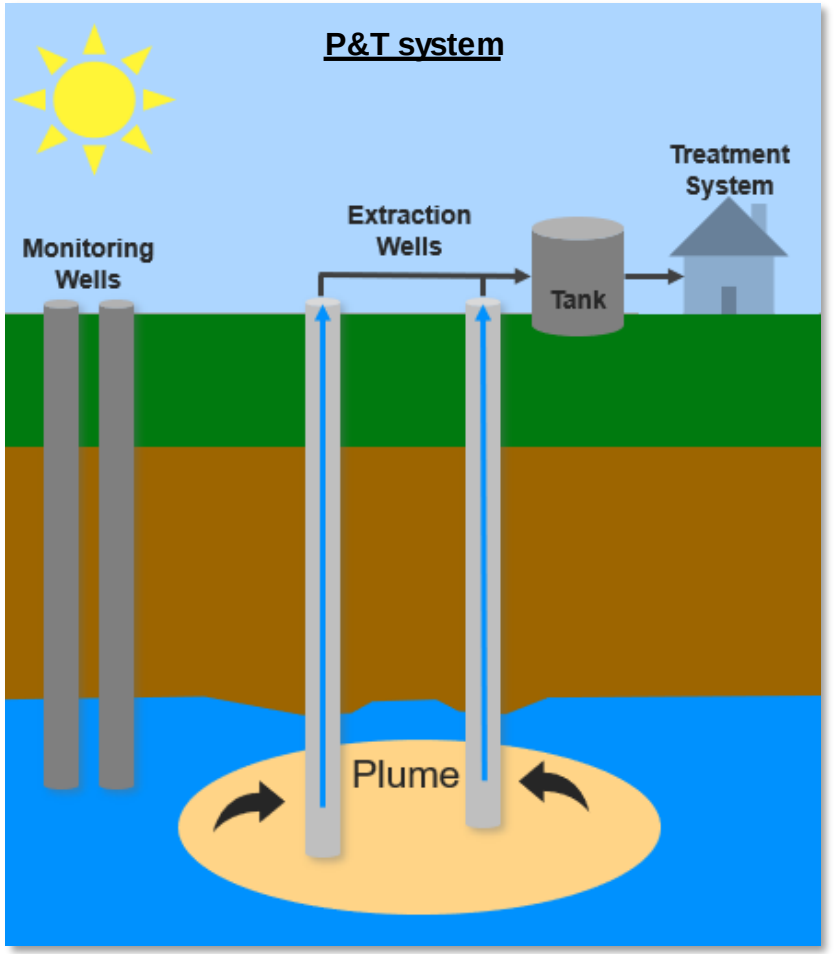
Overview of “high frequency/high volume” data

- Data collected with a frequency typically in minute/hourly/daily intervals over the course of months or years, creating millions+ records of data over time
- Each data row typically consist of just a timestamp along with a numeric datapoint, recorded from a specific part of a system on a client site
  - Majority of data is coming from environmental remediation systems and groundwater modeling projects, needing to be closely monitored
- Increase in interest to digitally manage these types of data, from field data collection to visualization

Sources of high volume data

- Pump & Treat (P&T) – Groundwater remediation systems
- Soil-Vapor Extraction (SVE) – VOC soil treatment
- Dual-Phase Extraction (DPE) – Combination of P&T and SVE
- Thermal Remediation – Heating systems used for in-situ remediation
- Pressure Transducers – Groundwater modeling
- Air Quality – Monitoring of AQ at client sites

Transducer

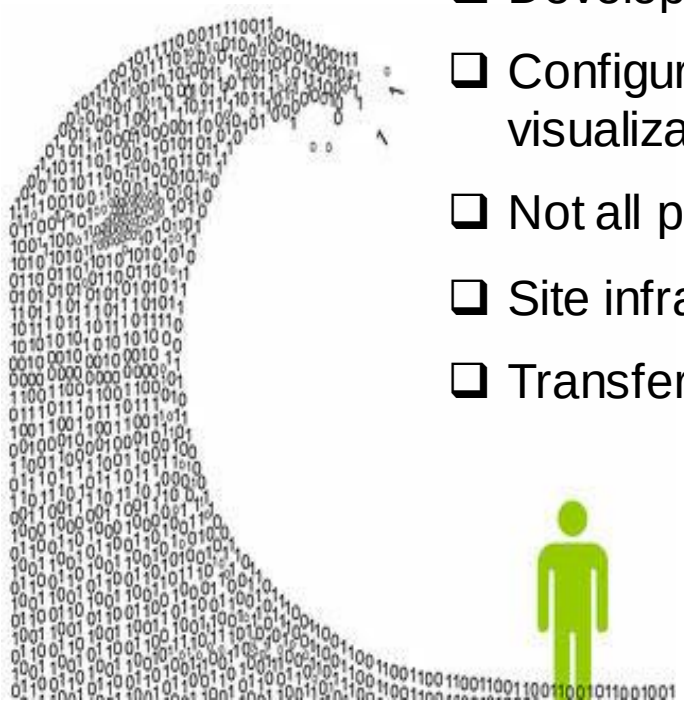


Sources of high volume data

Additional sources - supplemental data

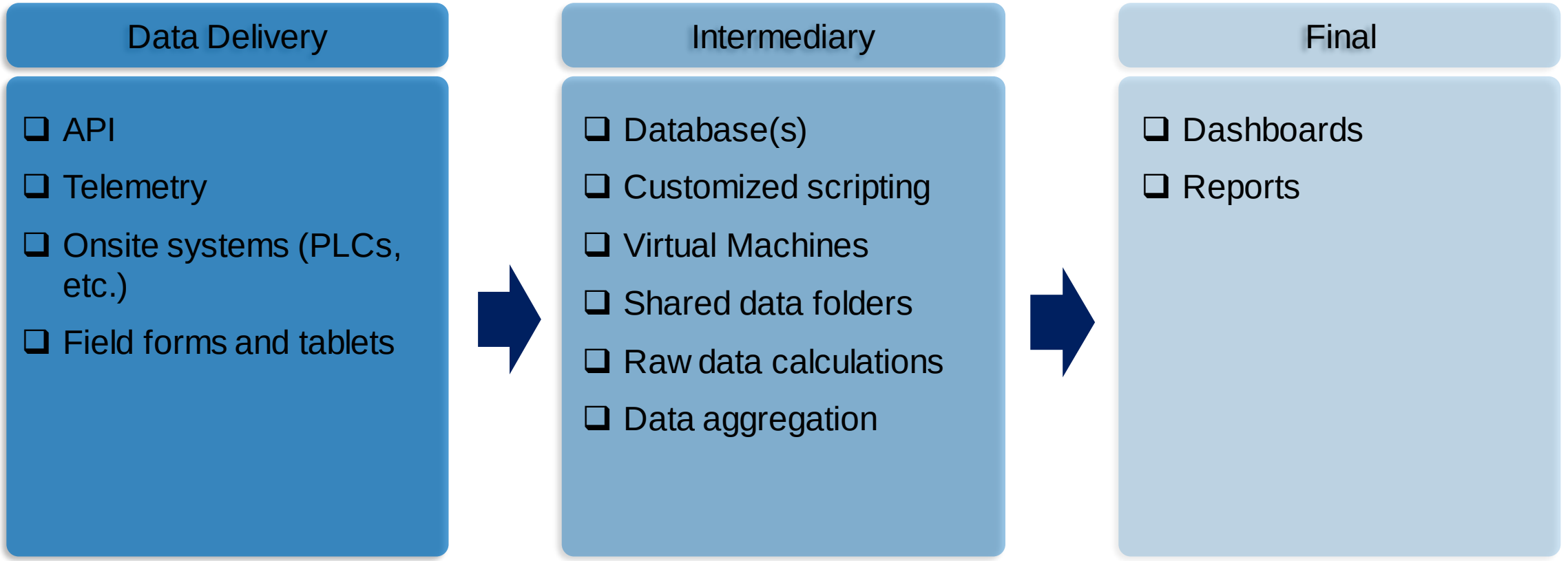
- ❑ Hydrological (USGS)
- ❑ Meteorological (NOAA)

Challenges in managing high frequency/high volume data



- These projects can last for years, and managing high volume data manually or via spreadsheets for a large number of projects would be inefficient and unscalable; workflow needs to be automated
- Development of new tools to support automation
- Configuring multiple systems to automate workflows, from data collection to visualization
- Not all projects are setup the same, sometimes requiring new digital solutions
- Site infrastructure
- Transferring high volumes of data to a dashboard

Digital solutions



…and TEAMWORK! Big thanks to business partners, vendors, and colleagues for their support

Common system automation scenarios

System automation - scenario #1

1

2

Database

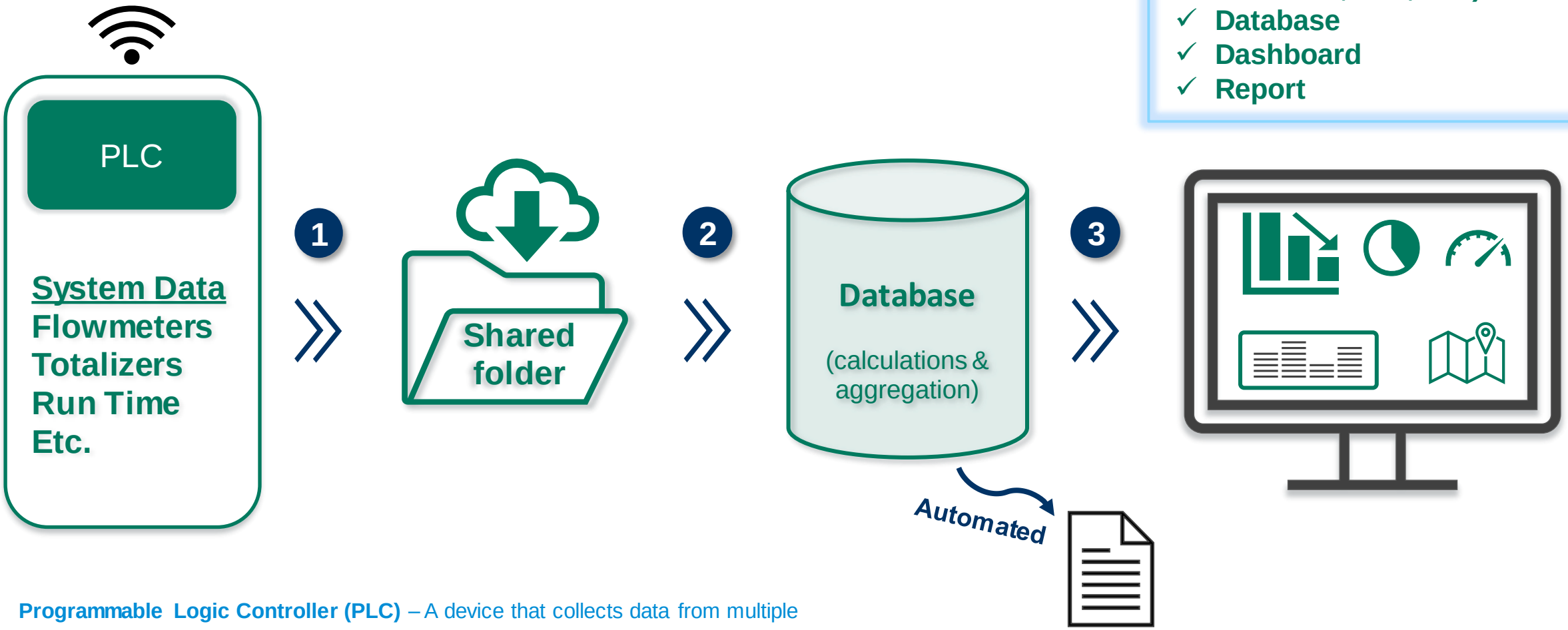
(calculations & aggregation)

Automation tools

- ✓ API
- ✓ Database
- ✓ Dashboard

System automation - scenario #2

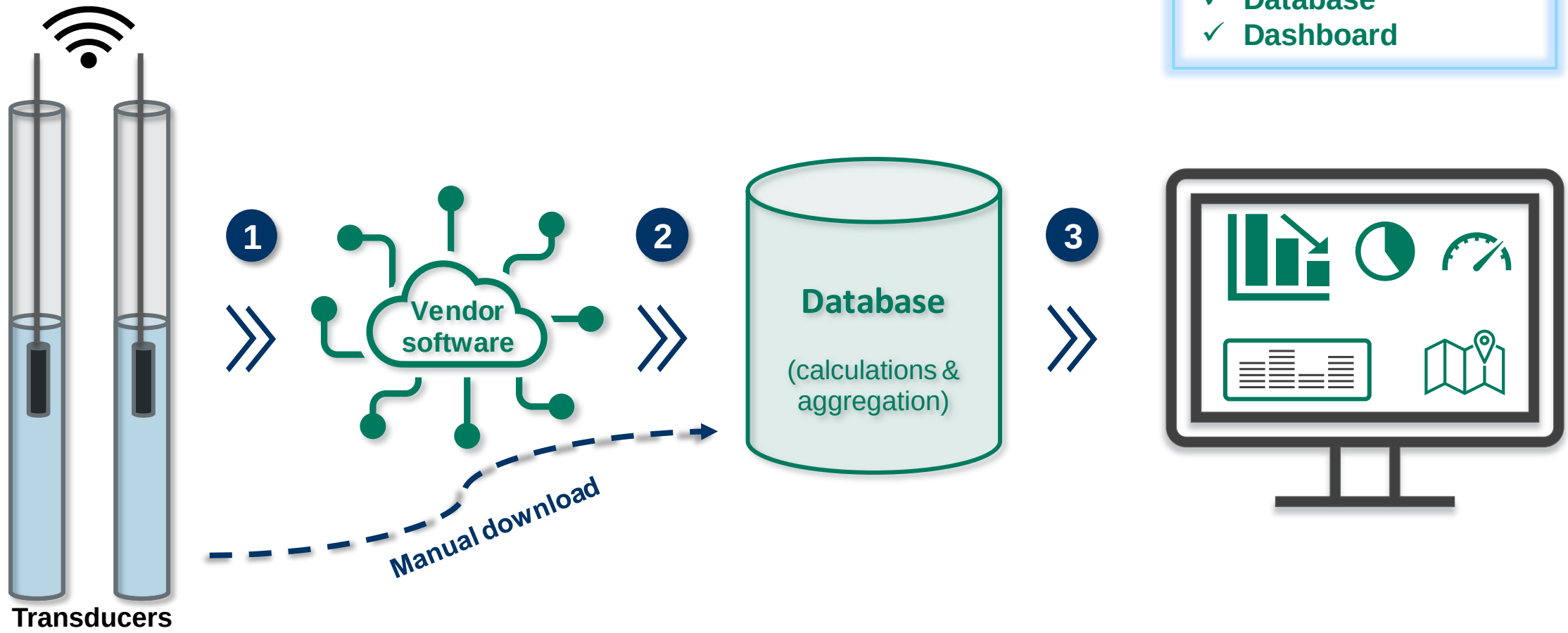
Automation tools
- ✓ PLC
- ✓ Shared folder (SharePoint, OneDrive, FTP, etc.)
- ✓ Database
- ✓ Dashboard
- ✓ Report



Programmable Logic Controller (PLC) – A device that collects data from multiple sources in the field, and can automatically send data to a shared folder

System automation - scenario #3

Automation tools
- ✓ Telemetry
- ✓ API
- ✓ Database
- ✓ Dashboard



Telemetry – Automatic measurement and wireless transmission of data from a remote source

Value & Future work

Value of automation

- Ability to scale; take on new projects and challenges
- Build and share dashboards, providing access to real-time data
- Database is a great way to easily back up, access, and secure data
- Provide high-quality data by removing manual processes
- Using data automation allows for us to allocate more time towards customized dashboards and implementing advanced technologies on projects

Future work

- Implement data automation workflows across client portfolios to maintain consistency on projects
- Predictive analytics
- Broaden scope from mainly remediation and groundwater systems to any system that generates continuous, closely monitored data streams (e.g., sustainability, smart technologies, etc.)
- Continue scaling and improving workflows
- Grow team to help support demand for automated solutions!

Thank you!

Caleb Worthman
Senior Consultant
ERM, Boston
Caleb.worthman@erm.com

Questions?