BRIDGING THE DATA FLOW GAP IN ENVIRONMENTAL COMPLIANCE AND REPORTING

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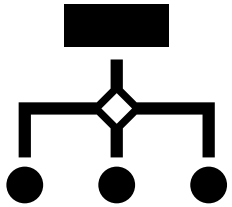
Presented By: Mona Hazur, Principal Environmental Scientist

Arcadis U.S. Inc.,

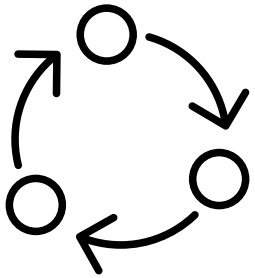
10205 Westheimer Rd., Suite 800, Houston, TX 77042

Overview

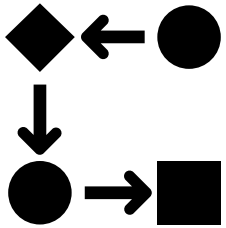
- What are the 3 tiers of data for Environmental Compliance?
  - Operations
  - Permitting
  - Reporting



- Activities and challenges of data collection and processing at each tier
  - Process changes
  - Regulatory changes
  - Personnel changes
  - Technology changes



- Solutions
  - Environmental Management Information Systems
    - Big EMIS
    - Hybrid systems
    - Custom built tools
    - Spreadsheets
  - Digital solutions and automation
  - The human element
  - Management of Change
  - Workflows and support infrastructure



Elements of Environmental Compliance

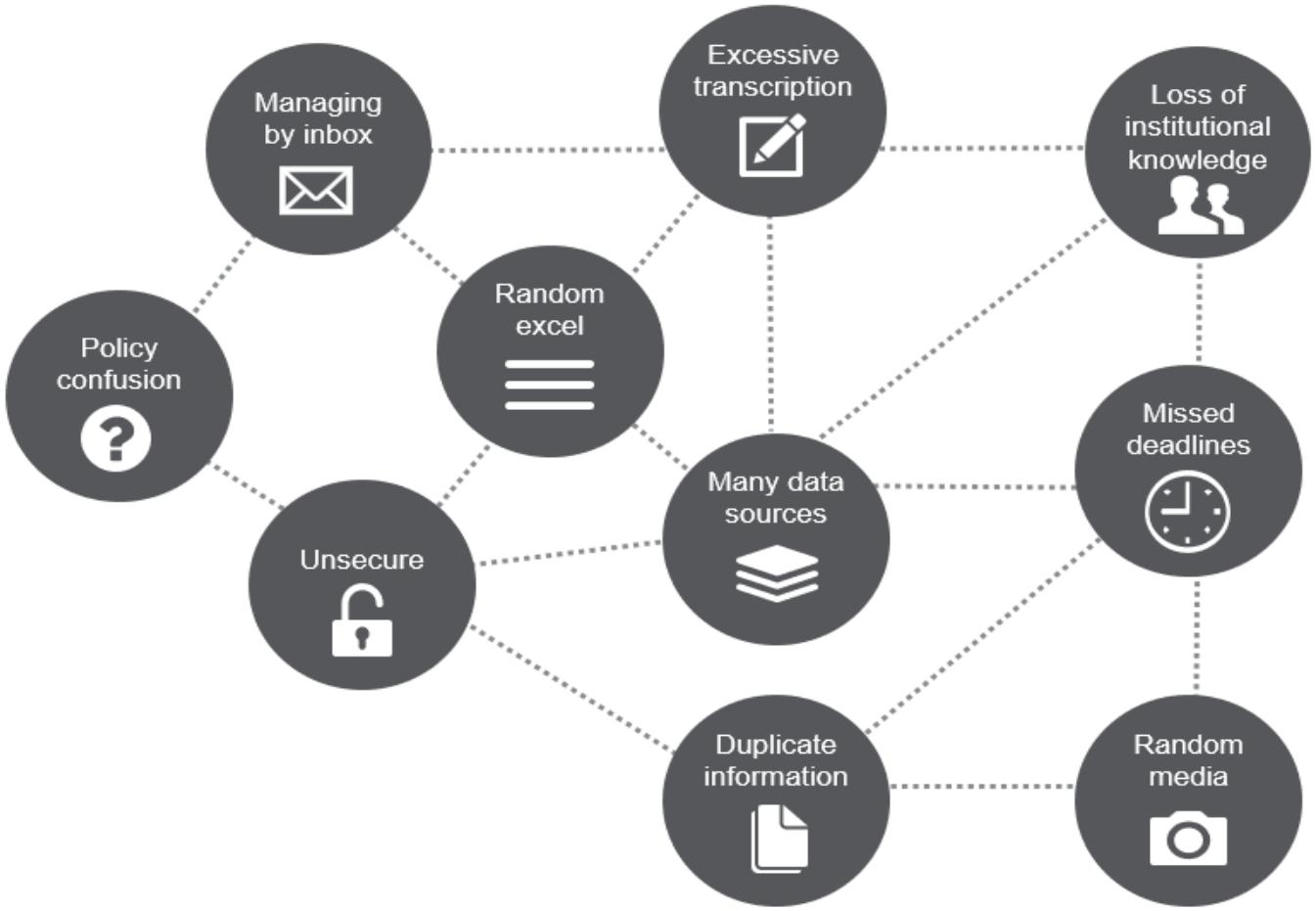
- State and Federal Regs
- Fugitive Emissions
- Mergers and Divestitures
- Process changes/New projects/New Products
- Consent Decrees
- Texas Audit Privilege Act (TAPA)
- Incident Management

Questions to Ask

- What are the regulatory drivers?
- What systems do we currently have and how well do they work?
- What solutions are available to us?
- What budgetary, staff, and time constraints do we face?
- What are the opportunity costs of keeping current set-up vs. a new one?

If it ain't broke…..

Challenges to EHS Excellence

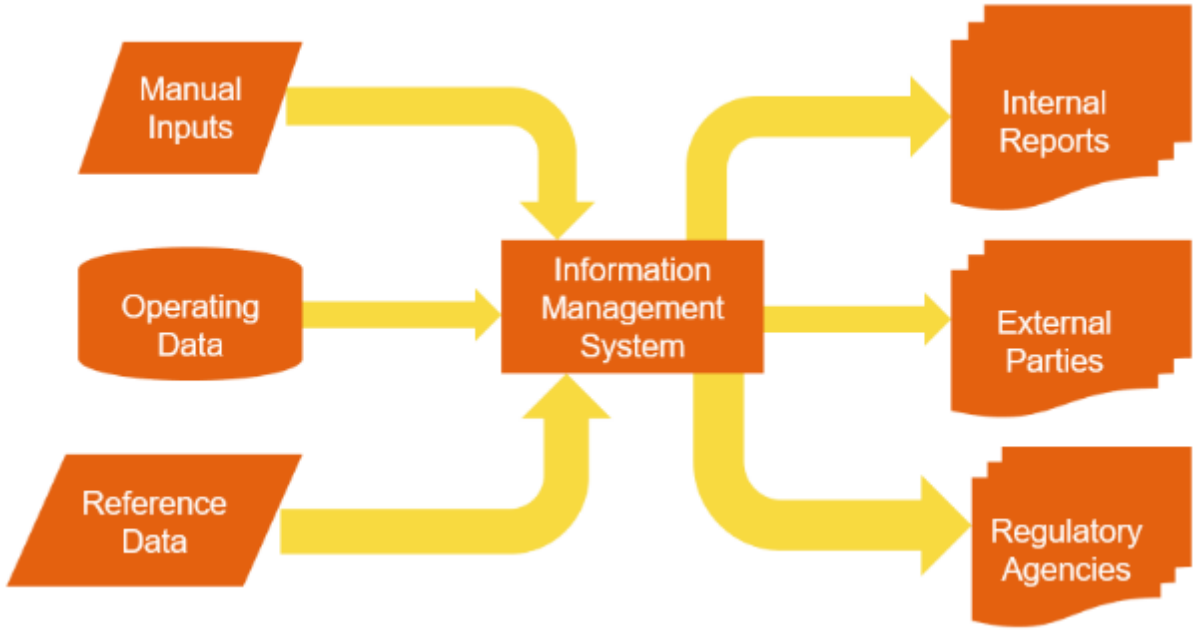


Can’t see the forest for the trees

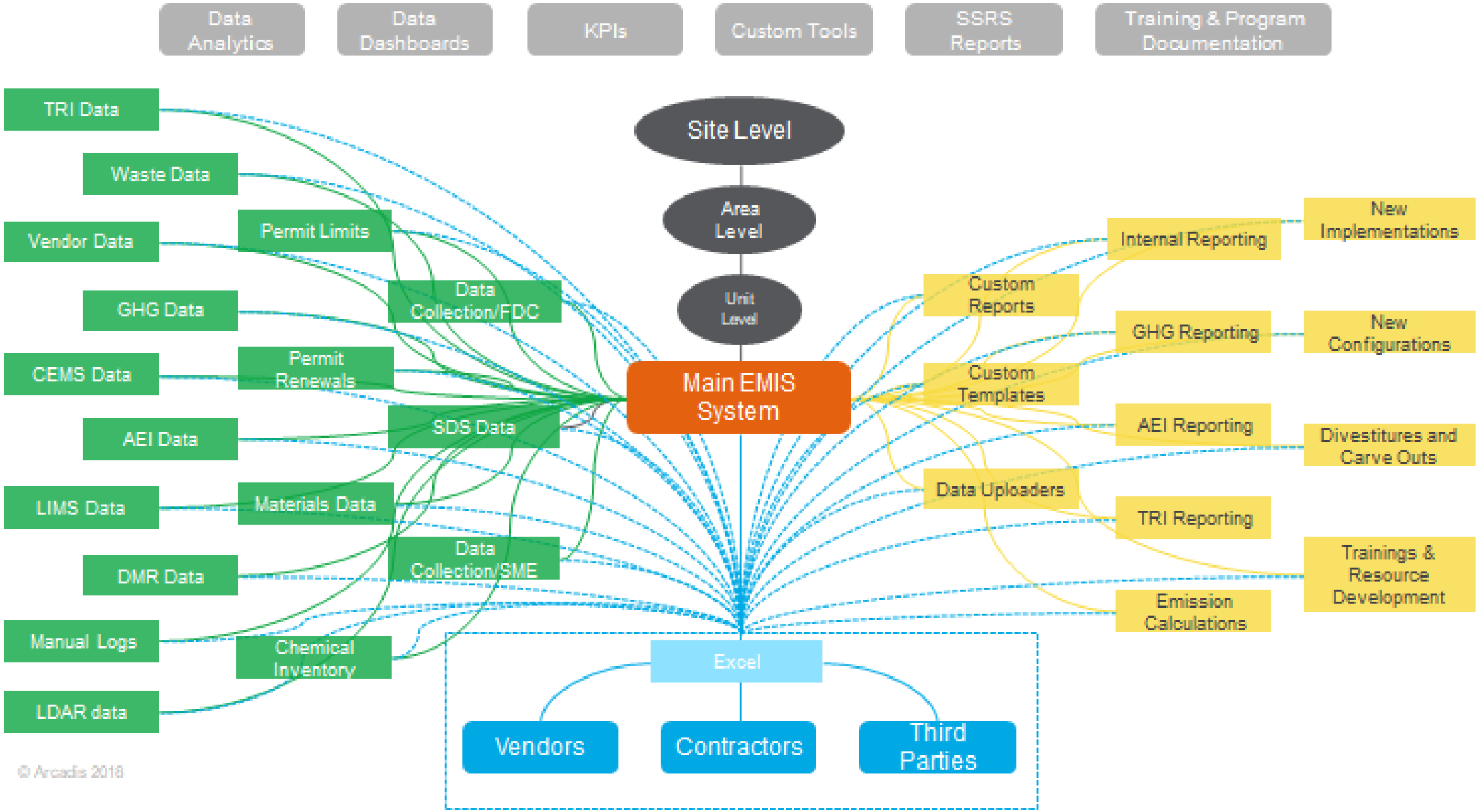
The Data Flow Challenge

Competing priorities for use of data can create gaps in understanding:

- Correlating data to operations or process areas
- Corporate and facility reporting requirements
- Permitting and regulatory requirements
- Management of change
- New technologies, equipment and processes



An effective "bridge" must facilitate smooth flow of data between these three competing "tiers" of reporting, permitting, and operations in a sustainable way by connecting the dots from data collector through processing by the system, to reporting to all stakeholders



Data Collection

Never before has data collection been more of a challenge then now due to the following:

- Drowning in an abundance of data
- Constant change on the ground resulting in a domino effect on data collected
- Too many data connections (interfaces)
- Connections between multiple disparate systems
- Often a single Reporting Manager having to manage multiple data collection points
  - Collection –> aggregation –> reporting –> operations improvement

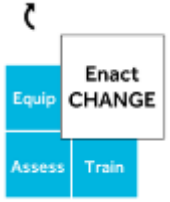
Going down the same rabbit hole every year expecting different results

Data Driven Decisions

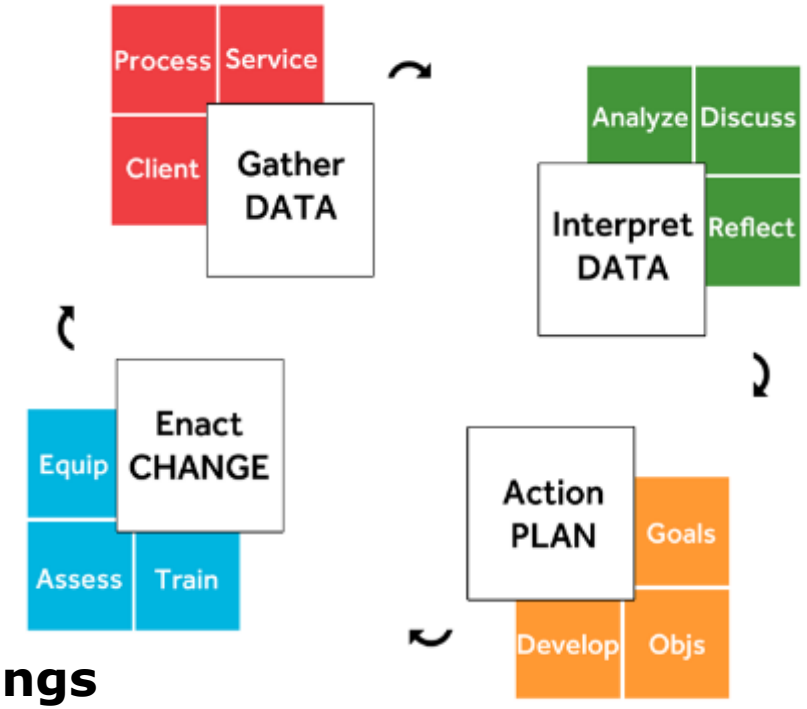
Stage 1 – Develop a culture of data collection

Stage 2 – Promote regular data review intervals

Stage 3 – Create specific action plans based on findings



Stage 4 – Scale changes for effective results



Reporting Practices

How data is represented, verified, validated and presented

- Know the audience: internal and external stakeholders
- Tables of data vs. visualization of issues
- Preparing reports: system vs. assigning teams of people
- Use of tools such as Power BI throughout processes and organizations to produce consistent outputs
- Processing of information by people: data tables vs. visual picture
- Dashboards for internal consumption of information vs. tabular reports for regulatory reporting

Challenge: Maintaining current systems vs. continual improvement

The H Element

- Data flow gaps cannot be filled by systems alone
- EHS Team structure should contain the following:
  - Subject Matter Experts (SMEs)
  - System Administrators
  - Data Managers/Coordinators
- Regularly scheduled personnel training
  - Cross-trainings to ensure knowledge retention during turnovers
  - Online learning libraries
- Communication channels open between management and technical specialists

Change Management

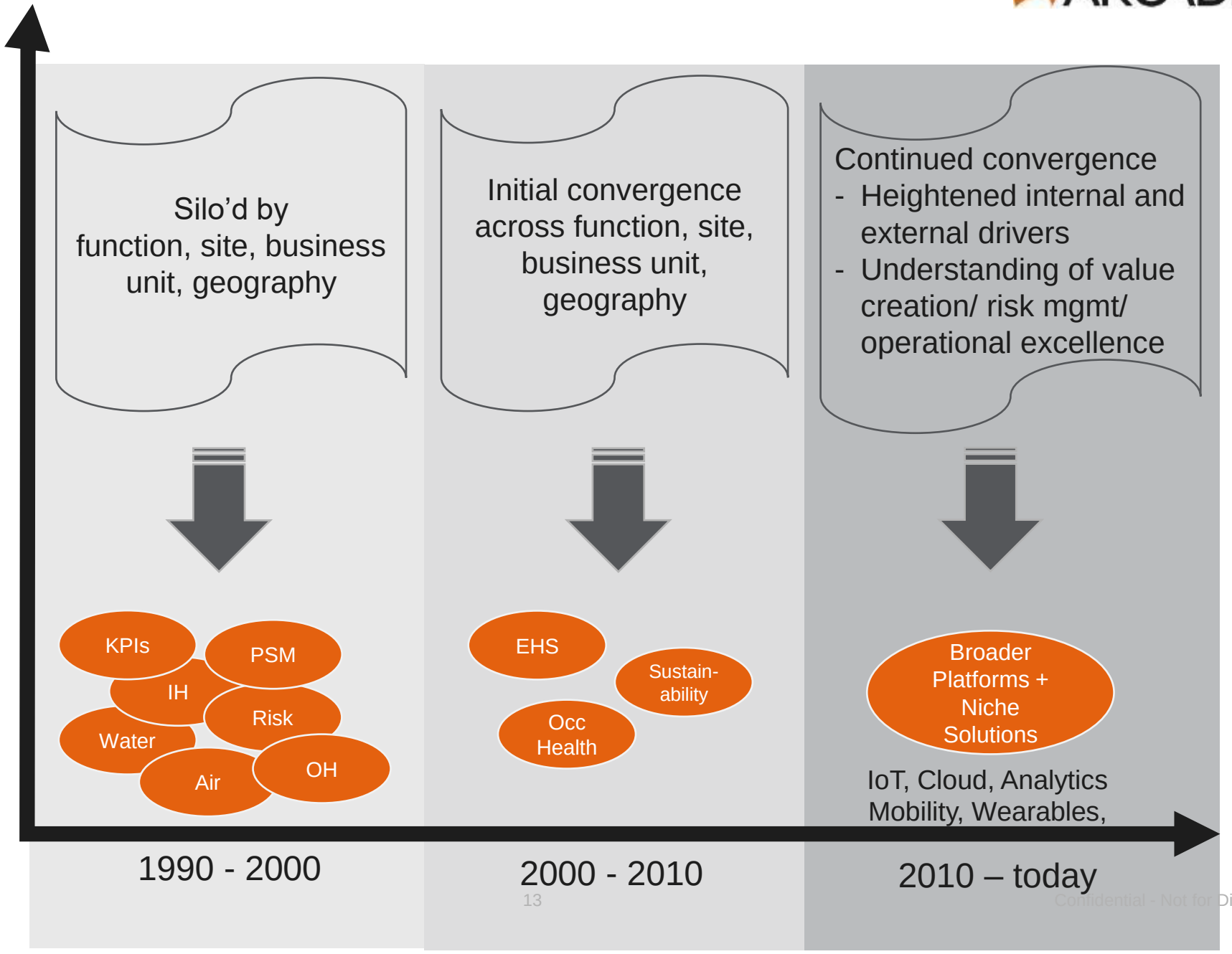
- Drivers of change
  - Critical vs. non-critical
- Communication path of change
  - Top down or bottom up
- Stakeholders impacted by change
- Circle of the change
  - Minor or Major
  - Short-term or Long-term

Change is Evolution

Why?

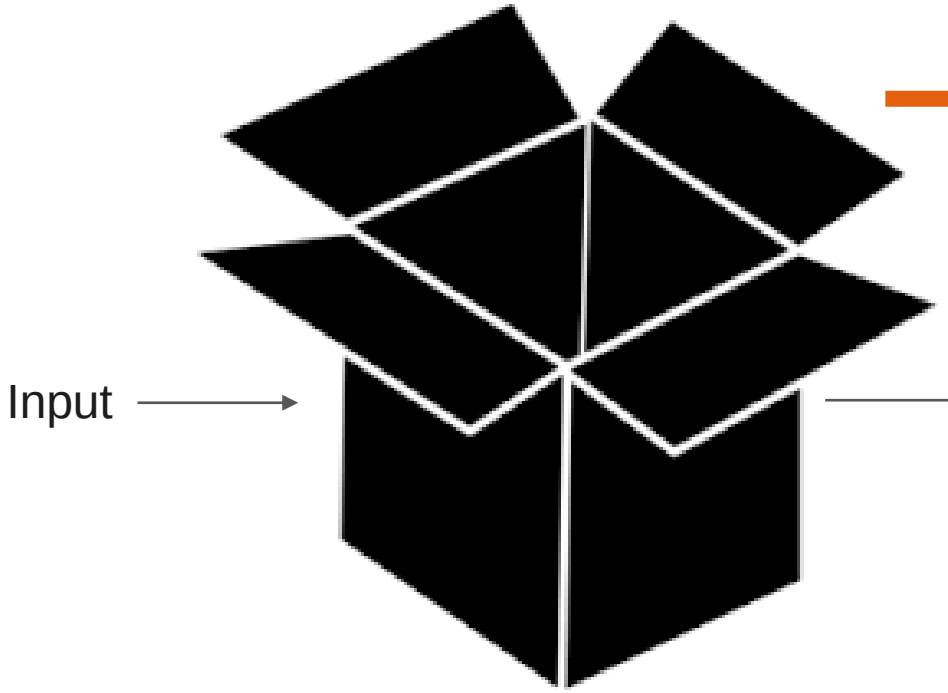
Organizational Structure , “Needs” & “Wants” & Drivers

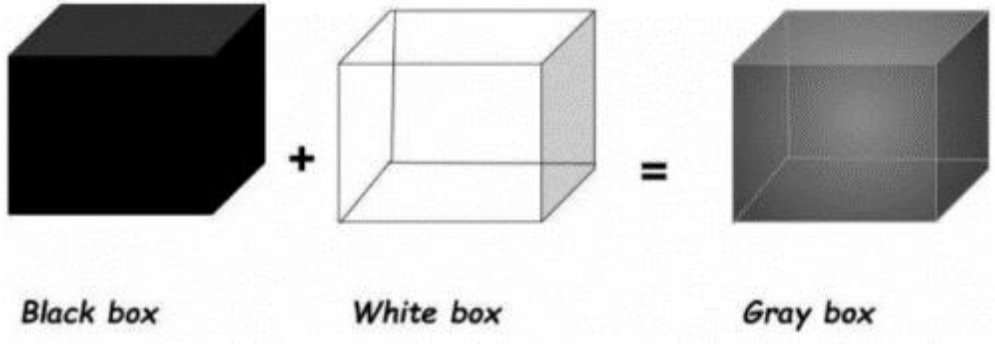
Software Solutions

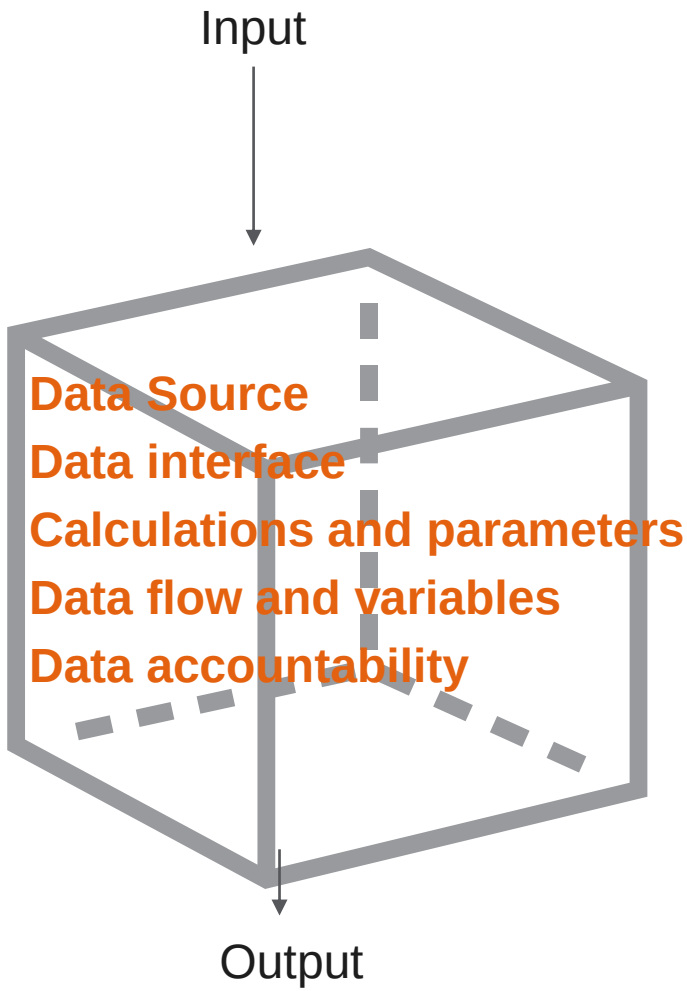


- Organizational Awareness & Convergence – across previously silo’ed “functions” and across the enterprise (at the site, BU, and corporate levels)
- Software providers aggressively investing in organic and inorganic growth to meet these “new” needs
- Wearables, Cloud, IoT, Data Analytics
- Real-time/near-time, Leading Indicators, Predictive, “Insights”

Out of the Black Box and into the…..







Elements of Automation - Technology Stack

Automation typically involves a stack of compatible technologies that can work together and with the right licenses, can be implemented behind corporate firewalls without a need for external hosting or other complications

Robotic Process Automation tool – UIPath

Mobile Data Collection - FieldNow forms

SSRS – SQL reporting automation

Python – Scripting for autonomous process, AI & Machine Learning

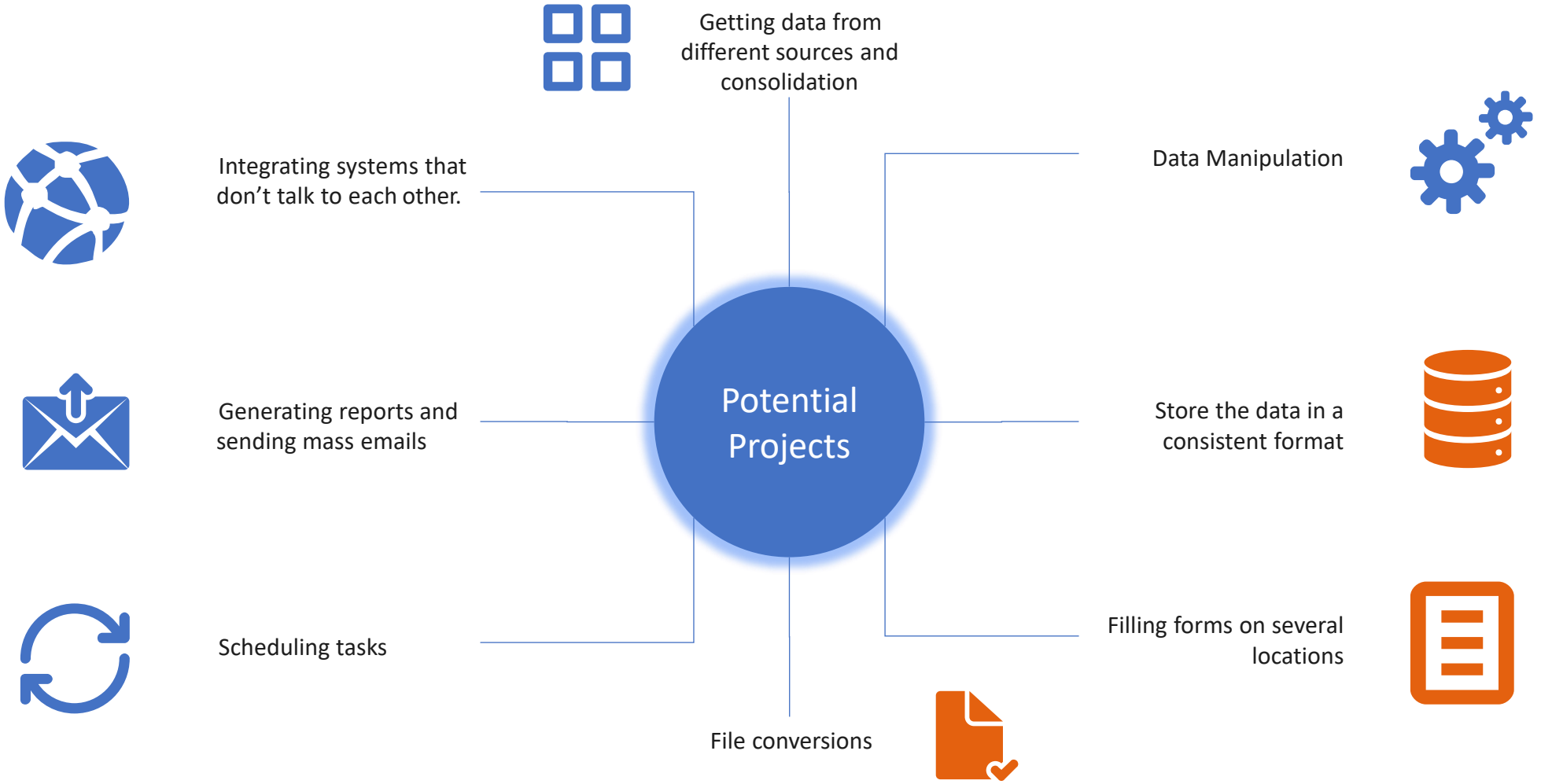
Microsoft Power Platform

PowerBI – Data Analytics & Visualization

SharePoint – Data storage, visualize

Azure services – Storage, analysis, extraction and conversion

Robotic Process Automation

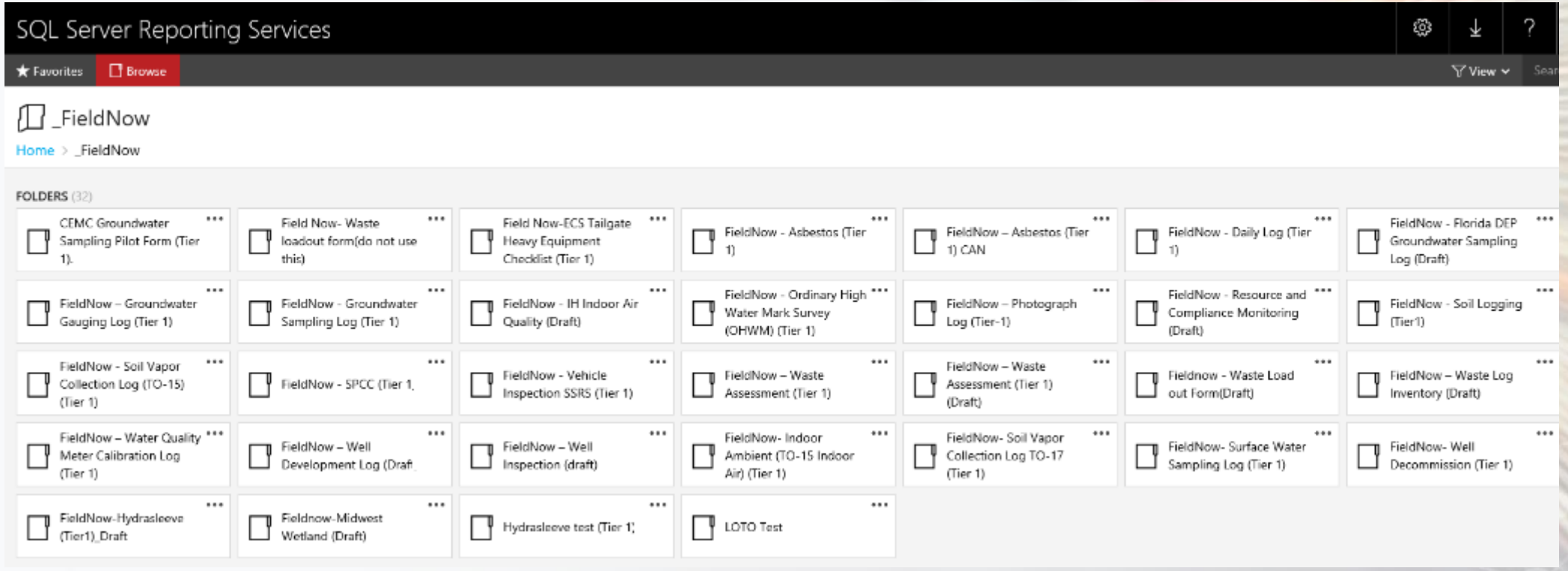


Mobile Data Collection using FieldNow®

The use of FieldNow® allows for **standardized data collection** and **streamlined, automated reporting**

Example: Mobile data collection within FieldNow® applications like Fulcrum allow for data to flow into a SQL Server Database. **SSRS** (SQL Server Reporting Services) is the reporting platform where the template is designed using the SQL data sources.

Staff can access the self-service, standard reports through a web interface.



Sample Forms using FieldNow®

ARCADIS Design & Consultancy for natural and built assets

FieldNow - Waste Loadout Form (Tier 1)
Waste Loadout Form for OMM teams SME: Rebecca Hensel, Lucas Cullen, Amanda Lucchino created by R. Miller
Last activity about 10 hours ago

FieldNow - Waste Log/Inventory (Tier 1)
Used to track on-site waste Updated: July/August 2019 Primary Contacts: Rebecca Hensel and Amanda Lucchino
Last activity 4 days ago

FieldNow - Waste Assessment (Tier 1)
Primary Contact: Amanda Lucchino
Last activity 4 days ago

Sample Reports within FieldNow®

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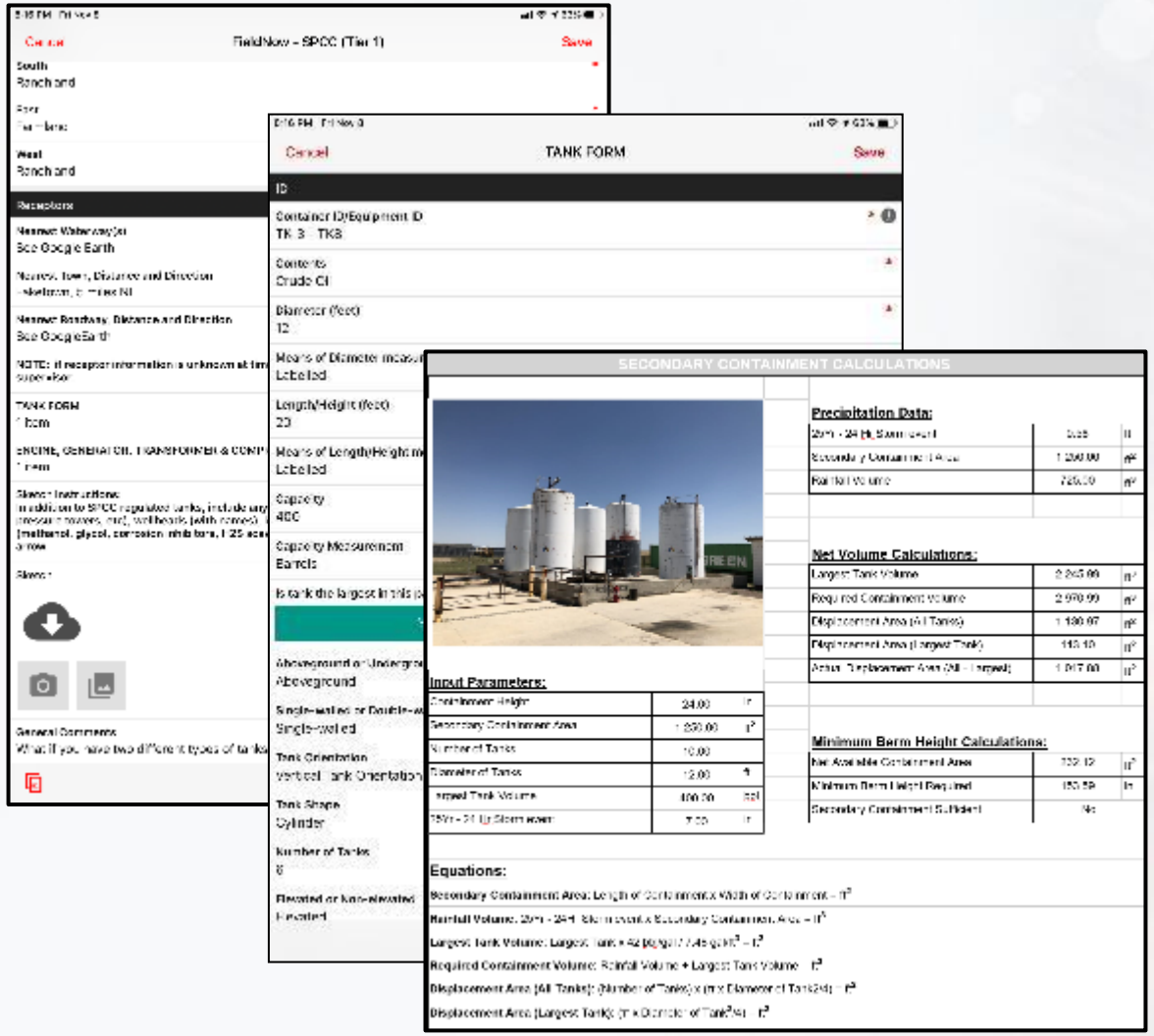
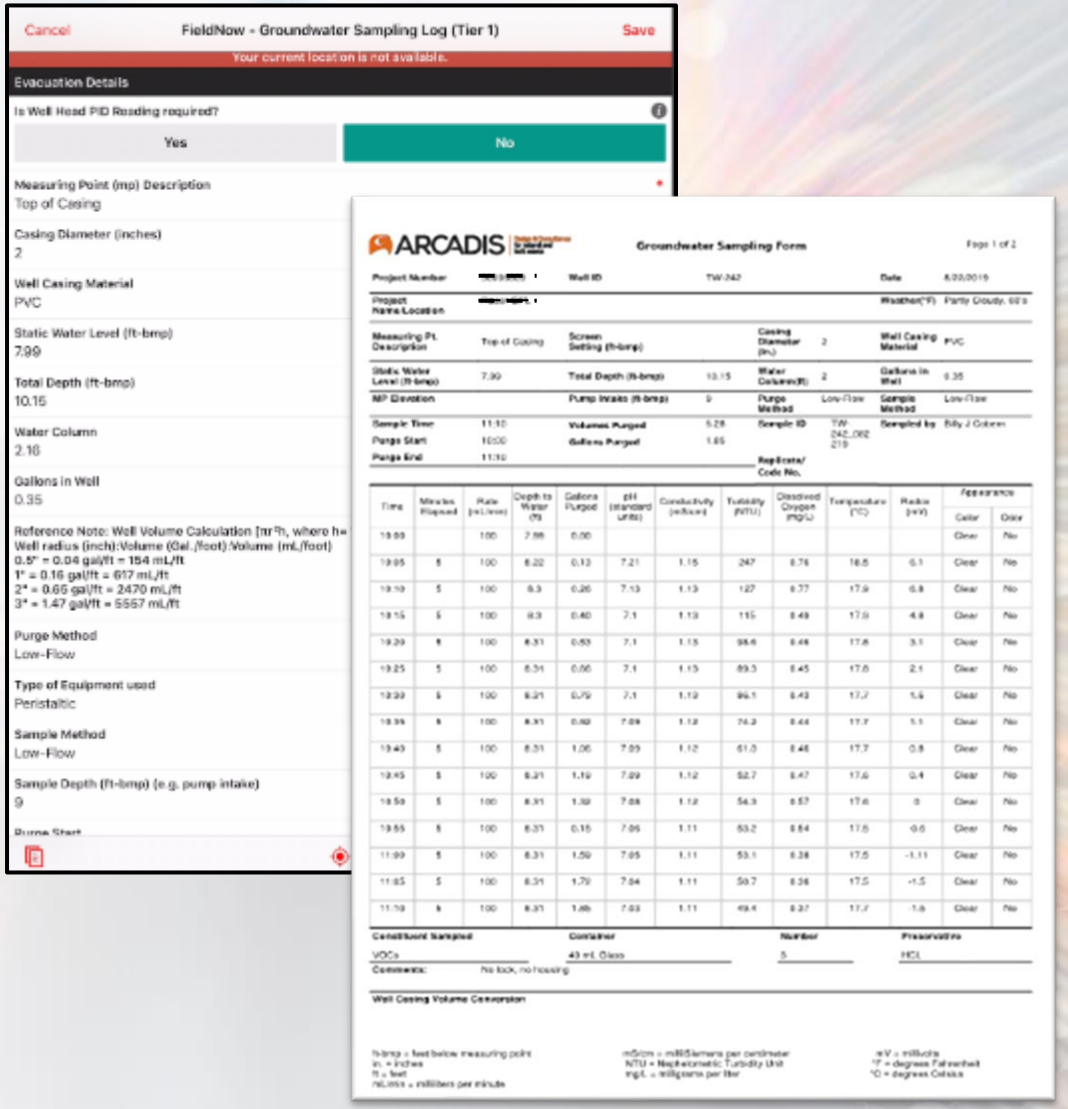
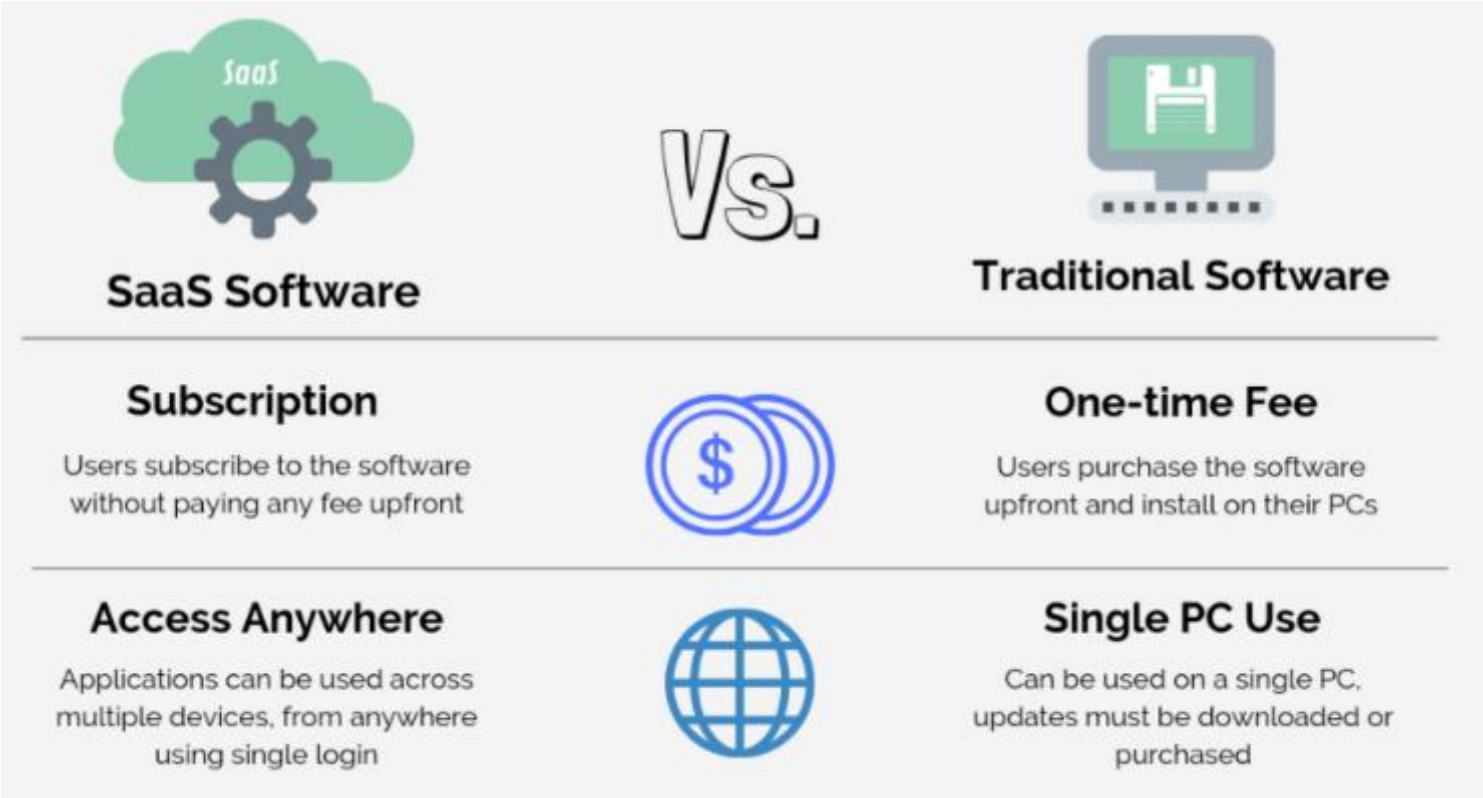




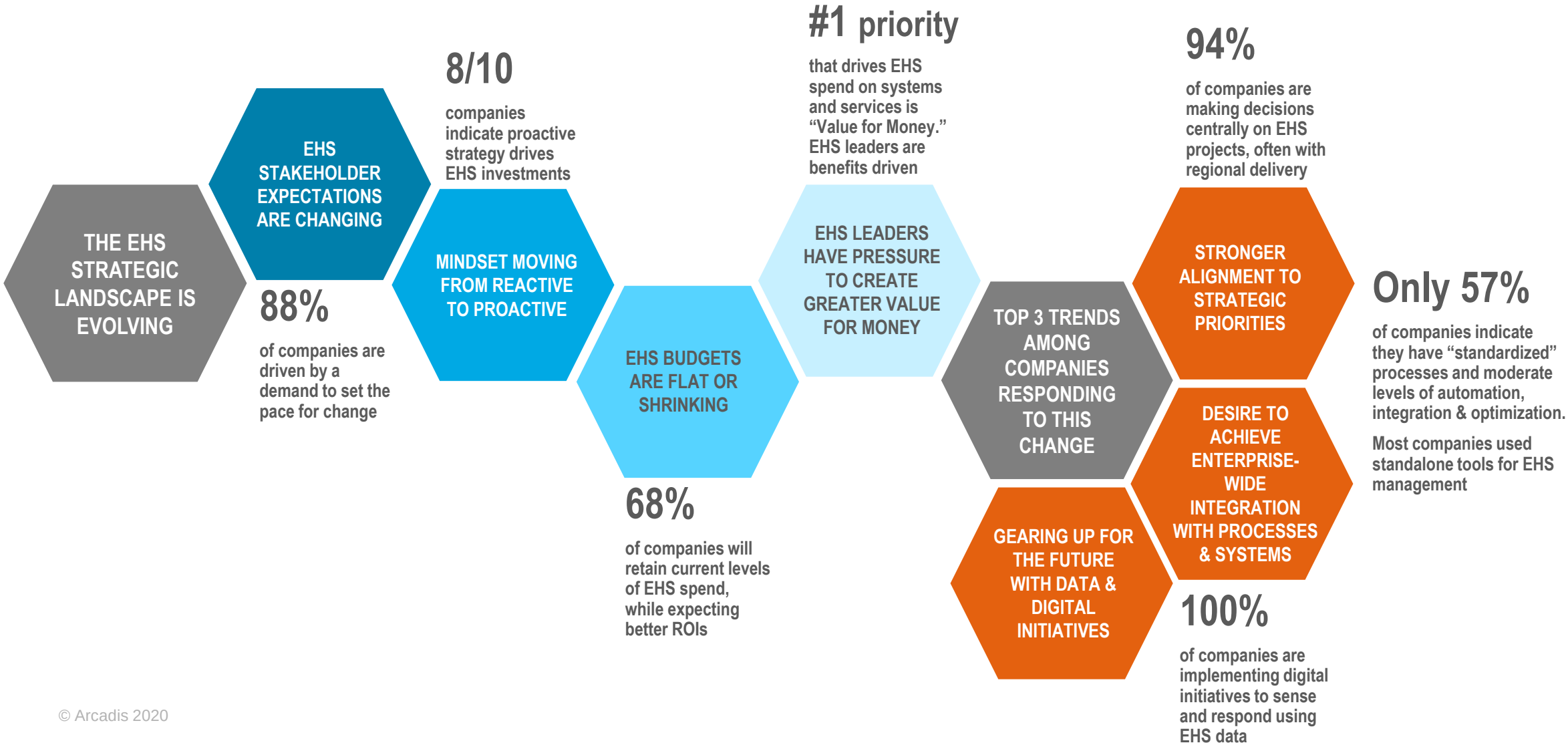
Software as a Service vs. Platform Systems

- Regulatory needs
- Current system requirements and deficiencies (legacy system evaluation)
- Budgetary constraints
- Personnel support
- IT requirements



Survey of the Current EHS Landscape

Arcadis/College of William & Mary Market Survey Results



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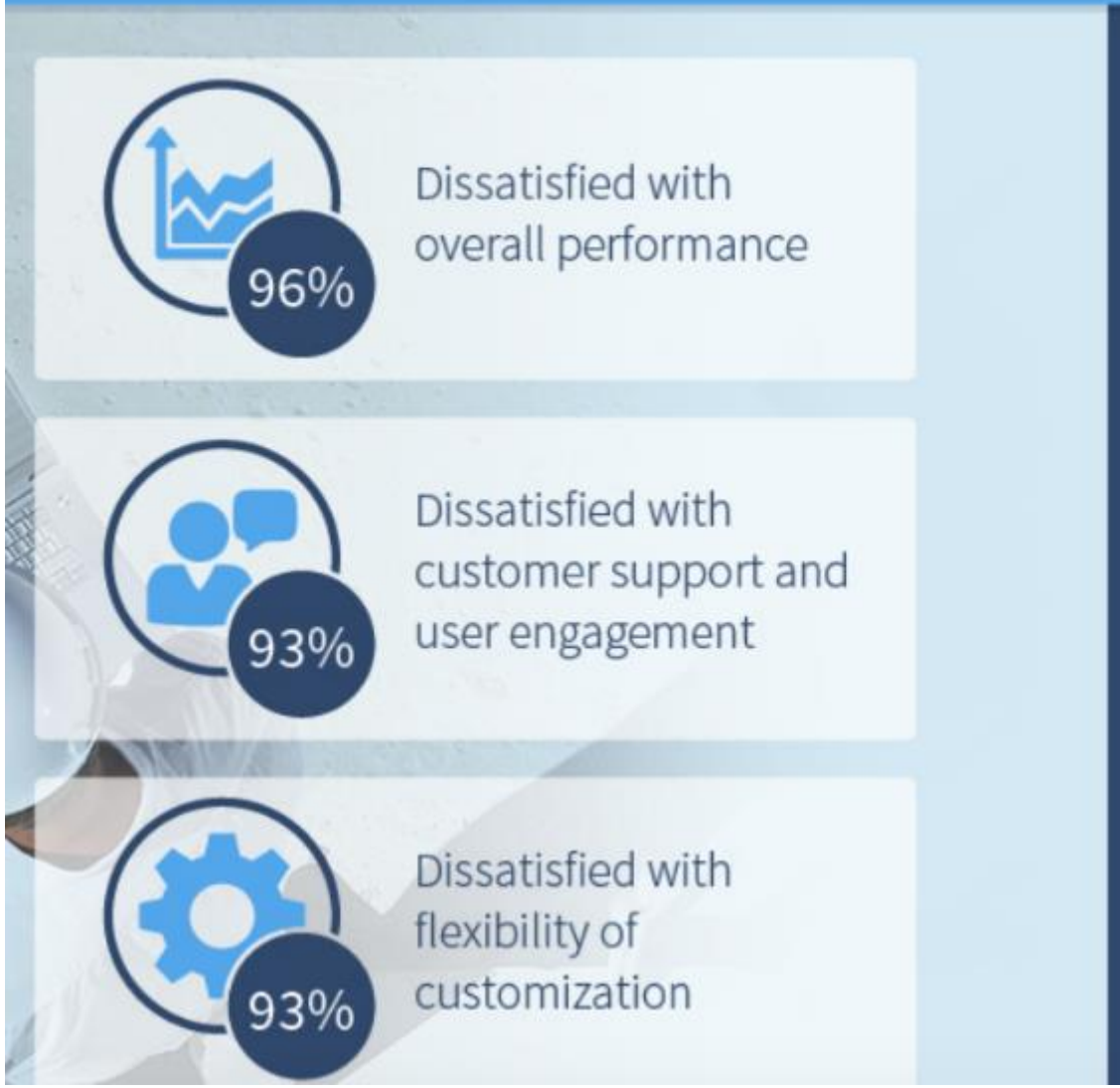
Why Companies Replace Their EHS&S Software Systems



96%

Dissatisfied with overall performance

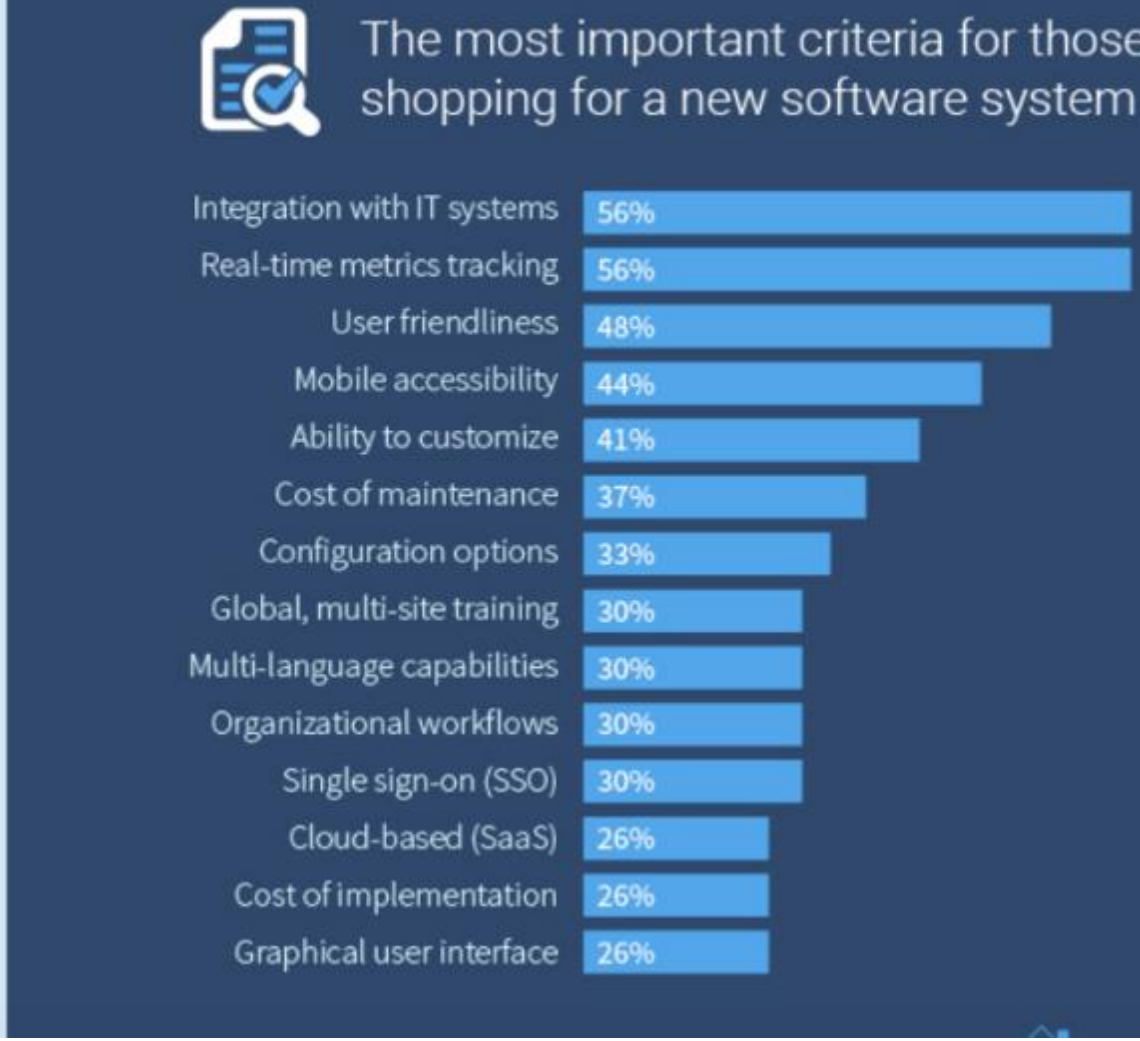
93%

Dissatisfied with customer support and user engagement

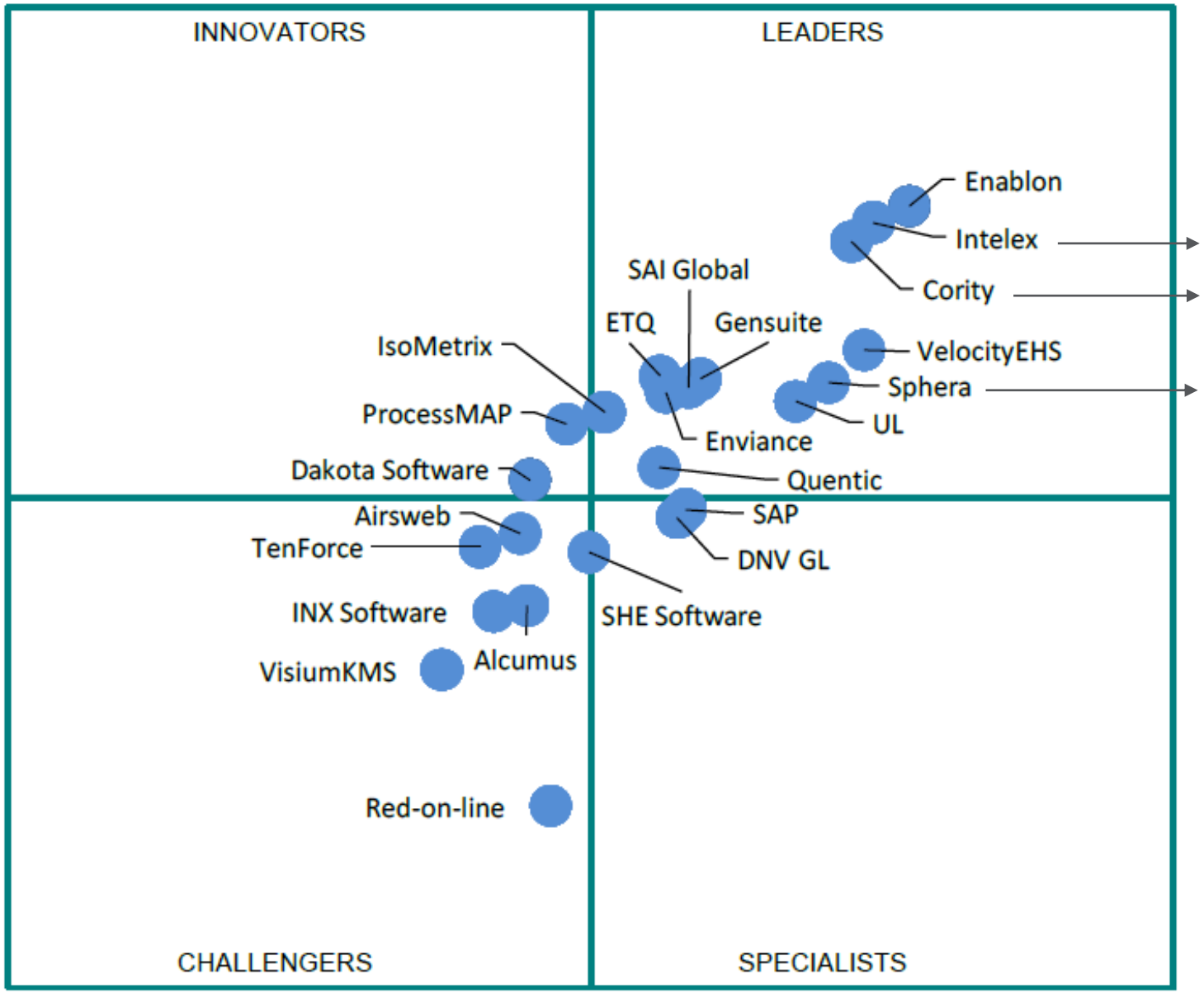
93%

Dissatisfied with flexibility of customization

The most important criteria for those shopping for a new software system



Verdantix Green Quadrant EHS Software 2019



Asset and Compliance Tracking System (ACTS)

regAction

Essential Suite Software, OpsAir, Sphera Cloud (Environmental Accounting)

Thank you for attending! Any questions?

For more information on permitting, reporting, EMIS Systems, Compliance strategies, and digital solutions, please contact us at:

Humaira.Hazur@arcadis.com

Digital Solutions: The Key to Working SMARTER