# *NIH Office of Research Facilities (ORF)*
# *Integrated Workplace Management System (IWMS)*

For: Federal Facilities Council (FFC)

Standing Committee on Real Property Inventory, Planning, and Transactional Real Estate

By: Kylash Ramesh, National Institutes of Health (NIH)

Date: 11/21/2024

# Agenda

1. **Speaker Bio & Background of NIH Office of Research Facilities**

2. **NIH ORF's Legacy Technology & Data Landscape**

3. **The ORF Integrated Workplace Management System (IWMS)**
   - Objectives
   - Analysis of Alternatives (AoA)
   - Acquisition & Funding Strategy
   - Implementation Approach

4. **Connecting NIH Facility Lifecycle Data**
   - Data Governance
   - Space Data Management
   - Asset & Parts Data Management
   - Facility Services & Transactions
   - Connecting Space, Assets, & Parts

5. **Beyond IWMS: Geometric Digital Twins, Operational Technology & IoT**

# BACKGROUND

# Speaker Bio

**Name:** Kylash Ramesh, PMP, LSSBB, FAC-COR III
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**Title(s):**
Program Manager, Integrated Workplace Management
Chair, ORF IT Governance

**Educational Background:**
B.S. from UMCP in Business/Economics
M.S. from UMGC in Cybersecurity Technology

**Professional Background:**
NIH since 2016 – first job after college
Interned at MEP Engineering firm before NIH

**Podcast Episode:**
"Supplement the Data" – Asset Management Decision-Making for Owners & Integrating Data and Human Experiences

# Background of NIH Office of Research Facilities (ORF)

**Mission:** Provide, maintain, and operate safe, healthy, and attractive NIH facilities.

**Lifecycle Functions:** Planning, Construction, Operations & Maintenance, Re-capitalization

**Support Functions:** Utilities, Energy, Environmental, Accreditation, Real Estate/Lease, Budget/Finance, Acquisitions

**Scale:** Over 300+ buildings; tens of millions of sqft.

**Complexity:** Heterogenous mix of space types, ranging from basic office & residential, to highly sophisticated mission critical 24/7/365 facilities

# NIH ORF's Legacy Technology & Data Landscape

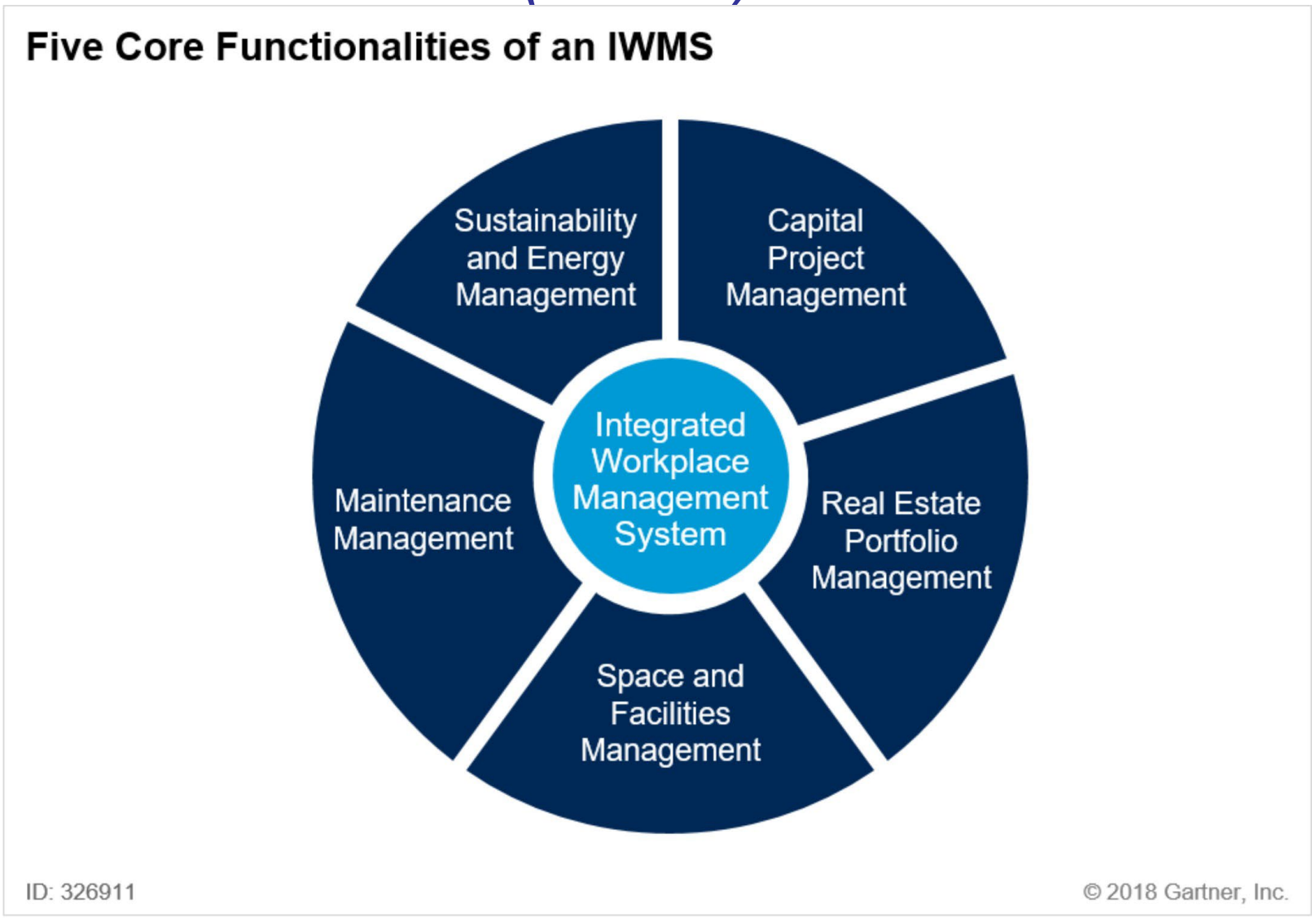
- Maintenance had 3 different systems.
- Construction had 2 different systems.
- Capital Planning had 3-5 "systems".
- Space had its own system.

## ORF's Legacy Systems & Data:

- did not meet full functional or technical requirements.
- did not provide ease of use to users and customers.
- were not integrated in a manner which supports data visibility or cross-functional workflows.
- some on-premise
- some in non-FedRAMP cloud environments
- some no longer supported by vendor

# *THE ORF INTEGRATED WORKPLACE MANAGEMENT SYSTEM (IWMS)*

# What is an Integrated Workplace Management System (IWMS)?



# Objective

**Objective:** Improve ORF's efficiency, effectiveness, and accountability when administering the NIH Facility Lifecycle by procuring, implementing, and sustaining an Integrated Workplace Management System (IWMS)

**Improve efficiency:**

- NIH Occupants use 1 system to request facility services (maintenance, construction, space), instead of multiple
- NIH Facility staff manage work and provide status updates in 1 system, instead of multiple
- NIH Facility System Admins & Data Analysts oversee 1 system, instead of multiple

**Improve effectiveness:**

- Reduce unexpected downtime through risk-based preventative and predictive maintenance
- Provide targeted & non-technical communication to affected occupants for planned and unplanned utility outages
- Mature Asset Management to forecast, budget, plan, and develop projects to address assets nearing end-of-life

**Improve accountability:**

- Expand transparency to NIH occupants and oversight bodies demonstrating data-driven decision making

# Step 1: Working Group & Analysis of Alternative (AoA)

1. In 2019, ORF established a working group with representatives from each functional area (Maintenance, Construction, Space, Capital Planning) to identify software requirements for their respective functional area.

2. ORF received dozens of software demos from vendors to learn about the products in the marketplace and ask questions.

3. Ultimately, ORF established 140 individual requirements, and weighted each requirement.

4. ORF identified 3 potential software solutions on the short-list: Archibus, IBM TRIREGA, & Nuvolo.

5. Each of the 3 potential solutions were evaluated based on how well the requirements were met.

| Performance Rating - Weight | ARCHIBUS | IBM TRIRIGA | Service-Now Nuvolo |
|---|---|---|---|
| **Green (Total)** | **103** | **118** | **122** |
| Green - Critical | 35 | 38 | 40 |
| Green - High | 49 | 54 | 54 |
| Green - Medium | 13 | 17 | 19 |
| Green - Low | 6 | 8 | 8 |
| **Yellow (Total)** | **31** | **18** | **18** |
| Yellow - Critical | 6 | 4 | 3 |
| Yellow - High | 13 | 8 | 9 |
| Yellow - Medium | 8 | 4 | 3 |
| Yellow - Low | 4 | 2 | 3 |
| **Red (Total)** | **6** | **4** | **0** |
| Red - Critical | 2 | 1 | 0 |
| Red - High | 1 | 1 | 0 |
| Red - Medium | 1 | 1 | 0 |
| Red - Low | 1 | 1 | 0 |
| **Total** | **140** | **140** | **140** |

**GREEN - Proficient**

**YELLOW - Acceptable**

**RED - Unacceptable**

| Requirement Weight Key |
|---|
| **CRITICAL** - Go / No-Go |
| **HIGH** – A mission critical requirement; required for the next release |
| **MEDIUM** – Supports necessary system operations; required eventually but could wait until a later release if necessary |
| **LOW** – A functional or quality enhancement; would be nice to have someday if resources permit |

# Step 2: IT Governance, Funding, & Acquisitions

1. In early 2020, after identifying Nuvolo as ORF's preferred IWMS solution, we obtained IT Governance approvals for procurement.

2. We then submitted an FY21 funding request to provide non-recurring funds for the initial implementation labor, and recurring funds for the licenses.

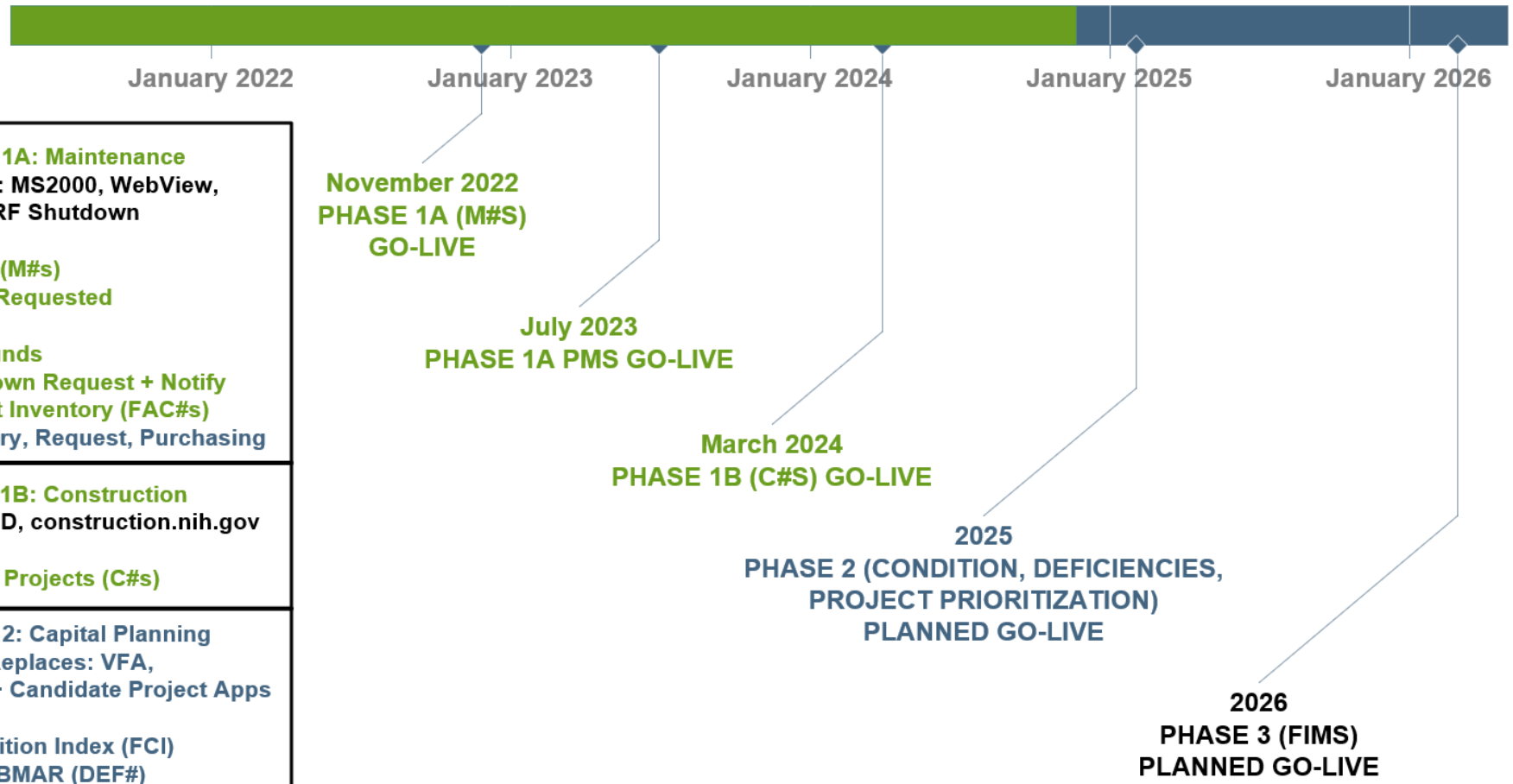
3. Afterwards, we identified the NIH Information Technology Acquisition and Assessment Center (NITAAC) and the CIO-SP3 GWAC as the most suitable acquisition approach.

4. In May 2021, ORF awarded the IWMS contract, which provided implementation labor hours and software licenses for the Nuvolo solution.

# *Implementation Approach: Phased by Function*

| IWMS Phase | Status | Functions | Facilities Role |
|---|---|---|---|
| **Phase 1A:** Maintenance & Asset Management | Completed 2022/2023 | • Customer-Requested Maintenance<br>• Preventative Maintenance (PMs) & Repairs<br>• Asset Inventory Management<br>• Parts Inventory & Purchasing<br>• Utility Shutdown Approval & Notification | Operations & Maintenance (O&M) |
| **Phase 1B:** Construction Project Management | Completed 2024 | • Baseline Planned Budget & Schedule<br>• Actual Obligations & Schedule Milestones<br>• Weekly Status Updates & Project Health<br>• Project Closeout & Turnover | Project Managers & CORs |
| **Phase 2:** Capital Planning | Ongoing | • Condition Assessment<br>• Deficiency Identification<br>• Candidate Project Development<br>• Candidate Project Scoring & Prioritization | Engineers |
| **Phase 3:** Space Management | Planned for 2025/2026 | • Campuses, Buildings, Floors, Rooms<br>• AutoCAD Floorplans<br>• Space Reservations & Hoteling<br>• Key, Lock, and Space Requests | Architects |

# ORF Integrated Workplace Management System (IWMS) 5 Year Roadmap




**Phase 1A: Maintenance**
**Replaced: MS2000, WebView, ORF Shutdown**

- Work Orders (M#s)
  - Customer Requested
  - Repairs
  - PMs & Rounds
- Utility Shutdown Request + Notify
- Facility Asset Inventory (FAC#s)
- Parts Inventory, Request, Purchasing

**Phase 1B: Construction**
**Replaces: UPD, construction.nih.gov**

- Construction Projects (C#s)

**Phase 2: Capital Planning**
**Replaces: VFA, Deficiency + Candidate Project Apps**

- Facility Condition Index (FCI)
- Deficiencies/BMAR (DEF#)
- Def. -> Candidate Project -> C#

**Phase 3: Space Management**
**Replaces: FIMS**

- Campuses, Buildings, Floors, Rooms
- AutoCAD Floor Plans
- Space Requests (S#)
- Locksmith/Keys (L#/K#)
- DART, GAIT, SIRC

**Green = Complete**

**Blue = Ongoing**

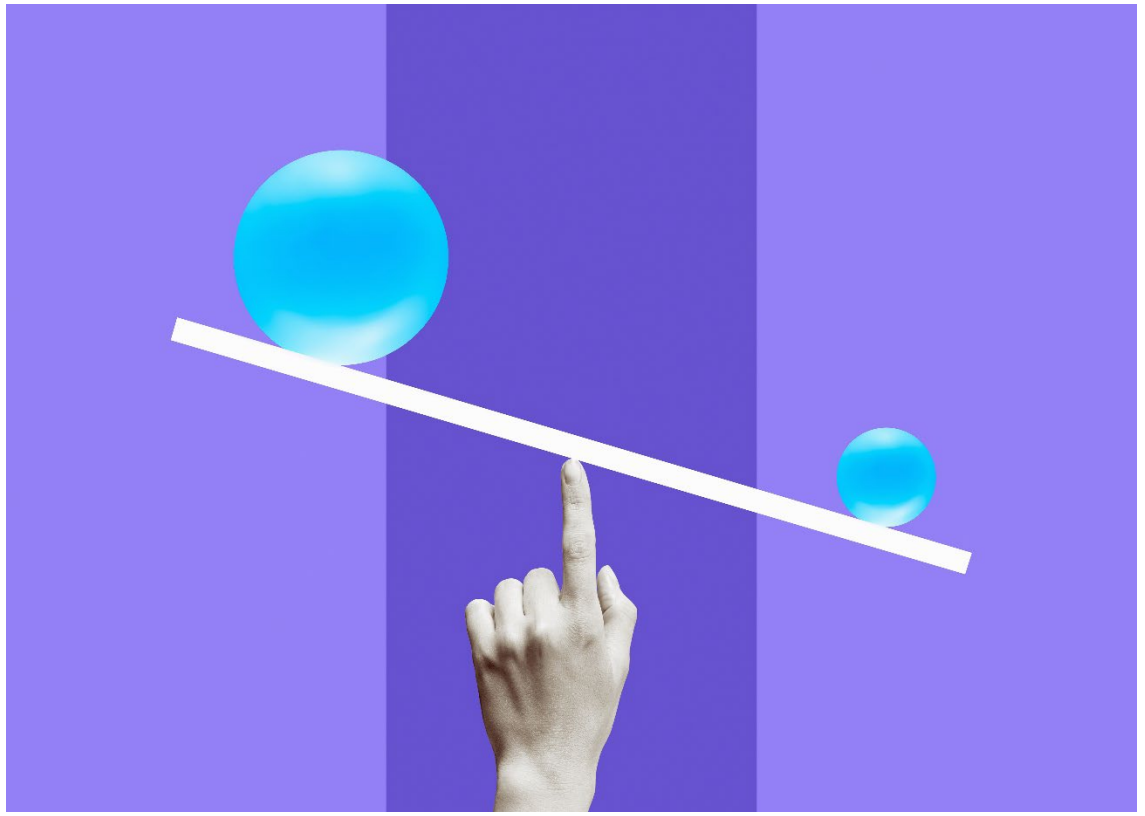
**Black = Planned**

# CONNECTING NIH FACILITY LIFECYCLE DATA

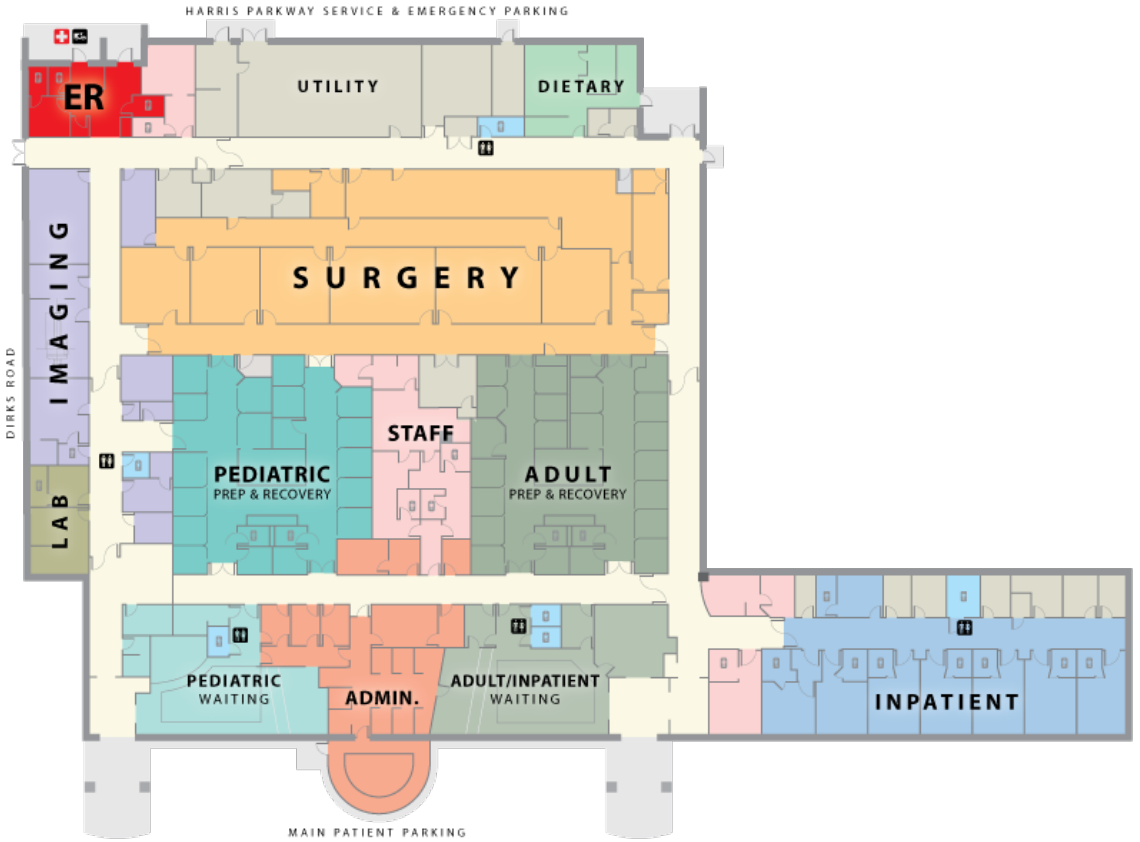
# Data Governance

- An IWMS provides more value when the underlying data is used for decision-making.
- We should only use high quality data to make decisions; otherwise, we risk making the wrong decision by using inaccurate data.
- Maintaining data takes resources, and we should only track a volume and granularity of data that can be maintained.

- How do we obtain & sustain high quality data?
  - **Standards (What)** – how is the data named, classified, and structured? What data is in-scope vs out-of-scope?
  - **Access & Ownership (Who)** – who should be able to see the data? Who is responsible for keeping it accurate?
  - **Changes (When)** – how is the data changed and when does it need to be updated?
  - **Source (Where)** – where is the data authoritatively stored and updated?



# Space Inventory Data Management




- NIH has several campuses, each campus has several buildings, each building has several floor(s), and each floor has several rooms.
- This data is structured in a Space Hierarchy within ORF's IWMS solution, Nuvolo.
- This data can be viewed by all NIH/ORF staff, but can only be created, edited, and deleted by a dedicated ORF team.
- The area (sqft.) data is calculated using standards from the Building Owners and Managers Association (BOMA)
- The Buildings are classified in accordance with HHS, GSA, and OMB policies.
- The Rooms are classified using OmniClass Table 13 from Construction Specification Institute (CSI)

# Asset & Parts Inventory Data Management

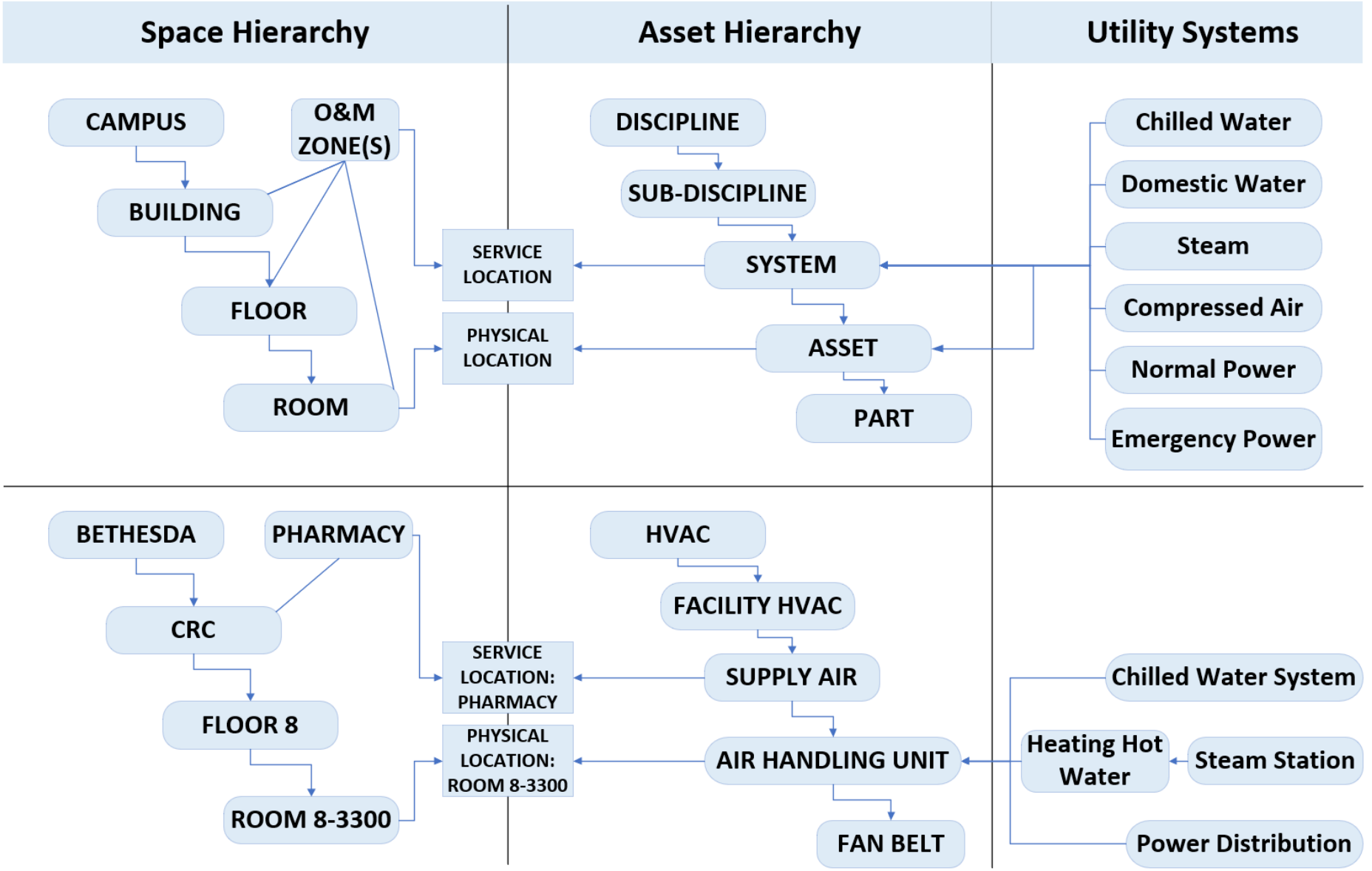
- NIH ORF is responsible for millions of physical products with varying levels of cost and risk of failure.
- We cannot maintain millions of data records; therefore, we must distinguish between Assets vs Parts.
- We track physical products that carry high costs or high risk of failure as “Assets”; everything else are “Parts”
- This data can be viewed by all NIH/ORF staff, but can only be created, edited, and deleted by a dedicated ORF team.
- The Assets are classified & named using UniFormat from Construction Specification Institute (CSI).
- The ORF Asset Hierarchy lists all products that ORF tracks as assets.

# Facility Services & Transactions

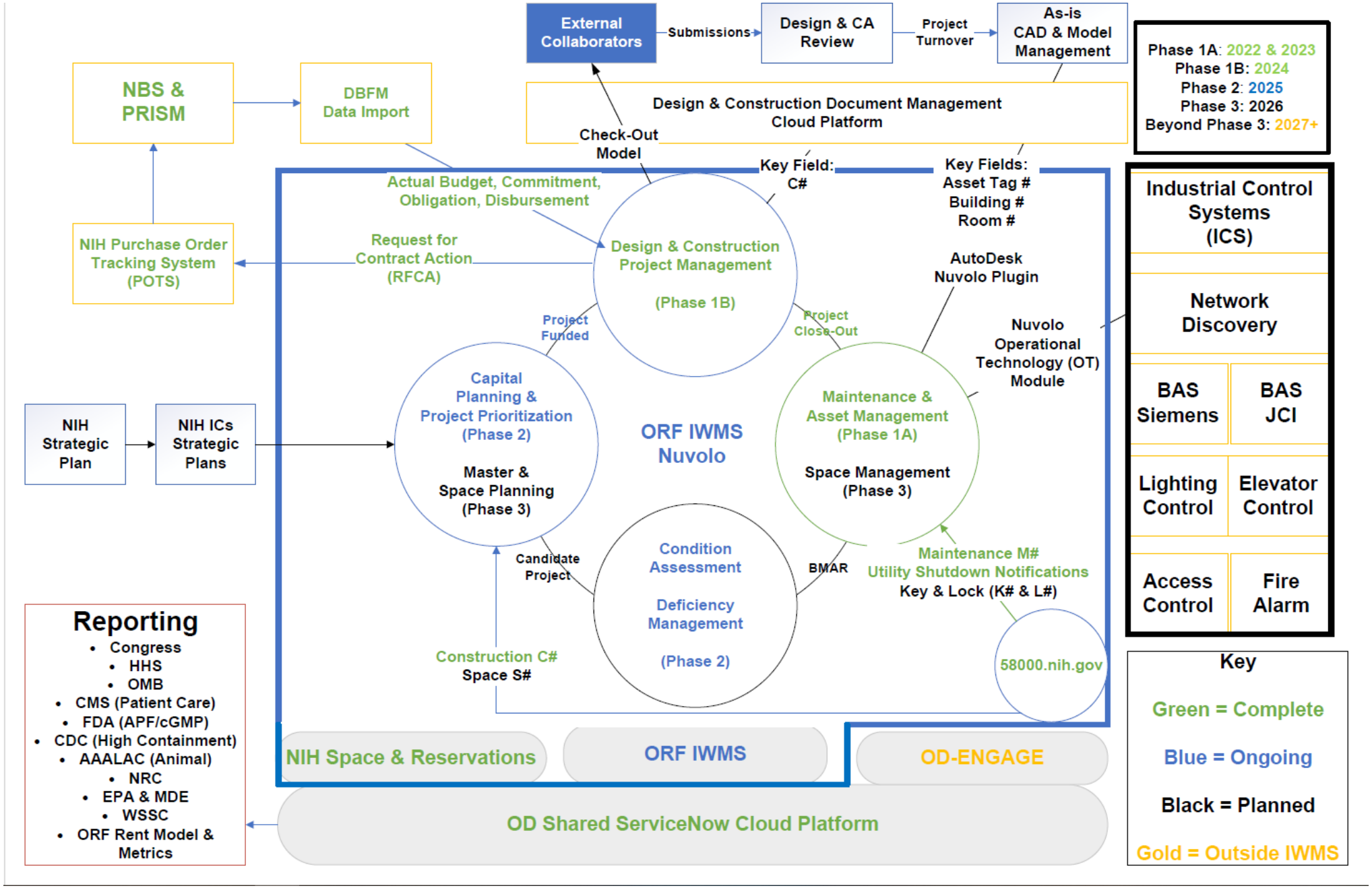
| Service | Unique Tracking # Prefix | Example Tracking # |
|---|---|---|
| Maintenance Work Order | M# | **M**30140184 |
| Key Request | K# | **K**1381048 |
| Lock Request | L# | **L**1204018 |
| Construction Project | C# | **C**200180 |
| Condition Assessment | FCA# | **FCA**10009 |
| Deficiency | DEF# | **DEF**424812 |
| Candidate Project | CAND# | **CAND**20008 |
| Space Request | S# | **S**201830 |

- Space & Asset Data are the foundational sets of reference data for Facility Owners.
- We want to ensure that all the services we provide are “linked” or “tied” to the Spaces and/or Assets that the service is applicable to.
- For example, we want to know what assets were installed, modified, or demolished by a Construction Project, and the spaces affected by that project.
- Put differently, none of our services should have a “free-text-box” when indicating the space or asset applicable to the service – **it should always be a “drop down menu”.**
- **This is only feasible if the data is in 1 system.**

# Connecting Spaces, Assets, & Parts



# *BEYOND IWMS: GEOMETRIC DIGITAL TWINS, OPERATIONAL TECHNOLOGY & IOT*


External Collaborators
Submissions
Design & CA Review
Project Turnover
As-is CAD & Model Management
Phase 1A: 2022 & 2023
Phase 1B: 2024
Phase 2: 2025
Phase 3: 2026
Beyond Phase 3: 2027+
NBS & PRISM
DBFM Data Import
Design & Construction Document Management Cloud Platform
Check-Out Model
Key Field: C#
Key Fields: Asset Tag # Building # Room #
Actual Budget, Commitment, Obligation, Disbursement
Industrial Control Systems (ICS)
NIH Purchase Order Tracking System (POTS)
Request for Contract Action (RFCA)
Design & Construction Project Management
(Phase 1B)
AutoDesk Nuvolo Plugin
Network Discovery
Project Funded
Project Close-Out
Nuvolo Operational Technology (OT) Module
BAS Siemens
BAS JCI
NIH Strategic Plan
NIH ICs Strategic Plans
Capital Planning & Project Prioritization (Phase 2)
Master & Space Planning (Phase 3)
ORF IWMS Nuvolo
Maintenance & Asset Management (Phase 1A)
Space Management (Phase 3)
Lighting Control
Elevator Control
Condition Assessment
Deficiency Management
(Phase 2)
Candidate Project
BMAR
Maintenance M#
Utility Shutdown Notifications
Key & Lock (K# & L#)
Access Control
Fire Alarm
Reporting
Congress
HHS
OMB
CMS (Patient Care)
FDA (APF/cGMP)
CDC (High Containment)
AAALAC (Animal)
NRC
EPA & MDE
WSSC
ORF Rent Model & Metrics
Construction C# Space S#
58000.nih.gov
Key
Green = Complete
Blue = Ongoing
Black = Planned
Gold = Outside IWMS
NIH Space & Reservations
ORF IWMS
OD-ENGAGE
OD Shared ServiceNow Cloud Platform