
Bringing Digitization to
Healthcare Facilities

PRESENTERS

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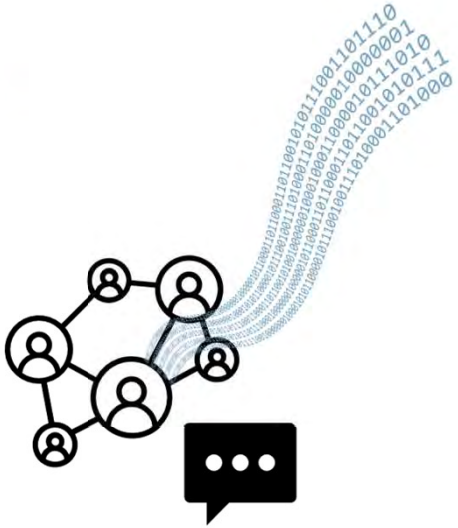
Learning Objectives

- Learn about digitization – what it is and how it can optimize and automate work processes.
- Learn how digitization can be implemented in healthcare facilities.
- Explore general and case-study specific outcomes of digitization.
- Understand the vision for Digital Twin and its implications for prospective hospitals.

Intro to Digitization

Home Monitoring



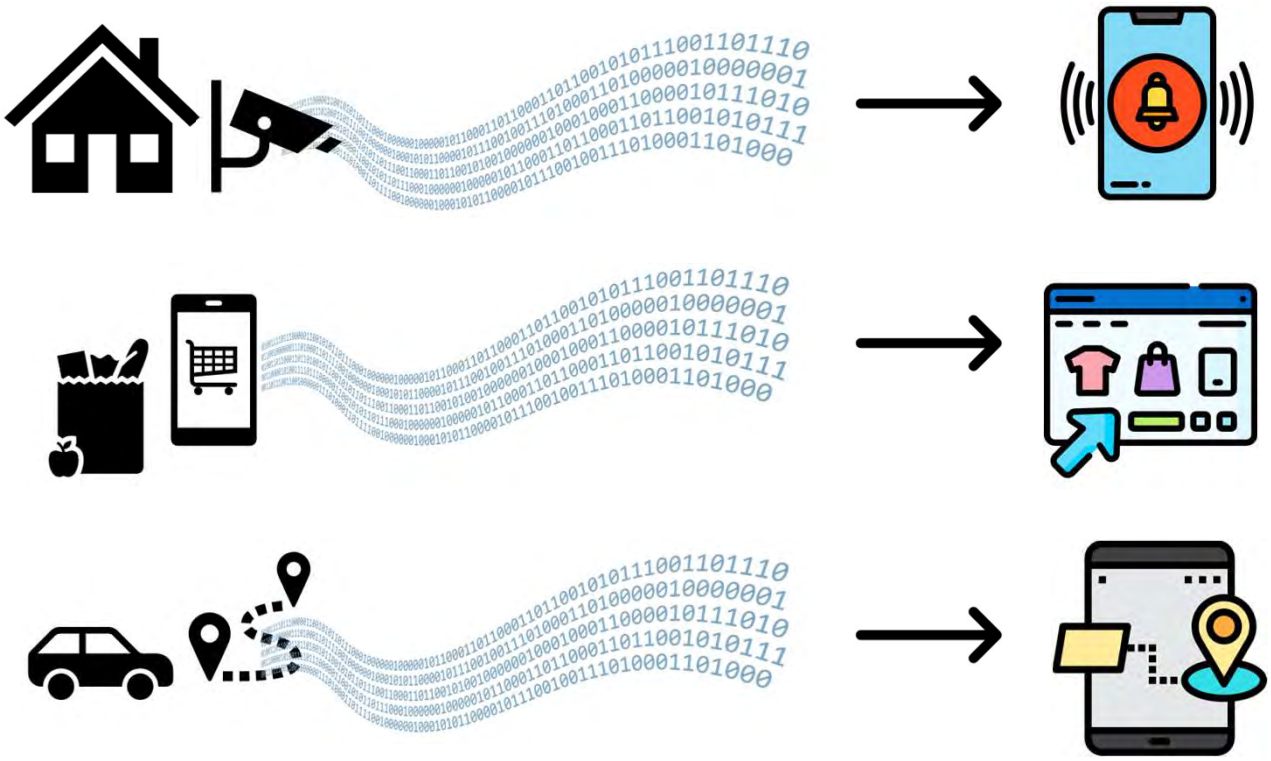
Socializing

Shopping

Traveling

Data is everywhere.

Intro to Digitization



Digitization takes data and makes it meaningful, consumable, and actionable.

Intro to Digitization

But still, what is digitization exactly?
What is this missing link?

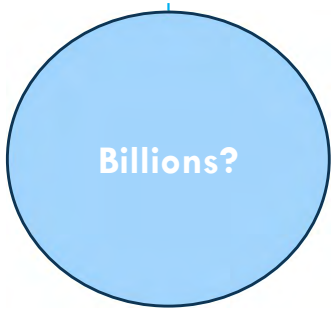
Intro to Digitization

For Healthcare facilities, we are drowning in data.

Intro to Digitization

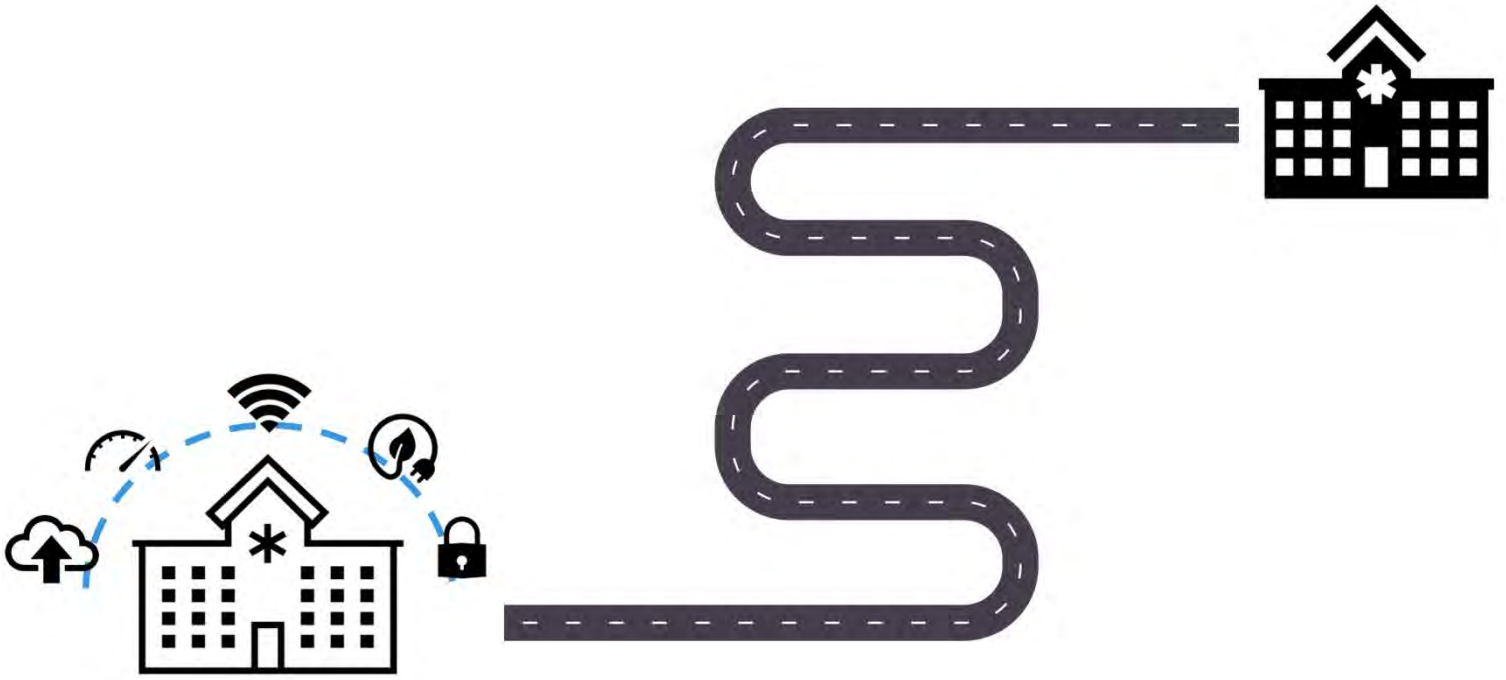
DECADE	DATA POINTS
1990's	15K
2000's	30K
2010's	300K
2020's	1 Million

2050's

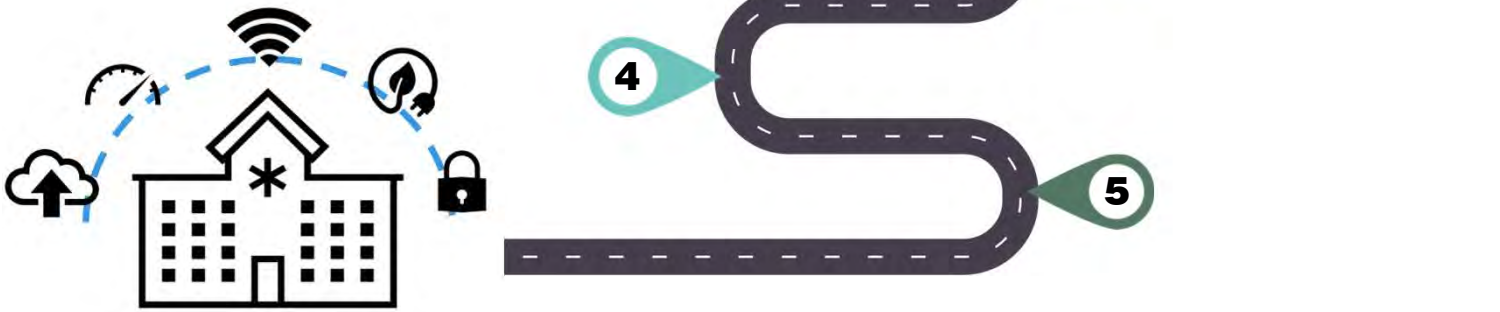


How can we be rescued from drowning even further?

Realize Digitization is not a single event, it’s a journey.



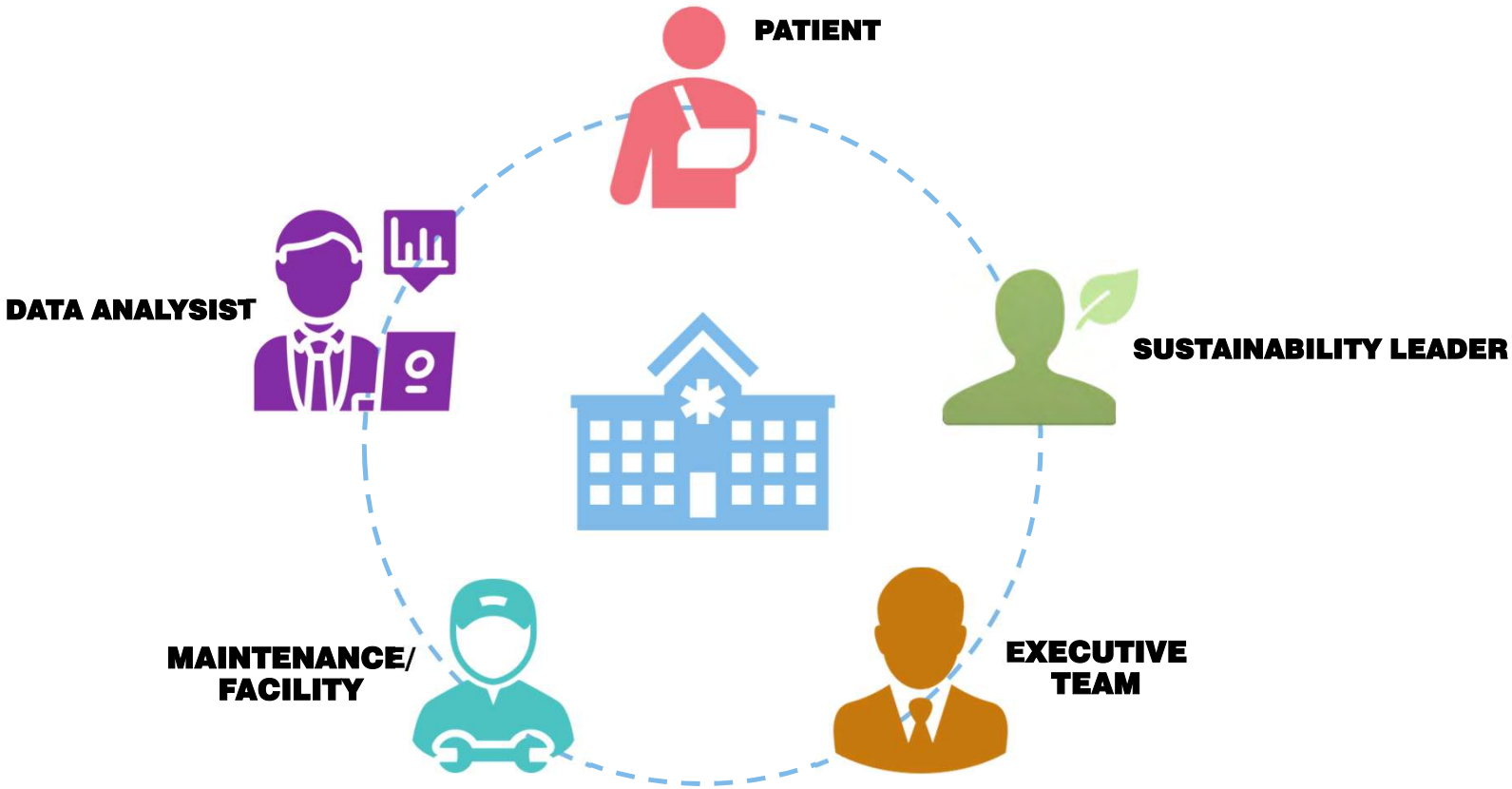
Let’s walk through this journey and define step specifics along the way.



<u>Step 1:</u> Begin with a vision.

- Define relevant stakeholders and objectives
- Think forward

1 Step #1: Begin with a Vision



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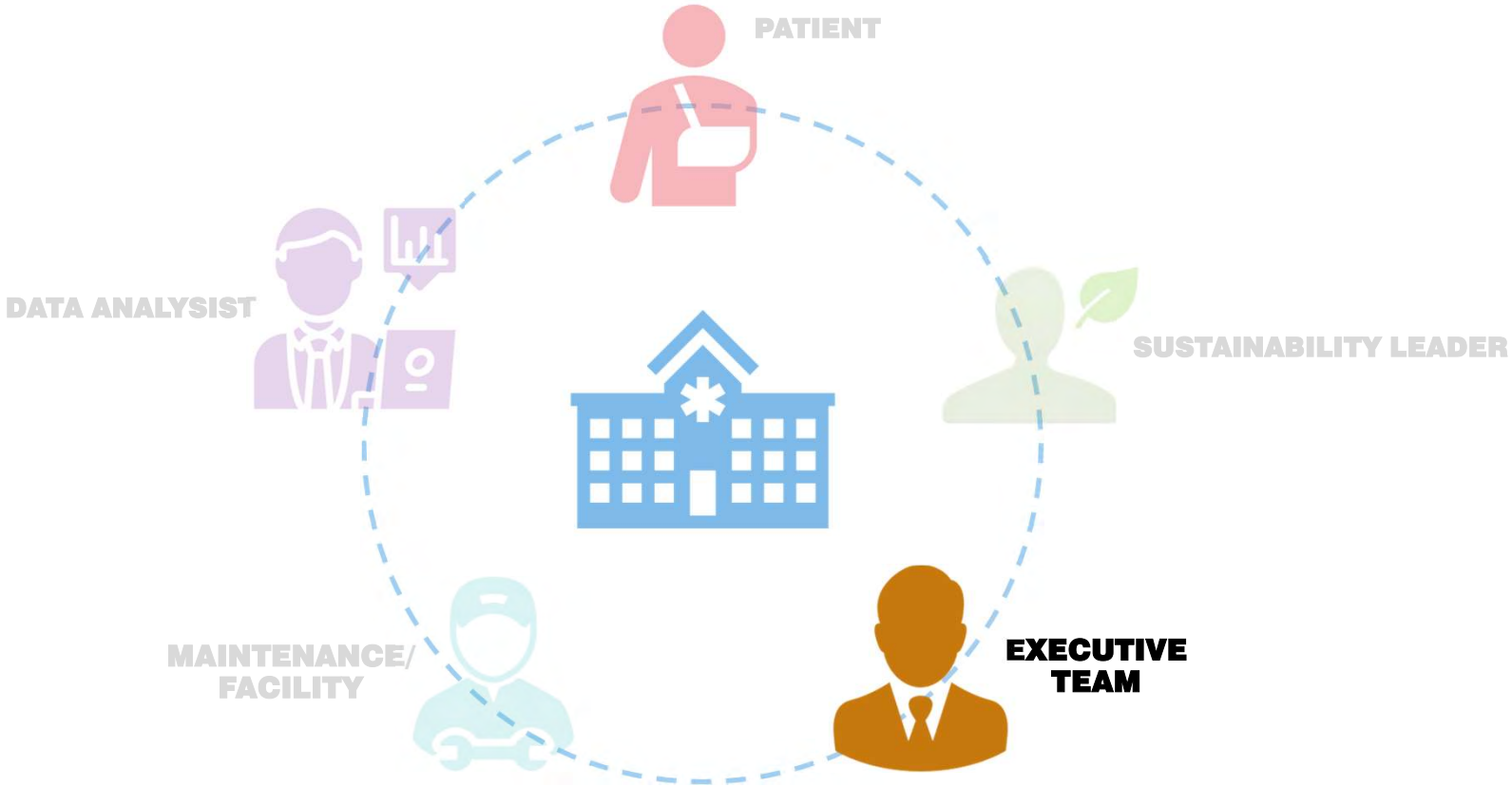


1 Step #1: Begin with a Vision

"We need to improve our <u>Key Performance Indicators</u> without adding staff"

EXECUTIVE TEAM

Key Performance Indicators

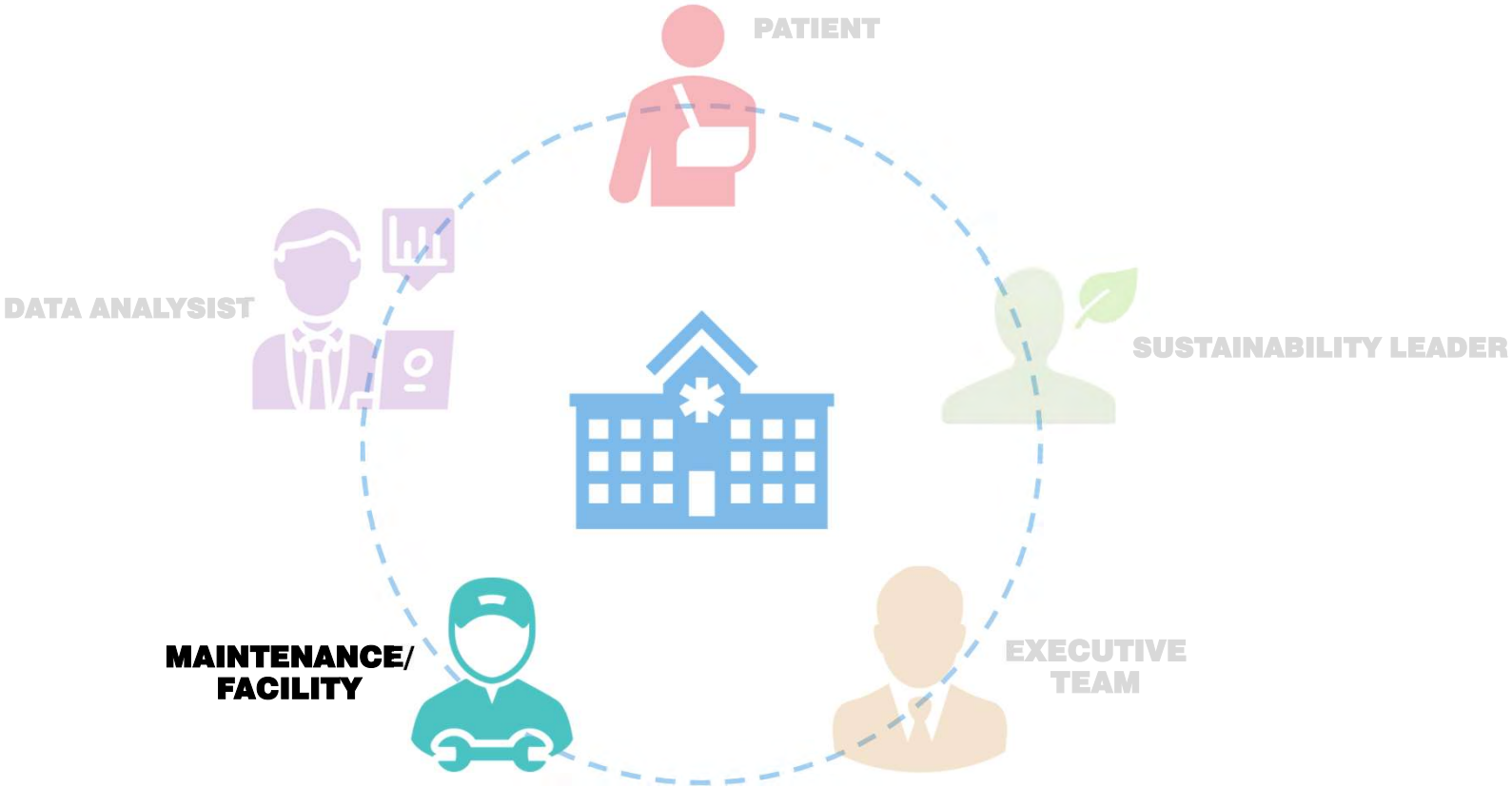
MACRO

- Patient Comfort
- Operational Costs
- Energy
- Work Orders

micro

- kW/Ton
- kW/CFM
- Average Valve Position
- CHW Temp Differential

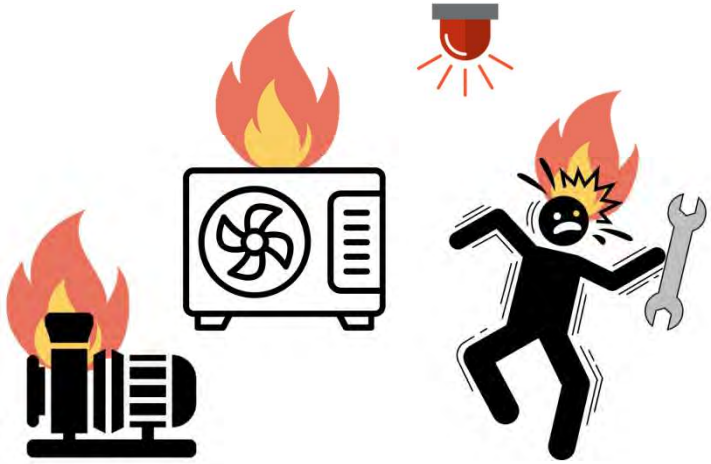
1 Step #1: Begin with a Vision



1 Step #1: Begin with a Vision

"Do we go from being Reactive to <u>Preventative</u>?"

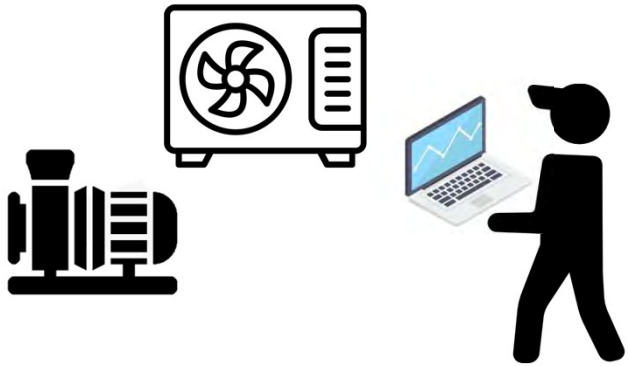
MAINTENANCE/ FACILITY



1 Step #1: Begin with a Vision

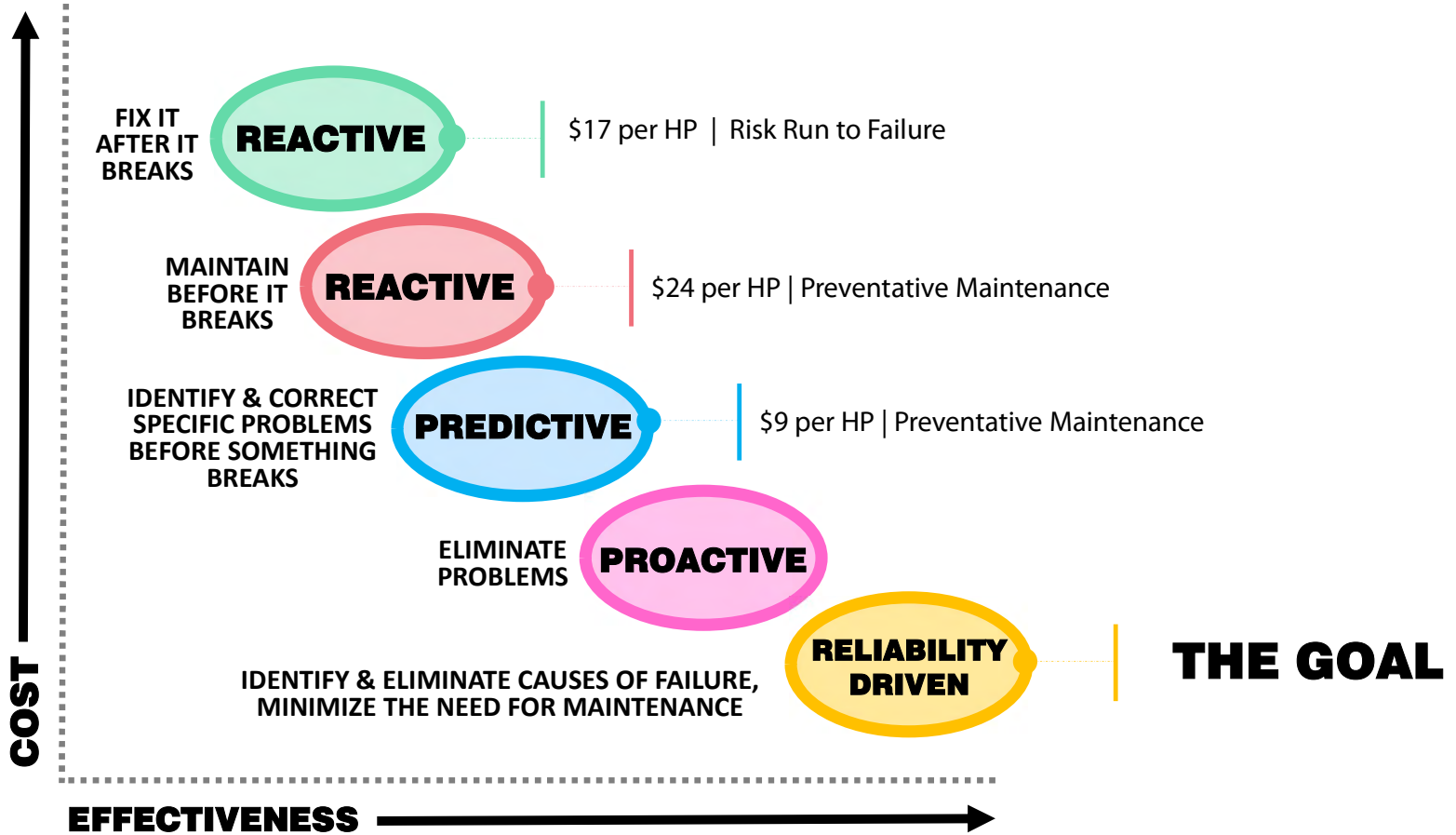
"or Reactive to <u>Predictive</u>"

MAINTENANCE/ FACILITY



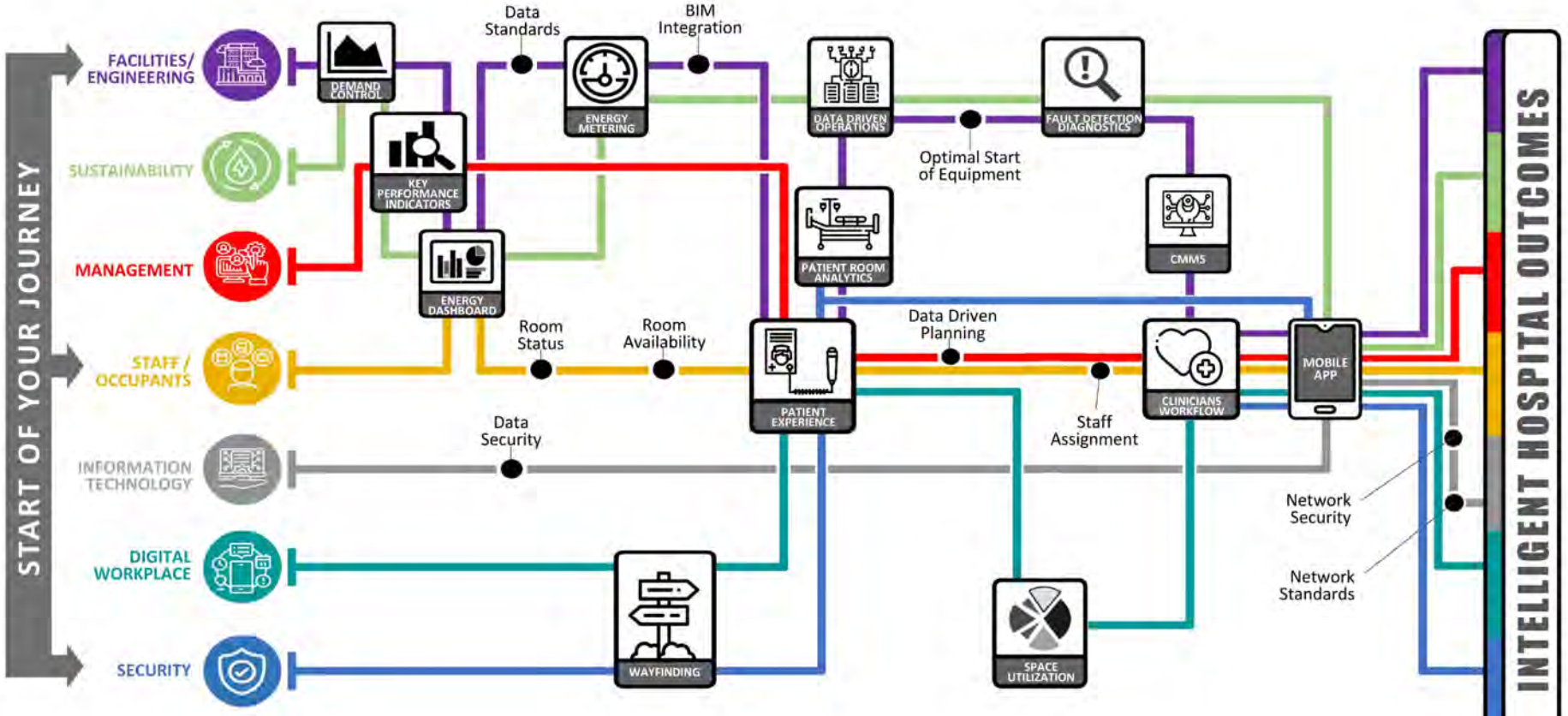
1 Step #1: Begin with a Vision

COST ADVANTAGES OF MAINTENANCE TYPES



Source: Flow Control Network, August 2015, Vol XXI No. 8 and https://www.theautomationengineer.com/insight/aiming-zero-downtime/

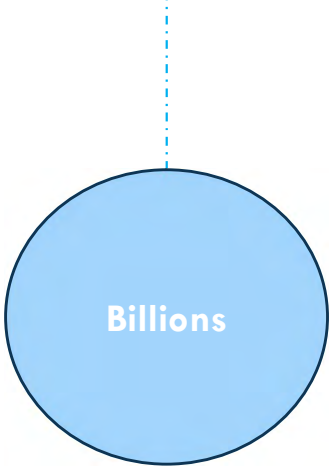
1 Step #1: Begin with a Vision

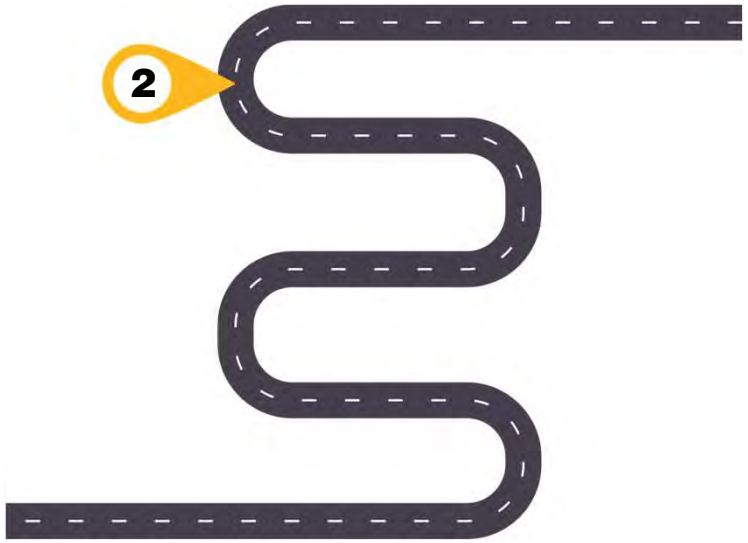


1 Step #1: Begin with a Vision

DECADE	DATA POINTS	STRATEGY
1990's	15K	• All Renovations & Repairs to be DDC
2000's	30K	• From BOC to 'Enterprise BOC' • Data Naming • Fault Detection Diagnostics
2010's	300K	• Data Driven Design and Operations
2020's	1 Million	• Predicted Operations: Energy and Equipment Failure • Machine Learning + Artificial Intelligence • Automation of Facility Management Functions

Step #1: Begin with a Vision

DECADE	DATA POINTS	STRATEGY
2050's		• Prepare today for the tools we'll have tomorrow



<u>Step 2:</u> Develop a master plan.

2 Step #2: Develop a Master Plan

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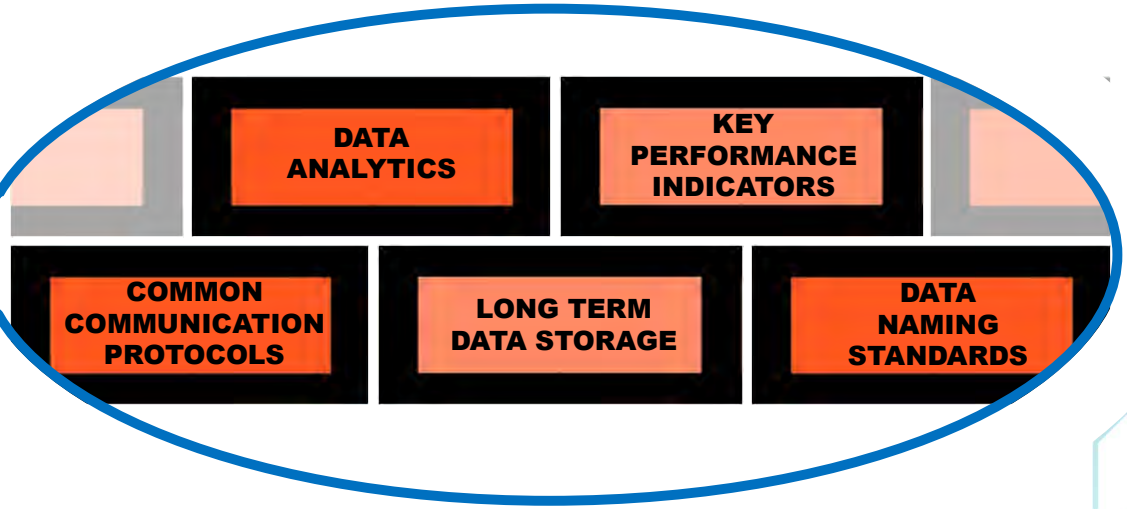
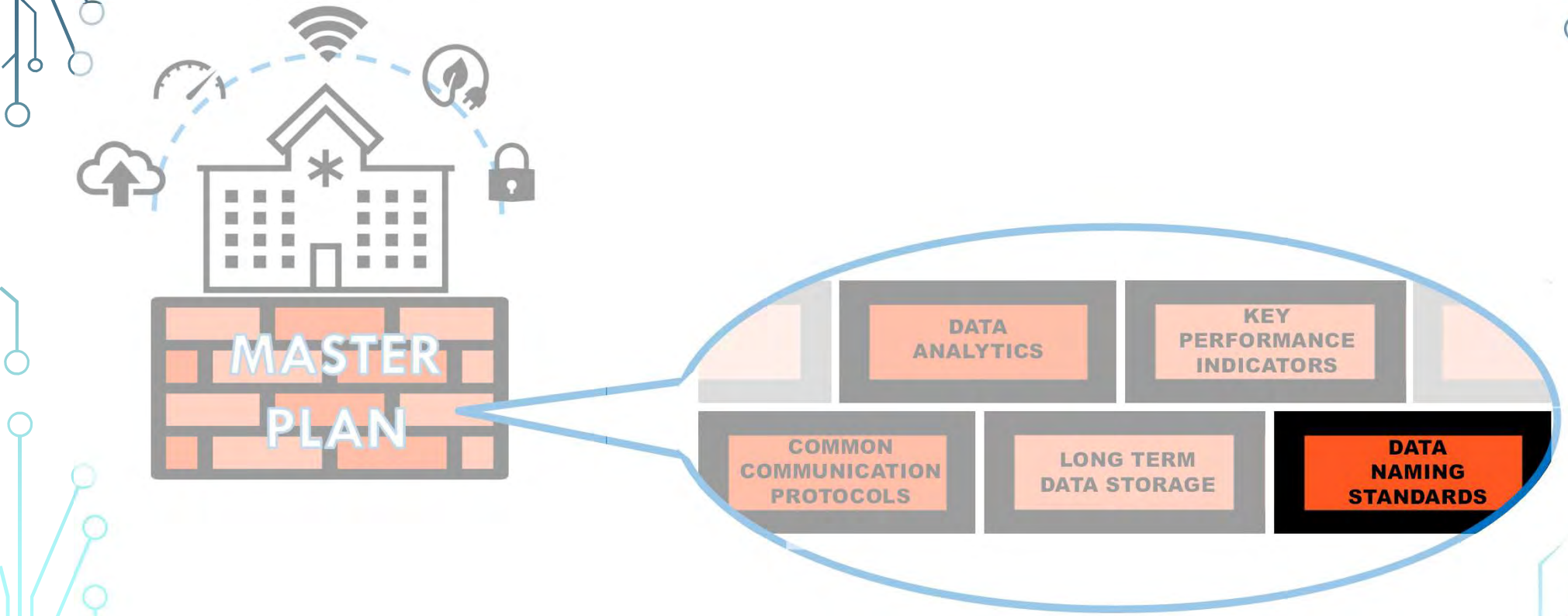


2 Step #2: Develop a Master Plan



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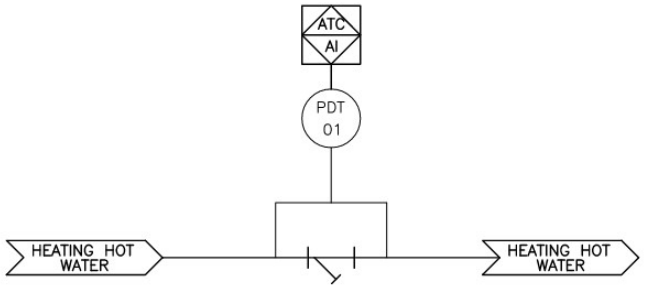


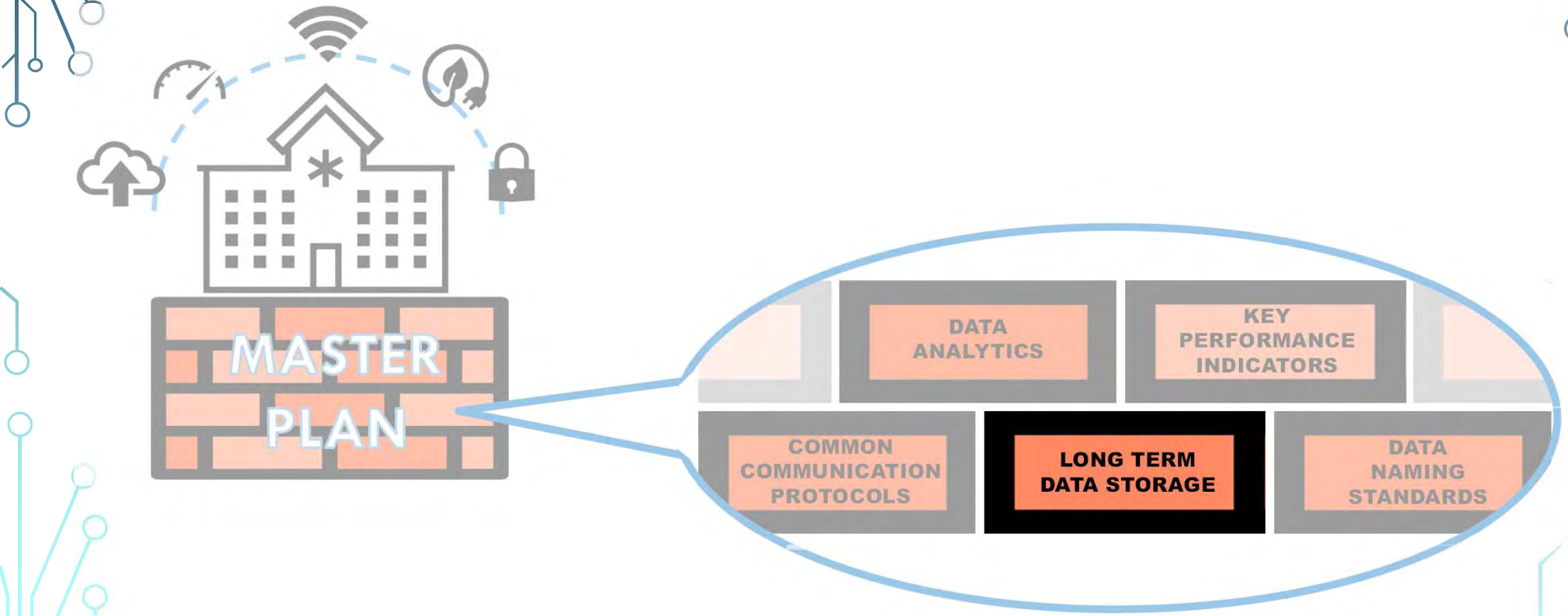
P = Physical
PD = Pressure Differential
V = Value
AN = Analog
PS = PSI

WORKSTATION				USER INFORMATION						
				POINT TYPE				ALARM CONDITION		
TAG	POINT DESCRIPTION	UNITS	POINT NAME (1)	ANALOG	DIGITAL	INTEGRATED	SETPOINT VALUE	HIGH LIMIT	LOW LIMIT	ALARM DELAY (MIN)
HARDWARE										
PDT 01	STRAINER DIFFERENTIAL PRESSURE	PSID	CEF05.HHW.STRXXX.XXX.PPD.VAN.PS	X						
SOFTWARE										
SDP	DIRTY STRAINER SETPOINT	PSID	CEF05.HHW.STRXXX.XXX.VPD.SPDP.PS	X			2.5			

NOTES:
(1) X'S SHALL BE SUBSTITUTED WITH THE 15–CHARACTER EQUIPMENT TAG THAT THE POINT IS ASSOCIATED WITH, FOLLOWED BY THE REMAINDER OF THE POINT NAME SHOWN. SEE SCHEDULES FOR EQUIPMENT TAGS.

4 **HEATING HOT WATER STRAINER MONITORING CONTROL DIAGRAM**
SCALE: NONE

2 Step #2: Develop a Master Plan



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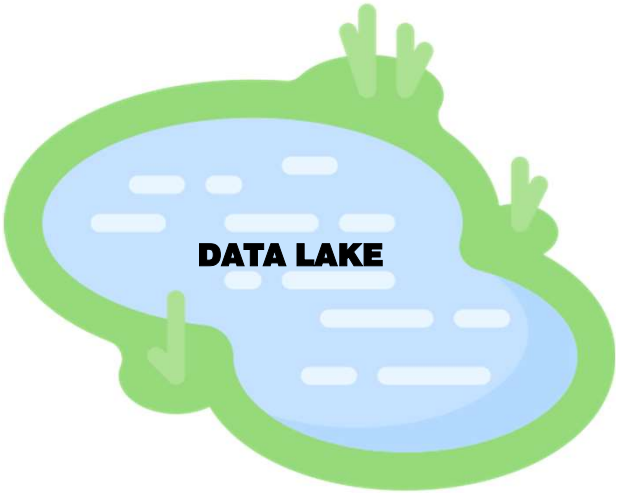
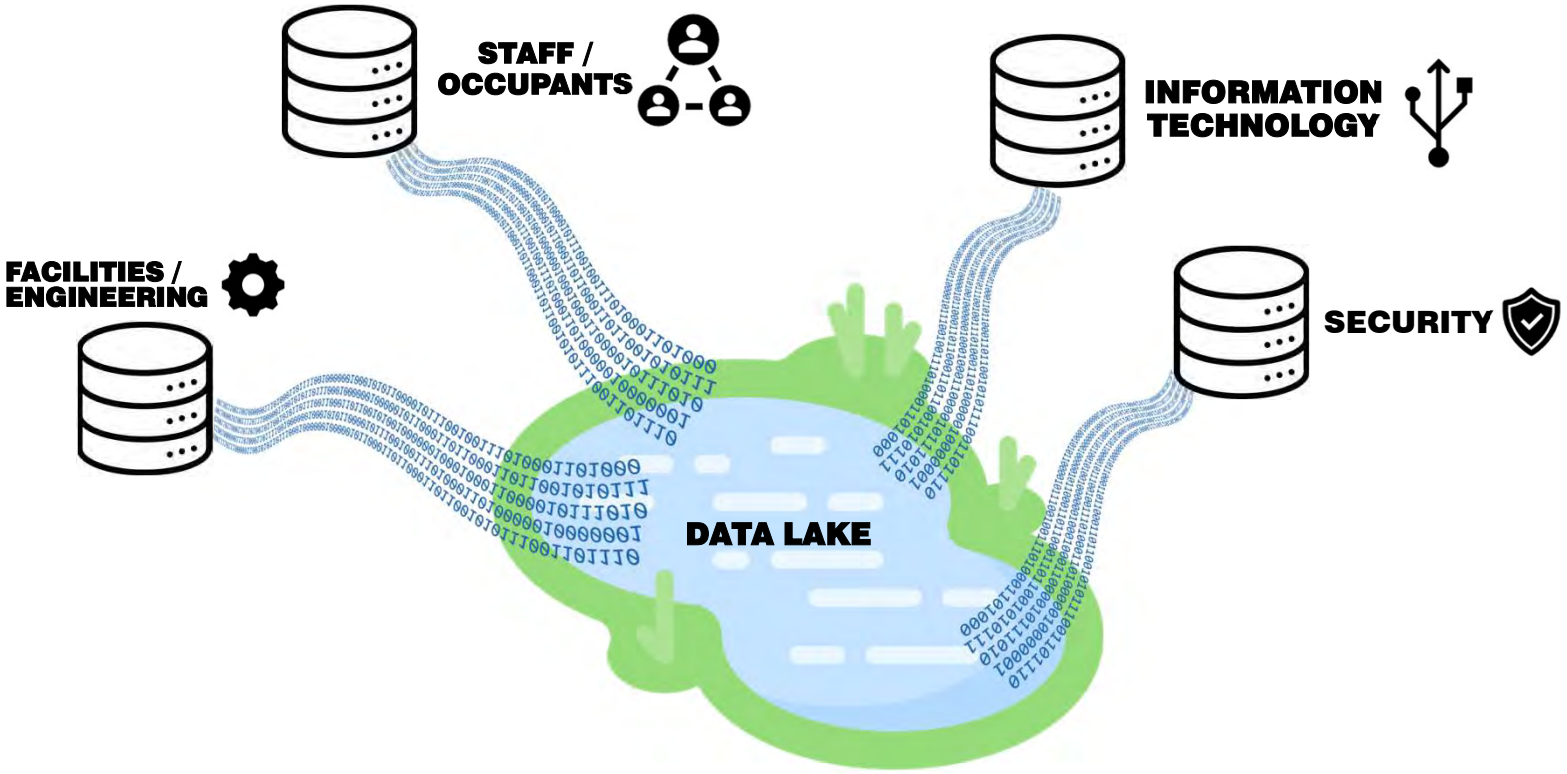


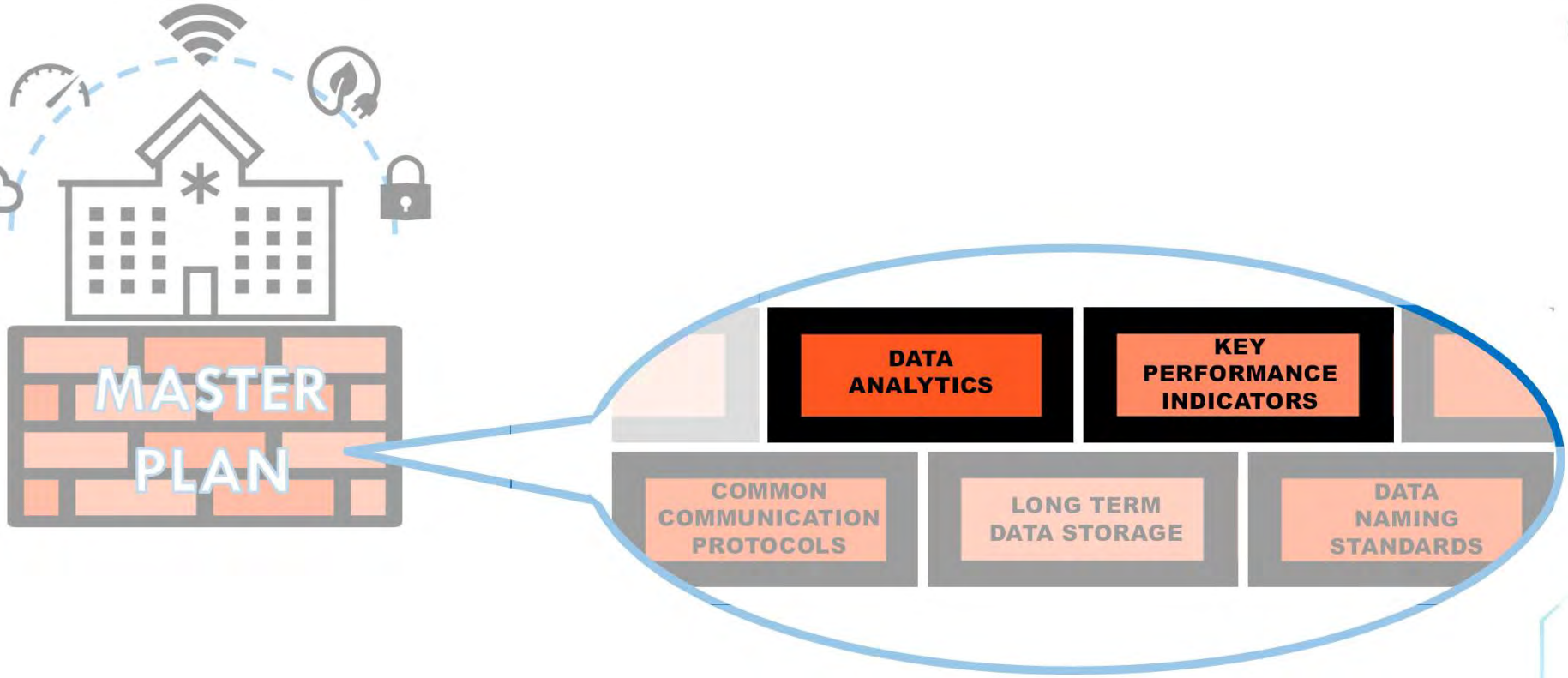
DATA LAKE IS A CENTRALIZED REPOSITORY

2 Step #2: Develop a Master Plan



DATA IN ALL STAGES (RAW, SEMI-STRUCTURED, OR STRUCTURED) CAN BE STORED IN DATA LAKE

2 Step #2: Develop a Master Plan



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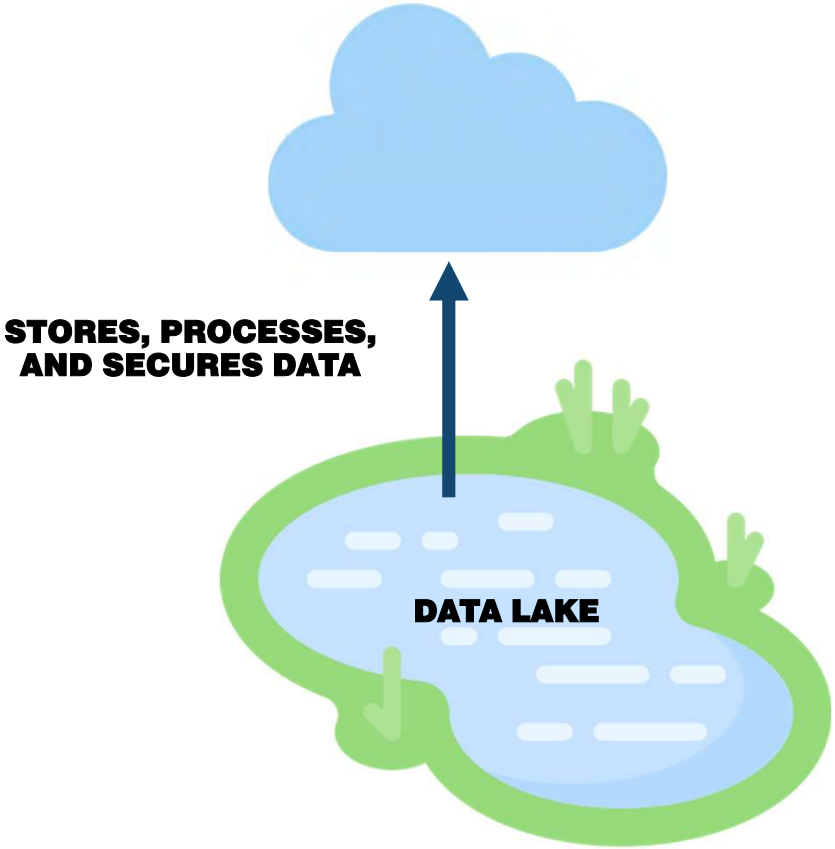

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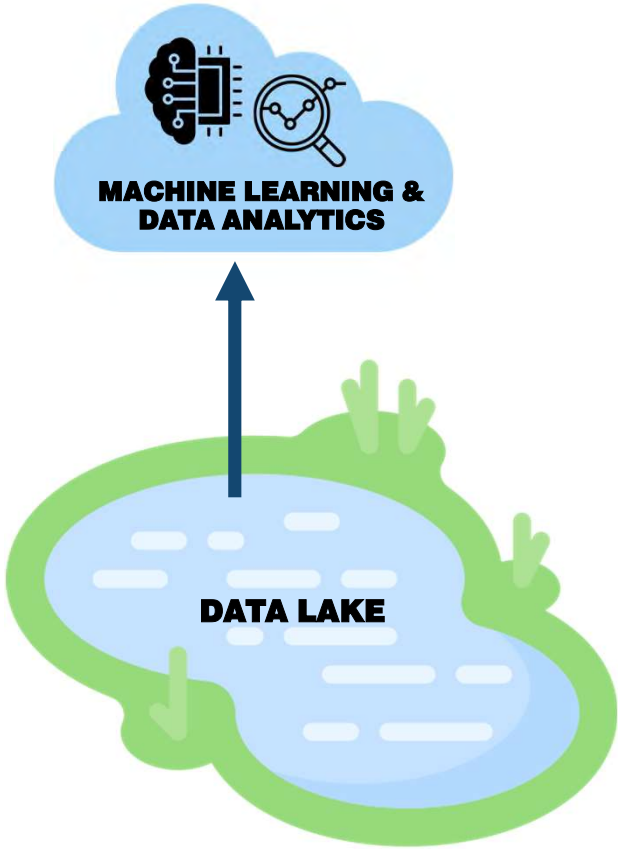

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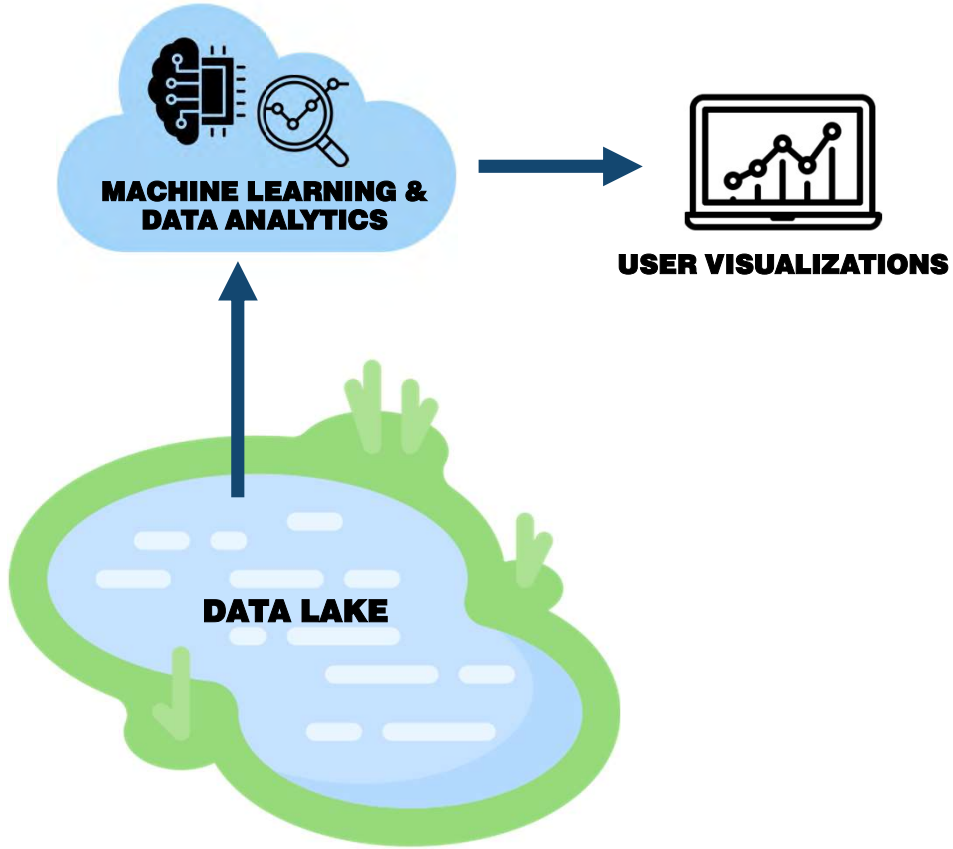

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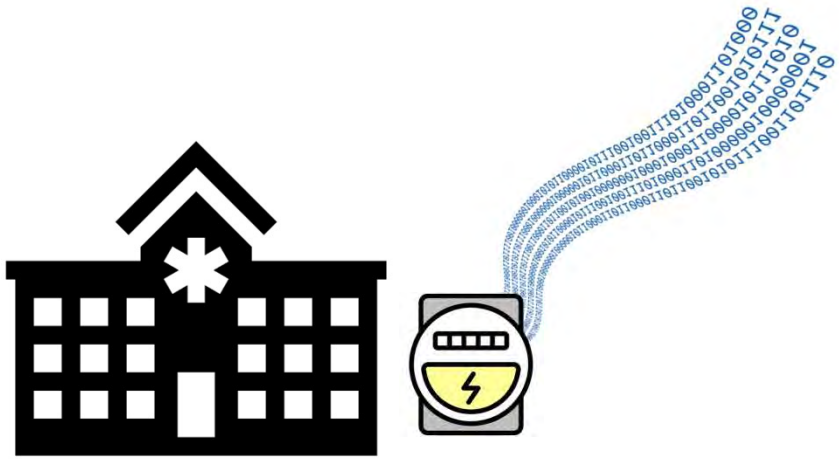
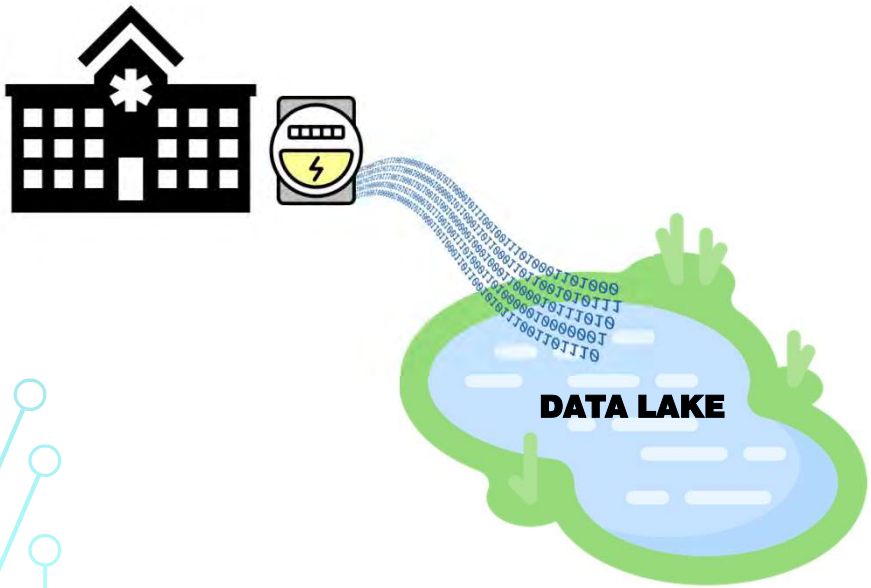


Example: Hospital's Power Meter

2 Step #2: Develop a Master Plan



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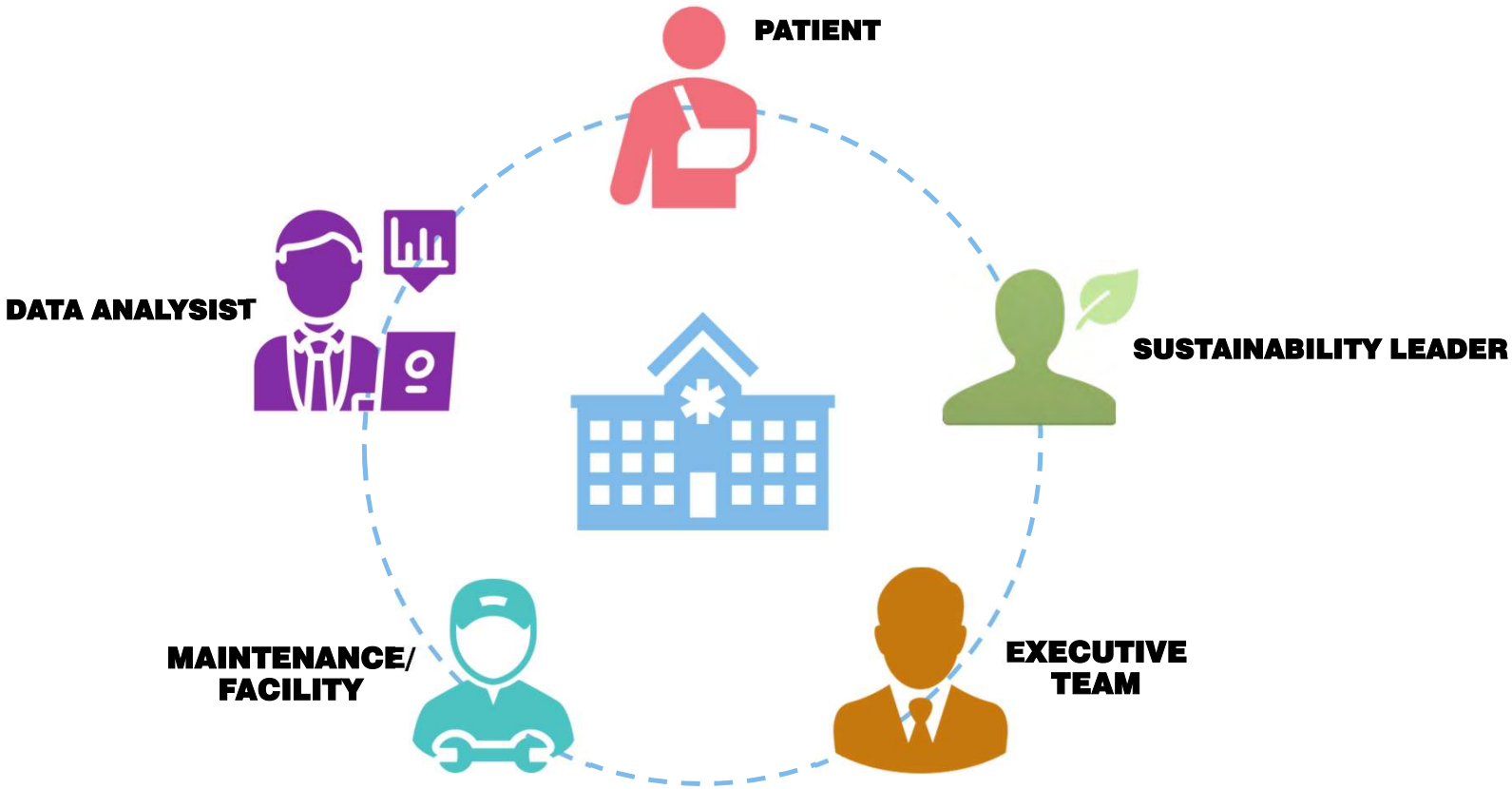
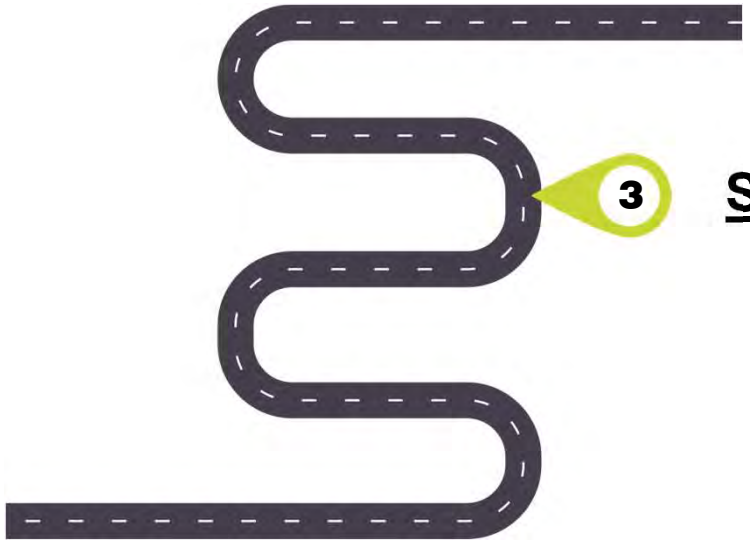
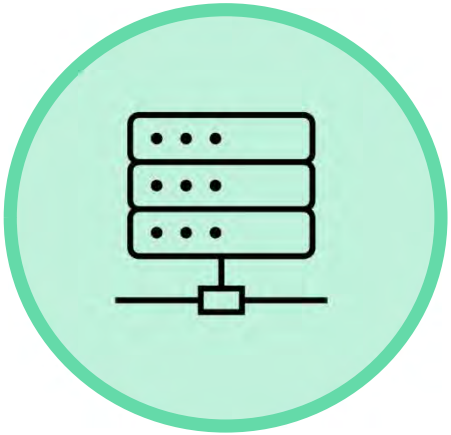




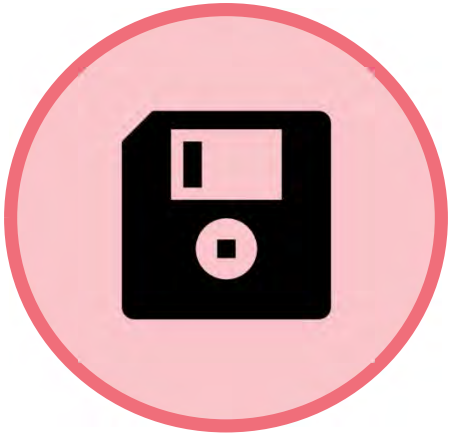
<u>Step 3:</u> Enable/Enhance Infrastructure.

Step #3: Enable/Enhance Infrastructure

Three Types of Infrastructure



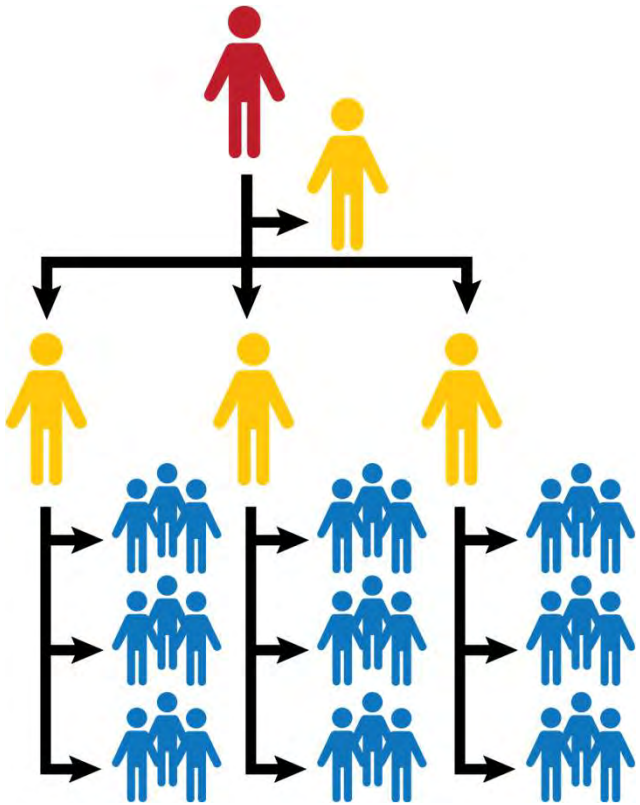
IT NETWORK



DATA

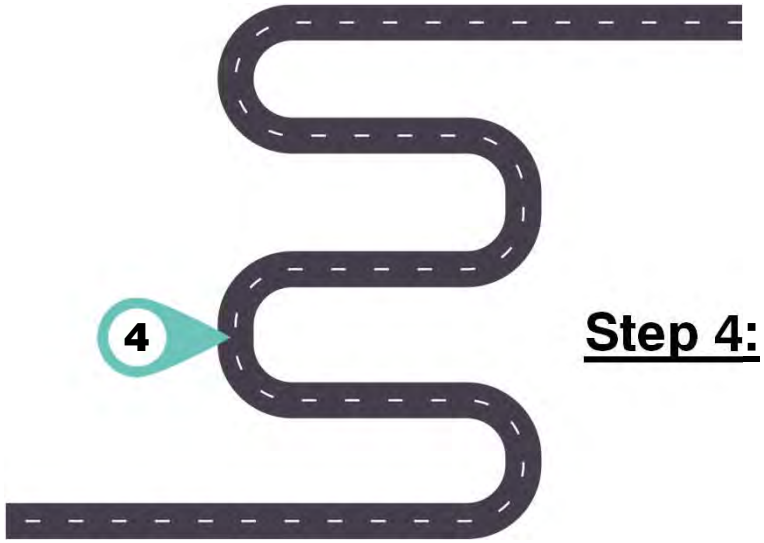
HUMAN INFRASTRUCTURE

Step #3: Enable/Enhance Infrastructure



Enhance Human Infrastructure:

- Data Quality and Standards
- Applications Engineering
- Central Building Operating Center (BOC) Roles
- Information Technology Functions in Facilities Management



<u>Step 4:</u> Systems Integration.

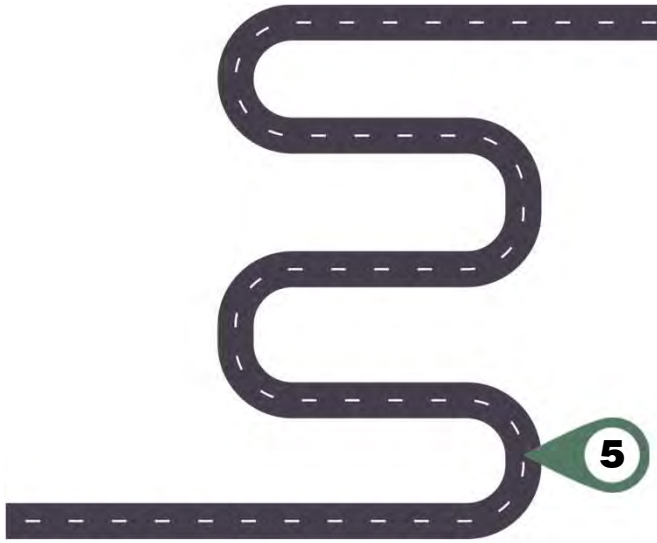
4 Step #4: Integrate Systems

Data Historian

- Single repository of data from multiple systems
- Different Apps pull data from one source
- Reduce time sharing data with disparate stake holders
- Historical retrieval / Pattern Recognition

Data Historian

- Iconics (Industrial)
- OSI Pi (Industrial)
- HanPrism (Industrial)
- Clockworks (Commercial)
- BAS (Commercial)
- IT Department's Home-Grown Option

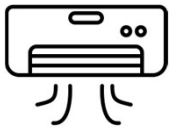


<u>Step 5:</u> Operations and Maintenance.

- Commissioning
- Data-driven design

Step #5: Operations & Maintenance

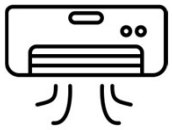
2 hours

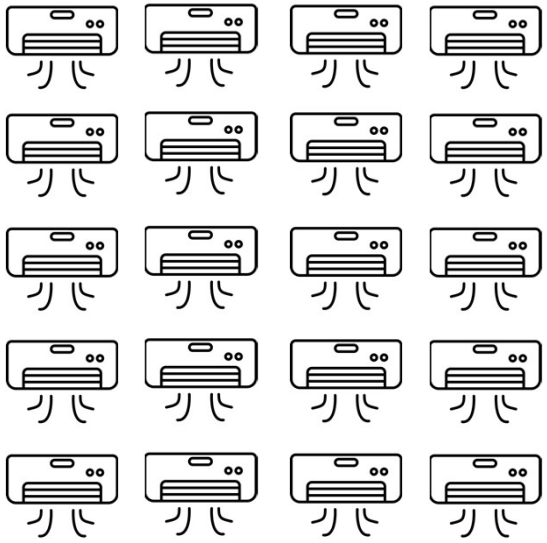


1 FCU

Step #5: Operations & Maintenance

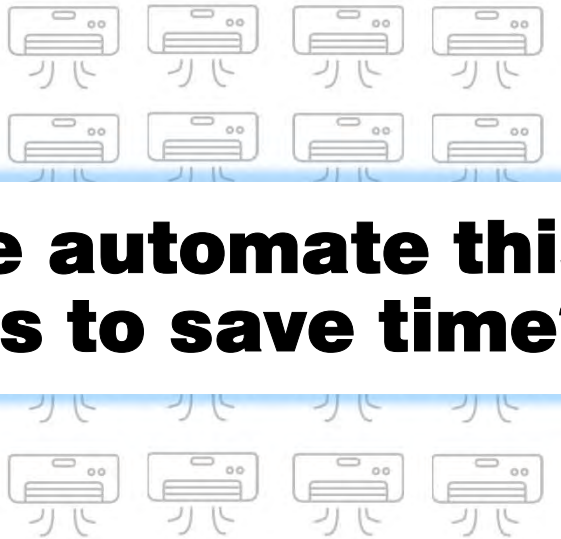
$$\frac{\text{2 hours}}{\text{1 FCU}} \times \text{20 FCU} = \text{40 hours}$$





Step #5: Operations & Maintenance

Can we automate this process to save time?



40 hours

20 FCU

Digitization Outcomes

Why Digitize?

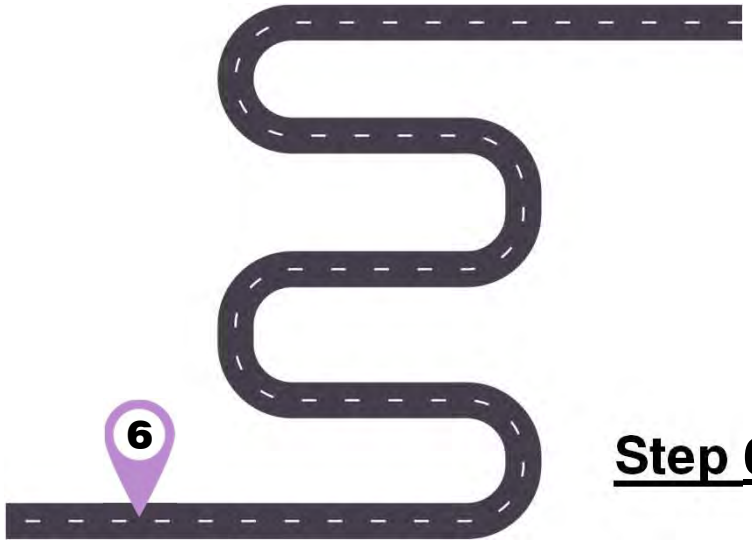
1. Enhance Safety
2. Improve Patient Comfort
3. Minimize Downtime
4. Increase Operational Efficiency
5. Realize Energy Savings
6. Leverage Data Empowered Design

Digitization Outcomes

Challenges and Lessons Learned

1. People/Culture – Change Management
2. Data Standards – Uniformity
3. Establishing the Business Case
4. Champion the Vision

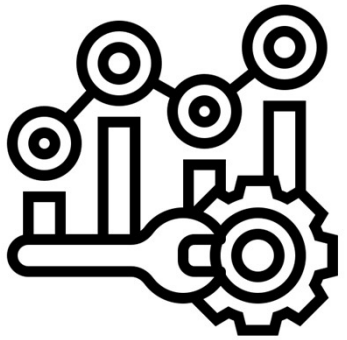
Digitization Outcomes



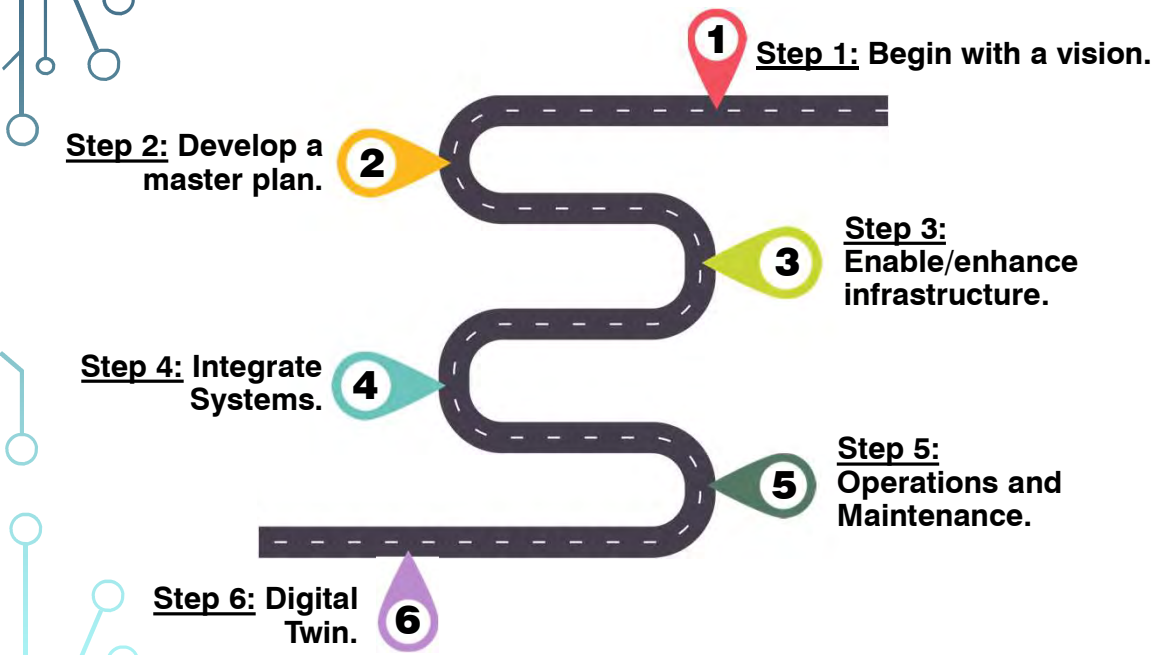
Step 6: Digital Twin.

APPLICATIONS IN HEALTHCARE:

- Single Pane of Glass
- Predictive Maintenance
- Data Driven Design
  - Optimizing Facility Layout
  - Enhancing Patient Flow
- Advanced Analytics
- Streamline & Simplify Operations



Summary



Highlights:

- Seeing Data as a utility
  - Collect Data NOW for the tools of tomorrow
- Digitization is a process
- Vision and Master Planning are essential

Contact Information

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