BUILDING OPERATING MANAGEMENT'S

NFMT®2020

Celebrating 20 years of being rated the #1 event in the FM industry

FM Metrics: Day-to-Day Data

A conceptual framework for organizing and using data for better facility planning and management

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Abstract

While big data, machine learning, and artificial intelligence offer great promise for facility management, many facility groups are just starting to acquire and deploy these advanced systems.

This session will outline how available and affordable "small data" approaches can create a useful facility data pool/metrics for current needs along with and during the transition to emerging new data technologies.

What is Day to Day Data?

Information that helps us know we are consistently providing:

- the **expected work environment and services**
- at a **competitive cost**
- with **acceptable risk.**

This comes down to three key questions about our facilities:

1. Are we providing the right ones?
2. Are we running them well enough?
3. Are we making the appropriate investments in them?

Day to Day Data is what we need to know to stay on track.

Example Day to Day Data for Facility Management

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Goal	Status	Alarms	Alerts	Tracking Data
Workplace Functionality	Workplace Events	Unwanted activity, Priority Demand work, Conditions < SLA	Unusual activity	Space Utilization, DM WO
Proper Asset Operation	System Operations	Equipment failure, Priority Corrective work	Equipment warnings	CM WO
Maintain Asset Health	Maintenance Work	Workplan compliance, Incidents	Work progress variance	PdM, PM, Scheduled WO
Maintain Asset Condition	Project Work	Workplan compliance, Incidents	Work progress variance	FCI, Capital WO
Organization Objectives	Safety & Sustainability	Leaks, spills, releases, incidents	Energy warnings	Energy, water, chemicals
Effective FM Operations	Resources & Feedback	Staffing shortage	Significant variance	Staffing, Budget variance

Advanced technologies are driving unprecedented change

THE CONTEXT

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Rapid Changes in Facilities Management Technology

- Mobile Apps – Users & Staff
- IoT Sensor Technology – Billion$$ of growth
- Facility Software Systems
  - Real Time Energy Management
  - Integrated Building Automation/Management
  - Integrated Workplace Management

Data is becoming more real time and integrated →Day to Day

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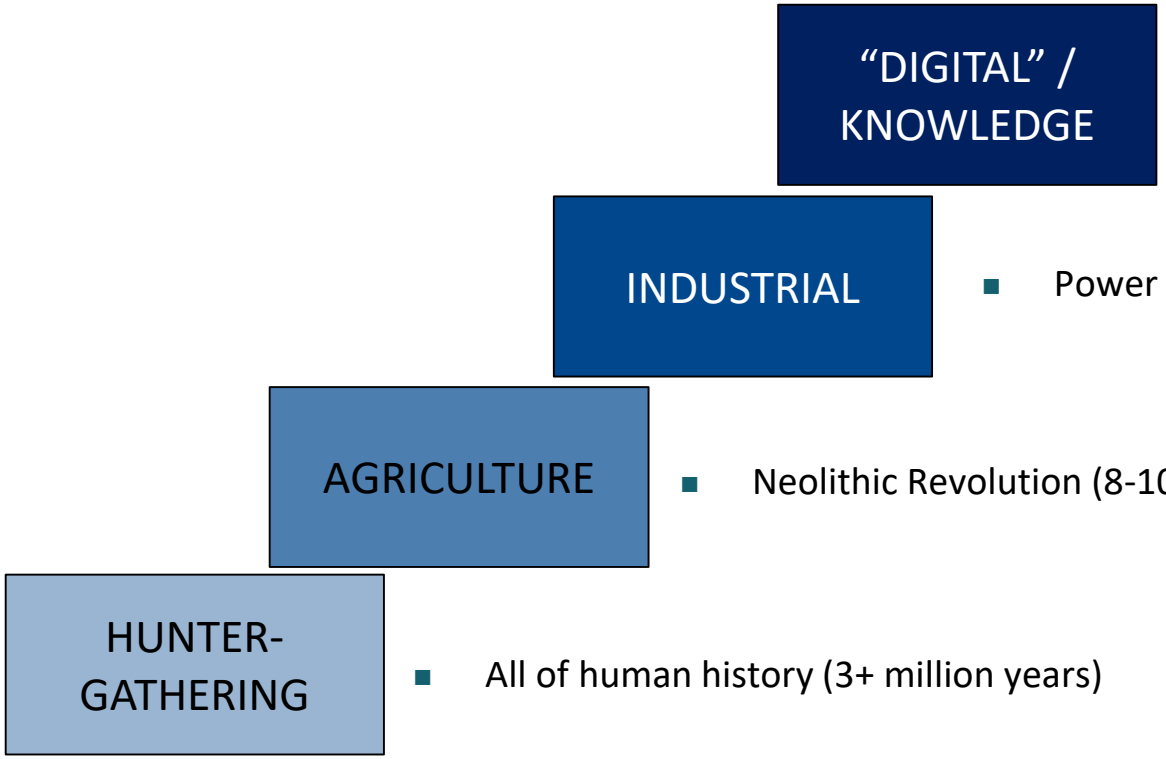
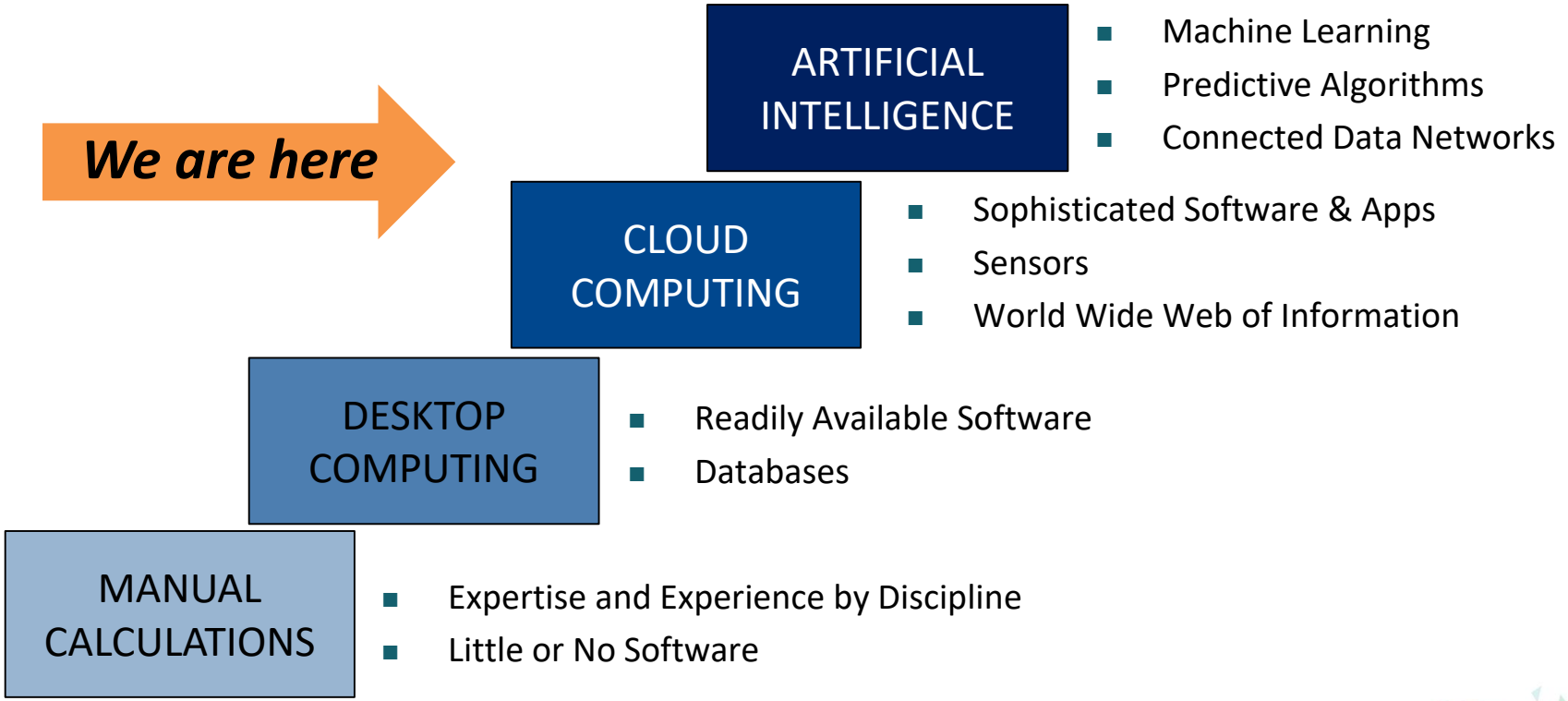
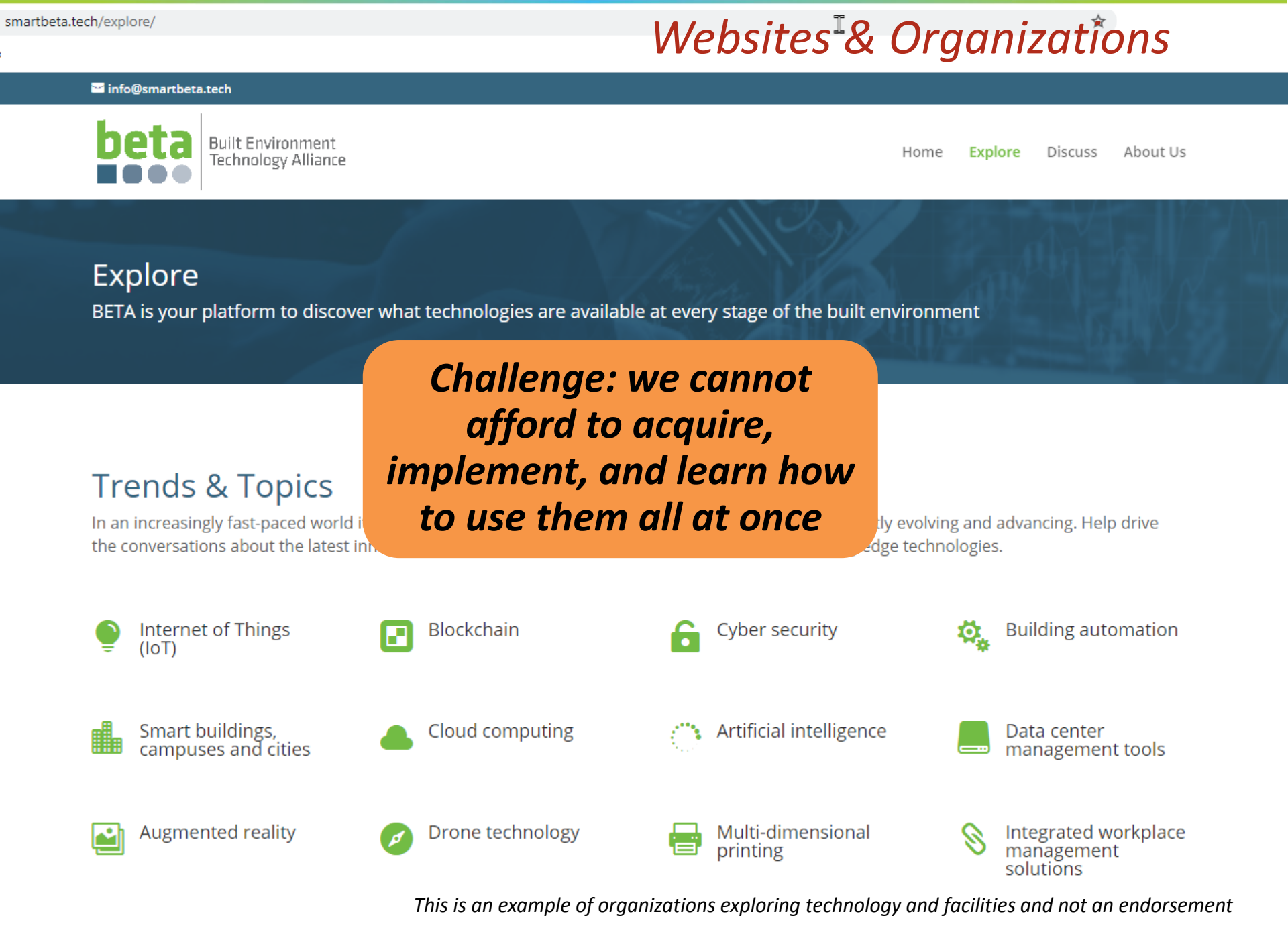
Data Changes are Part of Fundamental Social-Economic Evolution



Progression in Data Technology



Websites & Organizations



This is an example of organizations exploring technology and facilities and not an endorsement

How can we use the data and tools we have today?

and

Position ourselves to use the emerging data and tools as they become available to us?

THE PROBLEM STATEMENT

Challenge: Also need to avoid data overload!

Facility Data is Contained in Many Systems

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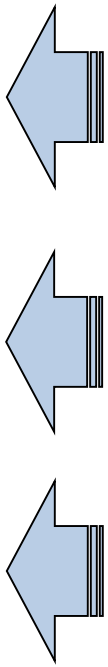
- Space
- Cost
- Facility Attributes
- Real Estate / Lease
- Use / Occupancy
- Work Orders
- Building System Data
- Utilities
- Operations/Practices



- CAFM
- Finance/ERP system
- Excel file
- Leases
- HR system
- CMMS/IWMS
- BMS
- EMS, bills
- Legacy knowledge, Paper documents, Procurement, Mobile Apps, Email, etc.

Recognize facility-related data that is available and useful wherever it is found

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Integrate Data as Needed

Use Single Application if Sufficient

- BMS/BAS system
- CMMS system
- IWMS system
- ERP system

Integrate with Additional Data for Desired Info

- Data Warehouse / Data Lake
- Business Intelligence System
- Ad-Hoc

Issues associated with integrating facility data from multiple sources.

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- Identify KPQ → KPI (determine measures & metrics)
  - Focus on what is useful
  - Define data use & access (what? who? when?)
- Identify system(s) of record
  - Data definitions & matching keys (*do NOT need exact matches*)
  - Granularity (volume, variety)
  - Refresh schedule (velocity)
  - Conflicts (veracity)
- Data conversion plan: clean & transform
- Document to facilitate replacing with advanced systems

Start Small,

Start by Function, and

Start Now!

AN APPROACH FOR DAY TO DAY DATA

Start Small:

Small Data Continues to be Useful

- Organizes the Volume of Facility-Related Data
- Understandable
- Metrics Help Focus Perception
- Affordable Framework During Analytics Evolution
- Relatively Easy to Implement

Small data tools can create similar metrics as machine learning, and artificial intelligence.

You May Not Need More Data

- Gartner estimates that 97% of data in organizations is not consistently used

Can you use data you have (or will have) ?

- Early Detection and Intervention
- Cognitive Insight (understanding complex systems)
- Sufficient Historical Data for problem analysis & forecasting

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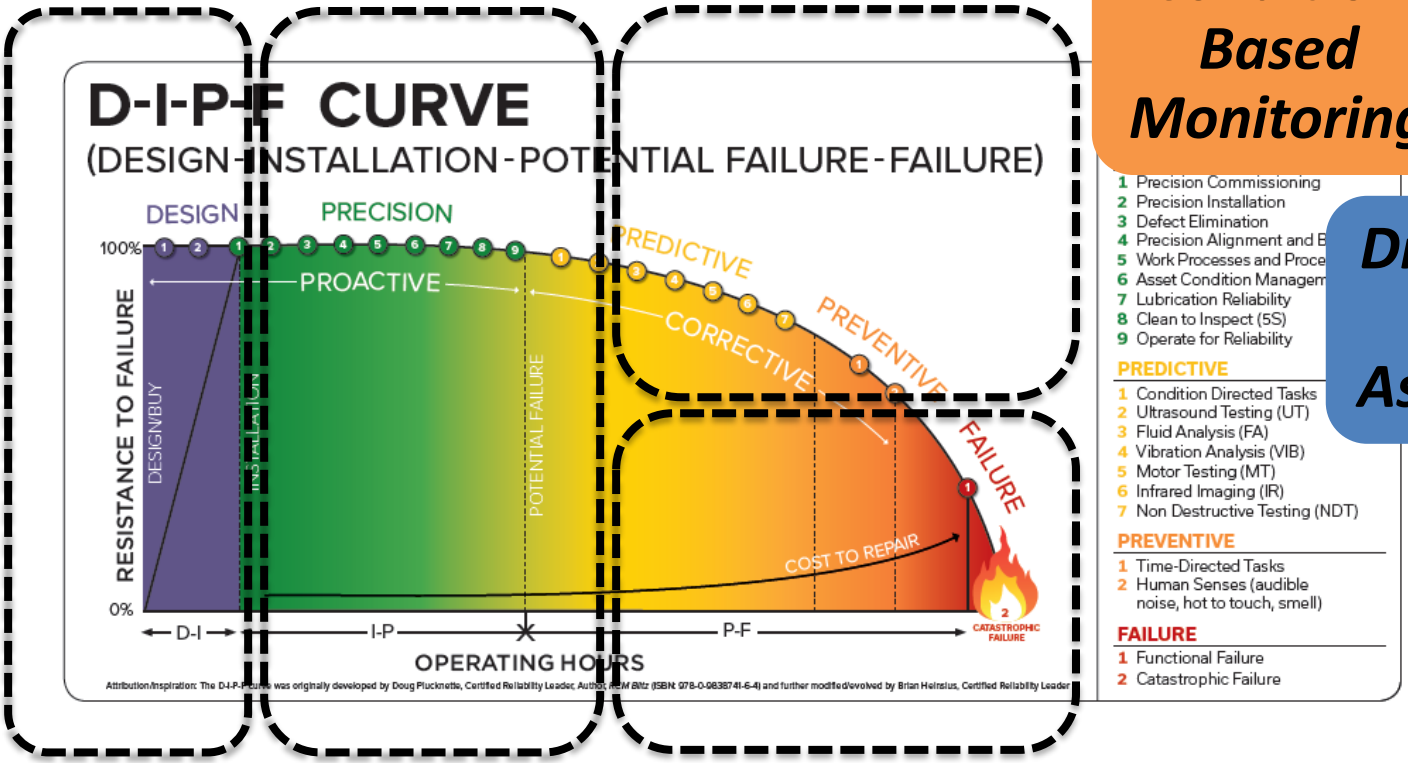
Application of Analytics



Condition Based Monitoring

Diagnostics & Risk Assessment

BIM, AI, Best Practices

Predictive Analytics

Root Cause Analysis/ Corrective Measures

Baseline Analytics for Management Plan

Anomaly detection

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Start by Function:

Align with Major Facility Functions

- Why Have Data?
- What are Major Facility Functions?
  - Pre-Facility (What facilities are needed?)
  - Post-Facility (How to best use and operate them?)
    - One-Time
    - Ongoing
  - Facility (& FM) Fit with Organization Mission
- What day-to-day data provides useful feedback (KPI)
  - Vs. What Standard? ("Normal," "Defined SLA," "Benchmark")

Why Have Facility Data?

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Data provides Feedback on Key Facility Functions

How are we doing (vs. SLA)

- ***Effectiveness**: are we doing it well enough?*
- ***Timeliness**: are we doing it on schedule?*
- ***Efficiency**: are we doing it within budget?*
- ***Utility**: do we still need to be doing it or change SLA?*

Feedback is How We Stay on Course

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Define Set of SLAs for Each Property Based on Strategic Facility Plan

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- Type of Facility/Space Provided
- Environment(s) Provided by Facility
- Availability/Reliability of Facility
- Quality/Condition of Facility (some examples:)
  - Maintain facility infrastructure in __ condition.
  - Acceptable downtime is ___ hours.
  - Non-critical repair completion time within ___ days.
  - Maintain building finishes to present appropriate organization image.
  - Maintain grounds to present appropriate organization image.
  - Complete authorized building service requests within ___ days.
  - Cleaning levels to be per __ level.
- Sustainability of Facility

Define "normal"

Use Day to Day Data to identify when something is not normal

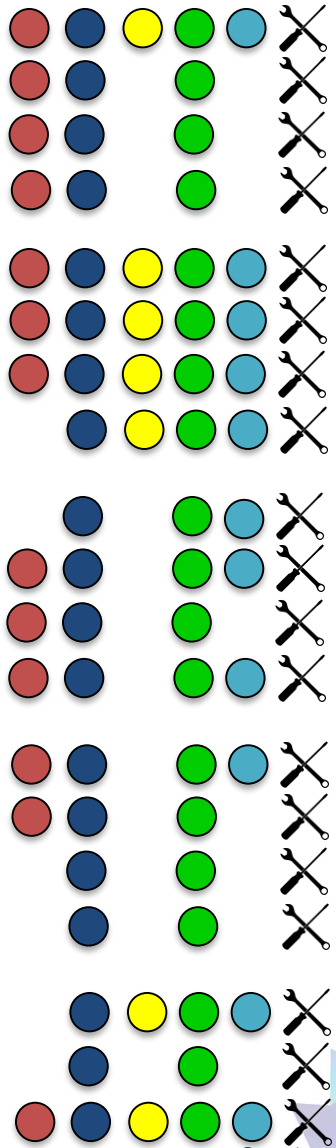
Start Now:

Look at Current Systems and Data

- What Data Do You Have?
  - What Would You Like to Have?
- What Would You Like to Put on Auto-Pilot?
  - Standard rules and responses to situations
  - When does something need attention (and whose?)
- What day-to-day data provides useful feedback (KPI)
  - Vs. What Standard? ("Normal," "Defined SLA," "Benchmark")
  - Which of this is NOT available in single system?

Day to Day Data: FM Operations

Current Systems	Typical Data
BMS, BAS, EMS	• Equipment Status • Alarms & Alerts • Energy Use • Downtime
CMMS, IWMS	• Predictive / CBM Work • Preventive Work • Corrective Work • Demand Work
CAFM, IWMS, CADD	• GSF by Type & Condition • Occupancy / Utilization • Space Assignments • Room Booking
ERM, Finance	• Staff & Contractors • Hours • Budgets, Asset Values • Cost (Activity Base?)
Other	• Project Info • Lease Info • Safety, Security



Emerging Technologies

- 5G
- AI / ML
- AR / VR
- Big Data
- Blockchain
- Facial Recog.
- IoT / Sensors
- Robotics / RPA
- Drones
- Speech Recog.
- 3D Print
- Video Anal.

Example Day to Day Metrics

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Goal	Effectiveness	Timeliness	Efficiency	Utility
Workplace Functionality	Occupant Sat. DMWO/Occupant % Space SLA	Space Availability Response Time/DMWO	Space Utilization GSF/Occupant	Assessment of current space & identify shortfalls / surpluses
Proper Asset Operation	% Unsched. WO % Environ. SLA % Cleaning SLA	Complete Time/CMWO Detect/Correct Time	Cost of Cleaning	Assessment of how well you are operating facility
Maintain Asset Health	Outage Rate % Maint. SLA % Scheduled WO	% Ontime PdM, PM	% Cost Corrective Maint. $/activity	Assessment of how well you maintain facility
Maintain Asset Condition	FCI (by system) Asset RAV/Market Compliance	Projects on Schedule	Projects on Budget RenewalCapital/RAV	Assessment of facility investment impact
Organization Objectives	Safety Incidents Comply Incidents EUI % Green SLA	Detect/Correct Time	Incremental Cost/ Savings	Assessment of how well you are meeting organizational goals
Effective FM Operations	Staff Engagement Process Initiatives	Staff Vacancy Duration Initiatives on Schedule	GSF/FTE Budget Variance TCO	Assessment of how well you are managing FM resources