B. M. S. COLLEGE OF ENGINEERING

(Autonomous Institute, Affiliated to VTU)
Bull Temple Road, Basavanagudi, Bengaluru - 560019

Course -

"DATA CENTER INFRASTRUCTURE MANAGEMENT"

Submitted By

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Submitted to

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C E R T I F I C A T E

Certified that the Seminar has been successfully presented at B.M.S College Of Engineering by Pramila Dalavai , bearing USN 1BM18IS068, in partial fulfillment of the requirements for the IV Semester degree in Bachelor of Engineering in Information Science & Engineering of Visvesvaraya Technological University, Belgaum as a part of the course during academic year 2019-2020.

Abstract
Data Center Infrastructure Management (DCIM) software is a new class of software that gives data center operators the ability to run efficient data center operations and improve data center infrastructure planning and design. It typically replaces Excel, Visio, and home grown databases. DCIM software can bridge information across organizational domains – Data Center Ops, Facilities, and IT to maximize utilization of the data center.
DCIM software provides data center operations managers with the ability to identify, locate, visualize, and manage all physical data center assets, quickly provision new equipment, and confidently plan capacity for future growth. DCIM tools can also help control energy costs, improve data center design, and increase operational efficiency.

Implementing a Data Center Infrastructure Management solution provides data center operations managers and their companies with significant operational and cost-saving benefits, today and into the future.

Problem Statement

A data center architecture is designed to provide an organization with certain types of resources. These include processing power, also called “compute” (CPU), storage (RAM and disk space), and networking connectivity.

While an organization can deploy all of these resources in an data center, these same resources are available for lease. Instead of purchasing and maintaining their own physical infrastructure, virtual data centers allow organizations to rent our virtual infrastructure from cloud providers at need.

DCIM software solves problems related to gathering information needed to enable Data Center Managers to effectively and efficiently manage the Data Center infrastructure.

Introduction

An intelligent DCIM solution provides the ability to better manage assets, change and capacity. DCIM software also enables power monitoring, environmental monitoring and energy management. Specifically, DCIM enables Data Center Managers to get answers to these specific questions so they can make better and more informed decisions, quickly, and get their work done.

Monitoring and data collection, thresholds, and alerts to accommodate tens of thousands of nodes across multiple data centers. This includes Intelligent Rack PDUs, Floor PDUs, Remote Power Panels (RPPs), Busways, UPS, CRACs, and environmental sensors. Plus, considerations for multiple protocols that exist including SNMP, ModBus, and BacNet.

Inventory Information from racks, servers, storage, network equipment, including network connectivity, power chain, and applications. Complete critical infrastructure information plus the relationships between IT and Facilities equipment with mapping down to the physical port level between each device.

Background Work

One of the challenges Data Center Managers face when implementing a DCIM solution is controlling the costs and complexity of migrating their current processes to a DCIM. While a system covering all or even some of the aspects of a DCIM - Asset, Capacity, Change, Power, Environment, and Energy - might be the ultimate goal, it is not necessary to implement it all from day one to receive a positive ROI.

Implementing a DCIM solution in phases can be just as cost-effective, and in fact might yield a quicker ROI than waiting to start using DCIM once each solution set is ready. For instance just moving from spreadsheets to an automated asset management solution, with the ability to get visual/textual information on your space and assets from a centralized database, can save tens of thousands of dollars in record keeping and processes.

The benefits of a DCIM solution can be found in time savings, people productivity, and cost savings. Employees no longer need to be on-site to identify what assets are in the data center and what space, power and cooling is available. Data Center Managers can have access to accurate data in real time at a click of a button. Understanding asset details and their physical power and network connections enables highly accurate capacity planning, down to the single port or 1 rack U level. Critical path capacity points are automatically and easily identified, reducing risks of failures. Reservations, moves, adds, and changes are accomplished with ease. Employee productivity and morale dramatically increases as processes and workflows are implemented to ensure high quality changes in the data center.

Tools Used

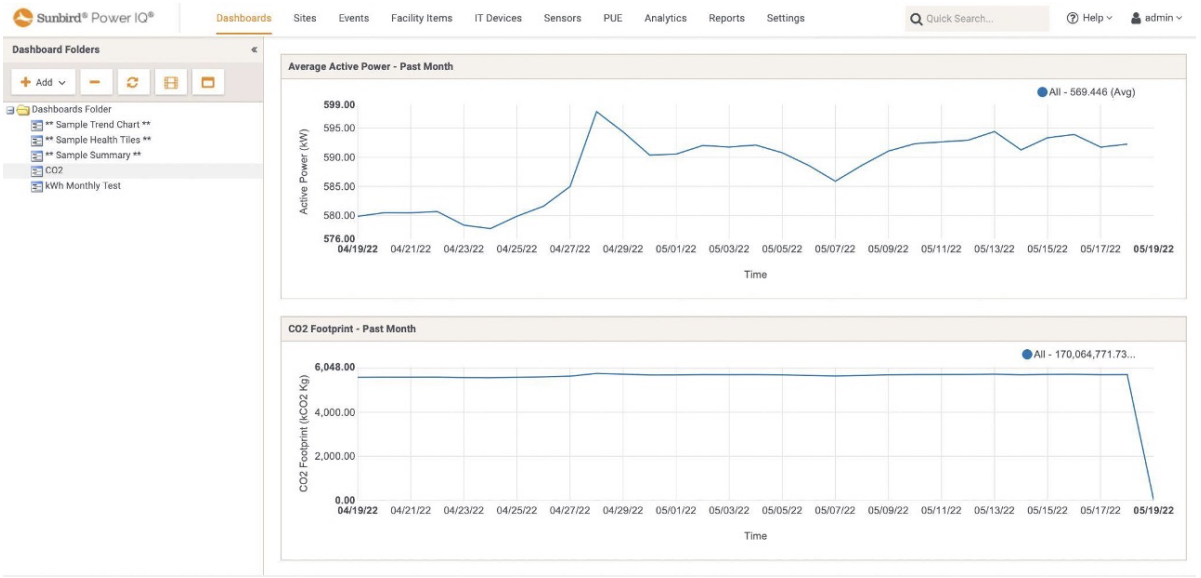
- Backend - Python
- Frontend - React
- 3D Visualization - Java and ODA library
- Security - MFA and SSO
- Database - Siebel
- API - Sunbird

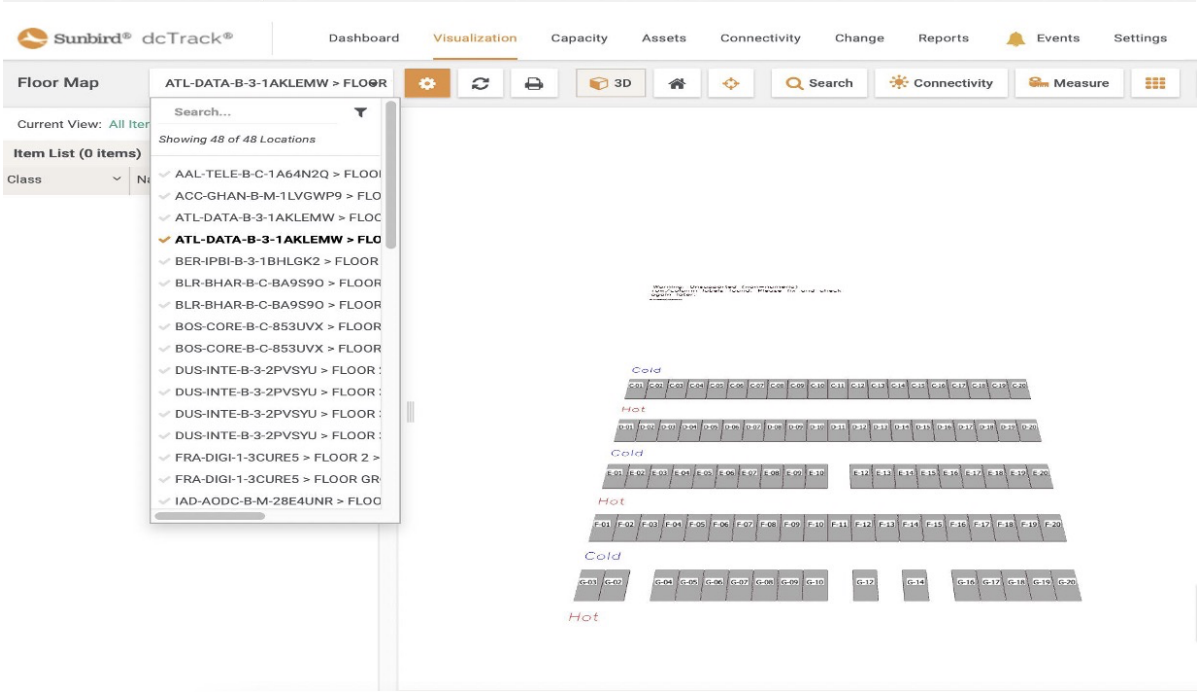
Methodology

1. Import Datacenter locations
2. Import racks as Cabinets
3. Add Assets to Cabinets
4. Import PDUs
5. Import data ports
6. Import power connections
7. Import cooling factors to PowerIQ
8. Import Drawings to locations using CSV files that has layout configurations

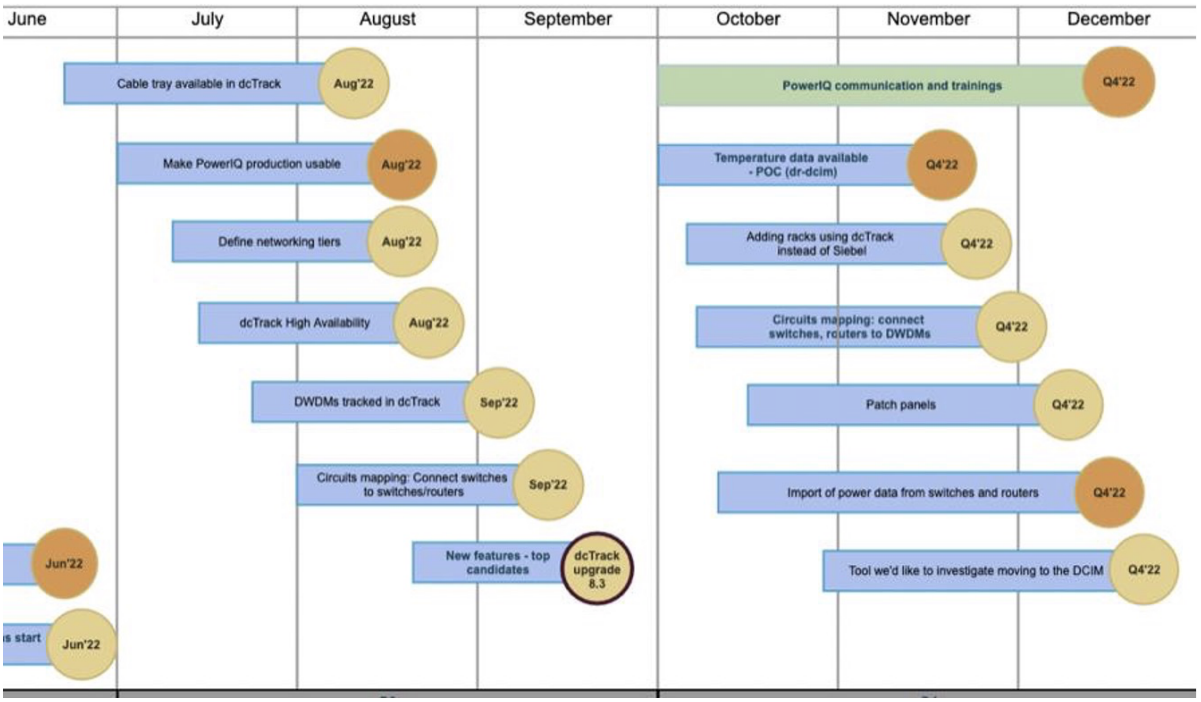
Meets the Challenge & Question	Implement
Gain insight into what I have: Floor Plan, Cabinet elevation, RU capacity	Asset management, Dashboards and Reporting Tools
Plan and Manage Power Chain, Power capacity, Network Trace, Fiber/Copper Capacity, Relationship Mapping	Capacity, Power and Network Connectivity Management
Improve processes - Best Practice Data Center management	Change/Workflow Management - Ticketing
Drive energy efficiencies, understand the cost and carbon footprint	Power and Energy Management, Environment Monitoring
Ensure components within the Data Center are up and running; alerted to issues/problems before they happen	Power and Environmental Monitoring
Leverage existing data, systems and processes	Integration through APIs, CMDB, 3rd Party Ticketing and other standard protocols (ODBC, SNMP, Modbus)

Results

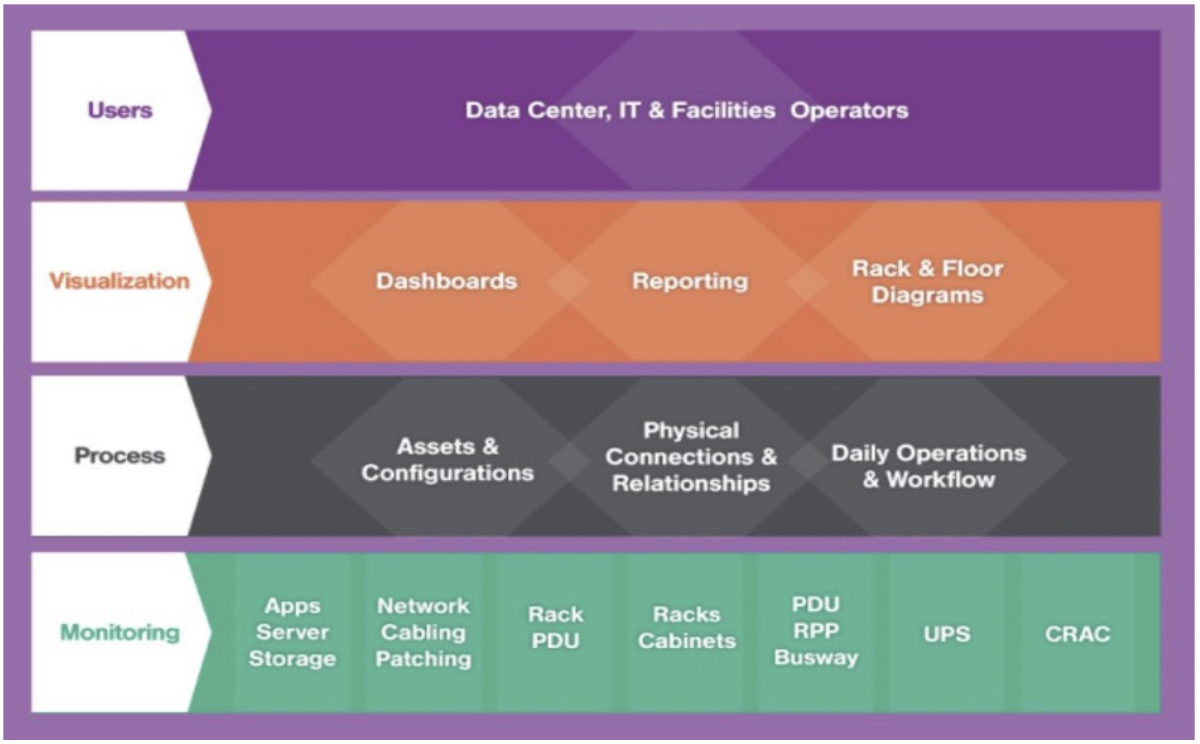




Future Scope



Conclusion



DCIM software provides data center operations managers with the ability to identify, locate, visualize, and manage all physical data center assets, quickly provision new equipment, and confidently plan capacity for future growth.

DCIM tools can also help control energy costs, improve data center design, and increase operational efficiency.

- Quickly model and allocate space for new servers, manage power and network connectivity in a single view or a few clicks
- Fully integrated workflow management including automation of work orders and workflow activities for process assurance, tracking and auditing trails.
- Constant monitoring with alerts before circuits fail
- Locate stranded capacity to avoid costly build outs