WHITEPAPER

Unifying Data Centers operation

Authored by:

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Executive summary

Almost all aspects of life are processed or monitored by a computerized system. Human activity ranging from entertainment, financial records, to healthcare systems require the support of data centers; connecting networks, processing data, and providing information to users and other software systems. Digitized and connected technologies rely of the availability of data centers.

The rapid adoption of IoT, big data, social networking, shared economy and cloud computing have fueled tremendous growth in the data center market. Coupled with consolidation through acquisition, this growth presents a great opportunity but also a great challenge. Data centers must maintain uptime, mitigate costs and manage complexity. Owners and co-locators are challenged to bring together disparate applications and systems into a single, cohesive management system that can operate, maintain, analyze and optimize operations across geographically dispersed locations.

Built on mission-critical industrial applications, proven technologies, and decades-long experience in enterprise-wide integration, AVEVA's software portfolio is a perfect fit for data center owners and operators requiring advanced analytics in big data environments. AVEVA provides customers with unmatched functionality in connectivity, data modeling, redundancy, resiliency, and scalability.

Data Centers industry challenges

Cutting-edge data centers have diverse operational challenges, with the need to manage a wide range of systems (Figure 1) – hardware and software of varying ages, from numerous vendors, and with widely divergent levels of cohesion and interoperability.
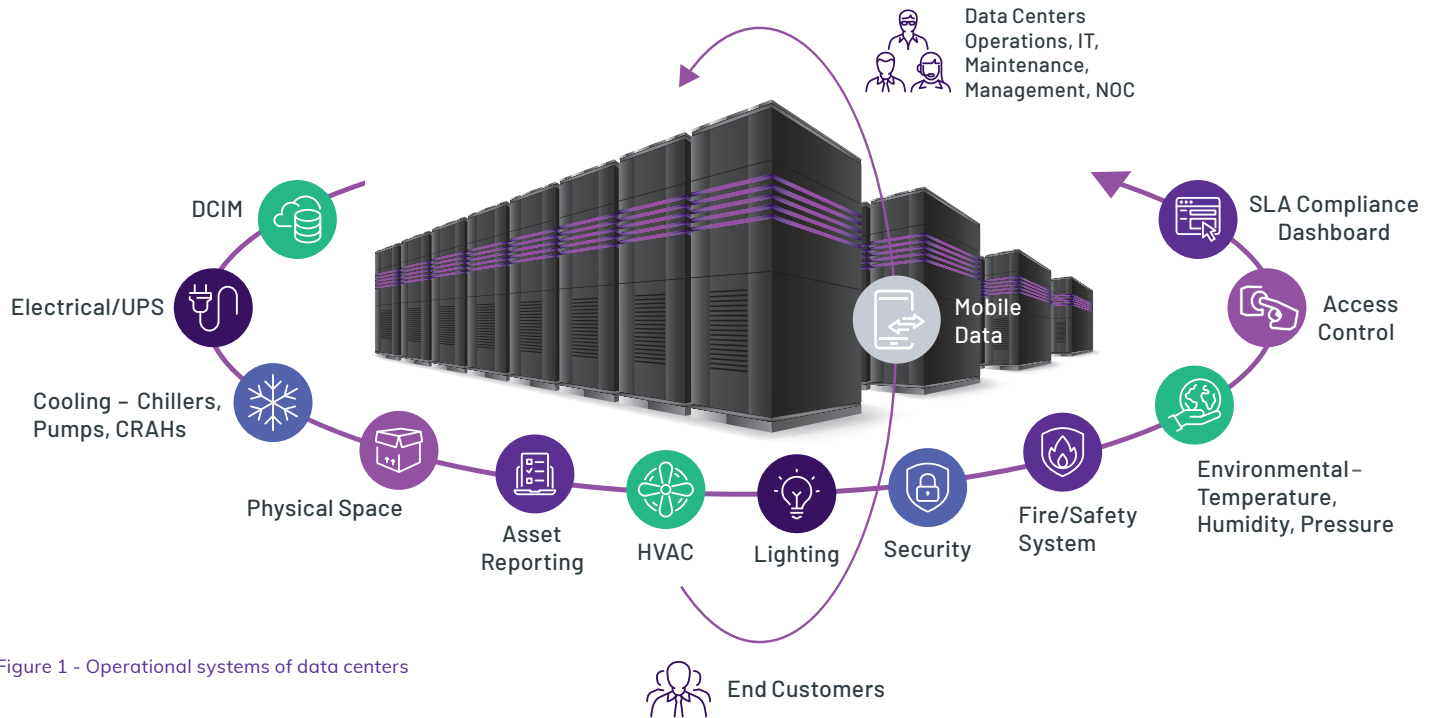

Figure 1 - Operational systems of data centers

By leveraging the AVEVA's industrial software portfolio data center owners can focus on their biggest challenges – to maintain uptime, manage complexity and mitigate costs.

Uptime: The Uptime Institute conducted surveys of Data Center outages during 2018 and 2019, which clearly indicated that outages occur frequently, and that outages are becoming more damaging and expensive. A third of the organizations reported major outages within the last 12 months, and close to 50% reported major outages in the last 3 years. This highlights that avoiding downtime remains a top technical and management challenge for all owners and operators.

Complexity: Several siloed software systems are required to operate a data center. Lack of integration from the multitude of third-party and home-grown systems in use today hampers operations and efficient decision making. The specialized applications required to operate a single data center site typically become

siloes of information, especially as facilities age and new designs are implemented over time. The increasing complexity and variety of software and hardware utilized in data centers are acquired and maintained over time, making it difficult to have consistent systems and a reliable single version of the truth.

Costs: Limited visibility into real time KPIs creates ineffective resource management and forecasting, resulting in increased energy costs and negative environmental impact. In fact, energy efficiency and water usage can make up to 50% of data center operating expenses. Labor costs are also significant. In a recent survey of global data center operators, the Uptime Institute also reports that 38% of IT organizations are having difficulty finding qualified candidates for open jobs. The increased volume of data centers around the world is partially responsible for a skills shortage resulting in a premium for experienced workers and increasing training costs related to employee turnover.

Data Center stakeholders have different needs

To provide a solution that comprehensibly addresses these operational challenges, it is important to understand the needs of all stakeholders in a data center organization:

- **Data Center Owners** are focused on growth, mitigating risk and reducing costs. They require access to right data to make the most informed business decisions, which impact operations.

- **Data Center Managers** are accountable to customers, must balance risk and opportunity and strive to break down departmental silos with an eye towards energy savings.

- **Operations Departmental Leaders** focus on operational efficiency through collaboration with peer departments to expedite decision-making, emergency response and recovery time.

- **Information Technology Experts** drive system availability and resiliency by maintaining and upgrading systems, managing deployment speed with cost, and streamlining information flows.

- **Operators & Maintenance Technicians** keep the facility healthy and require access to all available information, on the go, to maintain optimal conditions.

Visibility and confidence among all these stakeholders is essential to the collaboration required to effectively ensure reliable and cost-effective data center operations.

Achieving infrastructure and operations maturity

In 2016, Gartner released an IT Score for Infrastructure and Operations report, which outlines how organizations can assess themselves across 4 critical dimensions – People, Process, Technology and Business Management. Each of the dimensions has various attributes that are the key indicators of maturity in that dimension. The report defines five (5) levels of maturity: Awareness, Committed, Proactive, Service-Aligned and Business Partner:
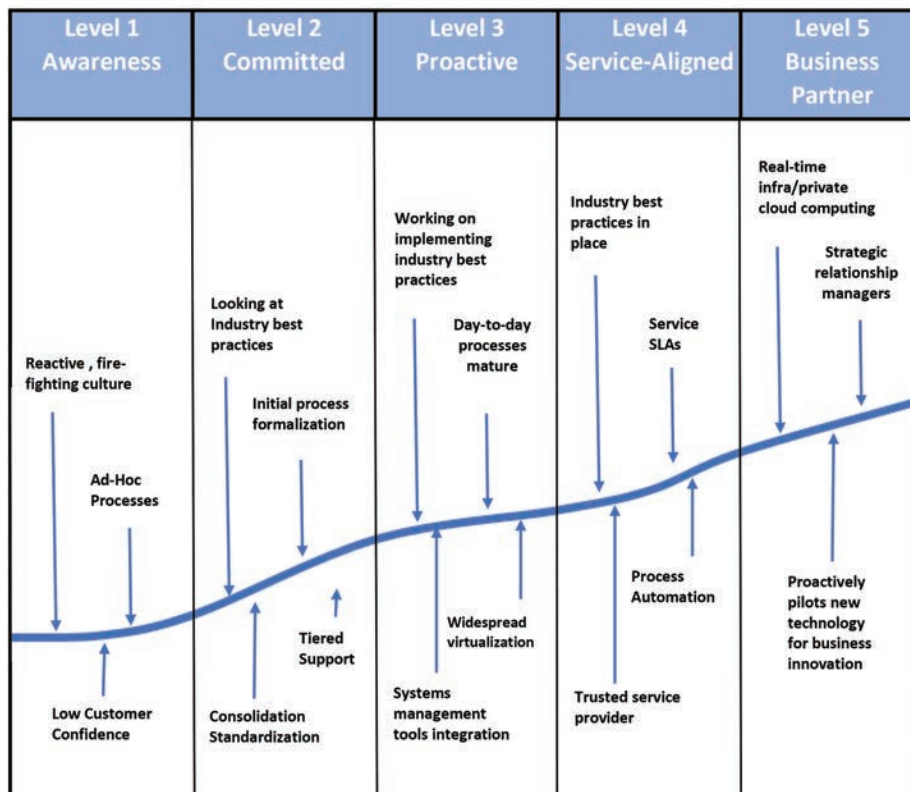
Source: Gartner 2016

Progression up the scale from one level to another requires technology adoption, dedicated effort, and great planning over a multi-year journey. **Ultimately, to successfully achieve a level 5 maturity on the Gartner scale, two questions aligning with real-time performance management and real-time decision support must continually be answered:**

How am I doing right now, relative to my plan?	**What should I do right now, to maximize the capability of my operations?**
Real-time performance management	Real-time decision support

To answer these questions in the flow of operations requires a tightly integrated system of systems approach to operations management. This approach delivers a line-of-sight visibility into data center performance and clear insights for optimization. By connecting disparate operations systems and people, organizations can identify actionable insights from multiple data streams, leading to more informed decision-making that produces better outcomes across the three data center priorities of uptime, complexity, and cost.

Unified Operations Center: a comprehensive operations management solution

AVEVA's Unified Operations Center adds value to data center owners and co-locators by delivering proven technology to accelerate scalability, facilitate operations efficiency, optimize energy consumption, converge disparate systems, manage workflows, and improve workforce training and operational knowledge management.

AVEVA Unified Operations Center for Data Centers is an OT\IT\IoT convergence solution, and provides a single-pane-of-glass view for data center owners and operations to monitor key KPIs and take command and control of both industrial assets and business applications.

The AVEVA Unified Operations Center for Data Centers (UOC) is uniquely actionable, universal, agnostic, and configurable. These differentiators strengthen the AVEVA UOC's abilities to help data center owners and co-locators ensure continuous operations, comply with service level agreements (SLA), and reduce costs.

The solution is hardware and software agnostic, with the ability to consume and share data from 3rd party vendors; and can be applied to new build construction, or existing software and hardware infrastructure. With out-of-box configurable tools and connectors data centers owners can reduce the complexity of developing and expanding such a unified solution; greatly reducing the need for customized programming.


How do we differentiate from generic IT dashboard solutions? We can send commands, integrate various systems, create work orders, create actions, send messages and actions to field staff.

Global operations perspective to site-wide analysis

Data centers are not isolated facilities but are located throughout the world. Stakeholders, manager, operations, and maintenance need both high-level perspective on how centers are functioning across geographic locations and drill-down capability for finer detailed analysis.

AVEVA Unified Operations Center for Data Centers integrates operations and business systems, from operational to financial systems, providing key metrics such as power efficiency, utility costs, and maintenance requests, allowing business leaders and decision makers to drive value and utilize resources efficiently. The solution aggregates, analyzes and converges data from disparate systems into actionable dashboards based around effective KPIs, even triggering automated workflows according to crucial events. It also highlights operations and maintenance needs at every level of the business, enabling allocation of enough resources to solve the problem, helping to manage costs and maintain uptime. This creates direct value for data center owners and operators who can focus their attention on the right decisions at the right time, increasing information flow and accountability at every level of the organization.
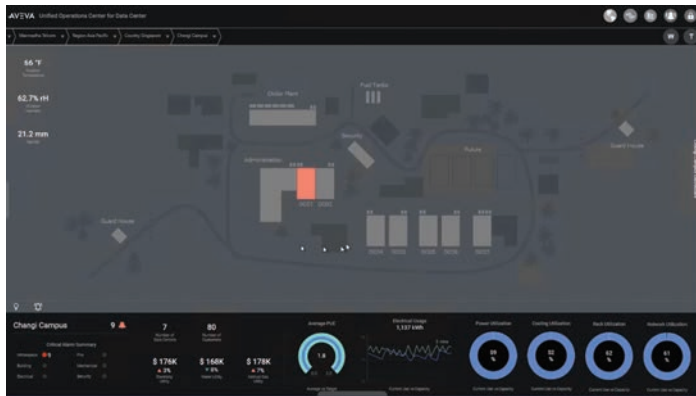
Context-driven view

One of the primary uncertainties facing stakeholders is how to respond effectively in real-time to information about problems, as well as identifying complex patterns from data and relating them to business goals to improve the efficiency and productivity of operations. Contextualization is the key to actionable information.

The integration of sub-systems such as building management, electrical, mechanical, fire and security into a single unified platform enables operators to react quickly to performance opportunities with increased situational awareness. Operators do not need to sort through disparate systems to find relational data – context is defined from the ground up to reveal insights not normally visible, ensuring that a data center is always running reliably and efficiently.

Streamlining workflows & collaboration

Having everyone on the same page reduces the amount of time it takes to respond to an issue. AVEVA's approach with Unified Operations Center, integrates aspects of collaboration and knowledge management by enabling information to be routed to the correct stakeholder aligned with supporting guidance from subject matter experts. This closed-loop approach is the true convergence of IT and OT, and it ensures that operations, information and people are always contextually connected. Achieving this 'always-on' state leads to a data center that is reliably in peak health by continually analyzing operational and asset health, increasing asset utilization and equipment life, and facilitating rapid identification of underperforming assets.

Use cases: system of systems through Unified Operations Center

At existing Data Centers, AVEVA' system-of-systems approach improves efficiency, uptime and collaboration among staff. Our standardization methods for building new data centers enable our clients to reduce risks and to ensure on time delivery and deployment. AVEVA' solution has proven highly effective for a wide range of real-world scenarios.

- At a global and well-known technology platform provider, AVEVA introduced Unified Operations Center to not only integrate financial systems at the enterprise applications layer such as asset management, but to also extend core capabilities throughout numerous subsystems connecting bits of information through context that had not been visible to the organization before.

- A large UAE data center provider sought a solution with advanced scalable remote monitoring and control of hardware and software across a range of sites and infrastructures including power, electromechanical and environmental. The ideal solution needed to integrate with the existing building management system gathering and analyzing data to provide complete visualization dashboards and reporting tools. This helped the facility achieve the 99.999% minimum availability requirement for the system.

- A North American colocation data center required a unified platform to integrate its sites and leverage the existing infrastructure to drive reliability, efficiency and better client services in real-time. The AVEVA platform was chosen to not only integrate multiple sites but connect other systems including building management and data center information management, providing a single easy-to-use, centralized operating and management environment.

- A North American colocation data center needed to monitor over a dozen data centers across the country, aggregating and presenting the information at their centralized command and control center. Their first attempt with a different provider failed to scale with the operational demands of the system and had to be decommissioned. AVEVA was the only provider evaluated who could create the management system for their large and complex operations and implement the solution for ten critical use cases within 60 days.

Cyber security compliance

Together with safety, the most critical area to address during digital transformation is industrial cybersecurity. The safety and security of your data is our top priority. As an established leader with over 50 years' experience delivering industrial software portfolio, we recognize that your data demands a stringent cybersecurity posture and the highest set of operating standards.

We continuously monitor the changing security landscape of cryptography and cybersecurity to ensure that we offer the best available protections to our customers and their sensitive data. We build security from the ground up – using components that meet recognized standards, and include enforced encryption.

We incorporate security protection into our system design and development process, including rigorous testing and validation. Security is integral to design and is fundamentally built into the AVEVA software services that support the operation of your systems.

Data center operators and all IT organizations are rightfully sensitive to cyber security vulnerability. As the number of connected devices increases, the risk to maintaining secure operations also increases. AVEVA's Cyber Security Team manages a Secure Development Lifecycle Process (SDLP), governing the practices and procedures for all solution and service development efforts. This multi-phase process includes requirements to continually monitor AVEVA's solutions for violations of Cyber Security best practices, execute penetration testing to eliminate any vulnerabilities and comprehensively address the organization's compliance and cyber security challenges.

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The value of AVEVA's Unified Operations Center

With decades of experience managing complex deployments and delivering tremendous value for customers, AVEVA is the ideal partner for data center owners and operators seeking a technological edge that improves operational efficiency and clarity and provides an unprecedented level of consolidation and control.

AVEVA's UOC adds value to data center owners and co-locators by delivering proven technology to accelerate scalability, facilitate operations efficiency, optimize energy consumption, converge disparate systems, manage workflows, and improve workforce training and operational knowledge management.

The value of a unified system of systems approach focuses on optimization of operations and maintainability throughout the facility's life cycle with additional intangible benefits such as higher customer satisfaction and quicker ROI realization. AVEVA Unified Operations Center for Data Centers spans the white space and gray space offering integration at every layer of the organization revealing optimization and efficiency returns that would be difficult to achieve otherwise.

- Real-time optimization – **20-25% savings**

- Energy optimization – **10% annually**

- Enhanced asset utilization – **5-10% reduction in operational costs**

- Intelligent predictive diagnostics – **10-15% annually**

- The AVEVA Unified Operations Center for Data Centers (UOC) focuses on the three biggest challenges facing data centers – to maintain uptime, to mitigate costs and to manage complexity. $100k average saving for each predicted failure. Up to 15% less energy consumption. **Up to 40% improvement in operational effectiveness.**

- The AVEVA Unified Operations Center for Data Centers (UOC) is uniquely actionable, universal, agnostic, and configurable. 41% reduction in the time required to complete tasks, 1 x solution, a system of systems, automating facilities and IT. **50% less engineering effort.**

- This latest release includes new functionality to enable unsupervised machine learning, incident escalation, connectivity to more business applications, and workforce skill and knowledge management. **15% fewer operating staff hours. ROI within 12-18 months on enhanced workforce operator training and resultant efficiencies.**

AVEVA's approach begins with a comprehensive requirements assessment focused on meeting the overall objectives of the organization for data center operations, while minimizing execution risk and includes our core expertise in delivering enterprise-level solution:

- The tremendous depth and breadth that comes from decades of prior global experience on projects of similar size, scope and complexity.
- A highly experienced and completely integrated execution team with strong leadership and proven standard practices.
- A global team of experts and an extensive network of partners who are familiar with the tools, technology and implementation methodology.
- An execution team who will provide design guidance to ensure compliance and consistency across all elements and phases of the project from pre-award to handover.
- Knowledge transfer and local support

Contact AVEVA or one of our regional partners for more information about Unified Operations Center for Data Centers.

About the authors

Douglas Nunez Sr. Infrastructure and Utilities Marketing Manager at AVEVA. With over 20 years in the Power and Utility area, Douglas has a deep understanding of power market dynamics, including key issues, policies and trends affecting renewable energy development. He is an experienced performance consultant with a demonstrated history of working in the power generation industry. He is also skilled in process controls, process simulation and project management.

Jeremy Wilbert Sr. Product Marketing Manager. Previously a member of the AVEVA channel partner community for 12 years, Jeremy's experience across sales, marketing and business leadership enhances his keen interest in technology to support customers around the world. In his current role, Jeremy is responsible for managing global product marketing strategy and sales enablement activities as a member of the Operations portfolio marketing team at AVEVA.

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