

The background of the entire advertisement is a blurred image of server racks in a data center. Overlaid on this are several digital graphics: a series of blue arrows pointing upwards, a line graph with white circular markers and a blue line, and various strings of binary code (0s and 1s) in green and white. There are also semi-transparent rectangular blocks in green and blue, and a red line graph at the bottom left.

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# Improve data center operations with forecasting

Leverage asset data to get the  
most out of your DCIM platform.

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## Introduction

There's a lot that goes into managing a data center. Rising complexity due to the thousands of applications and devices plus the absence of knowledge-transfer between stakeholders makes daily management an operational challenge. Add planning for future deployments and tenants to the mix and the challenge can easily become a costly, haphazard nightmare. Data centers are critical components of modern enterprises and should be used to drive business, not hinder it. In these environments, it is not only essential to have continuous monitoring in place, but also to effectively manage capacity and discover hidden potential.

The usual answer to these challenges is the implementation of a data center infrastructure management (DCIM) platform. While a typical DCIM solution can bring valuable insights, most don't go far enough. DCIM software generally focuses on providing real-time monitoring and a consolidated view of data with current inventory. We cannot

take these functionalities for granted, but the true challenge arises when insights into future states are required. Knowing that in this moment the data center is using 80% of installed capacity is valuable, but what about a month from now? Or a year? How does knowing current capacity help when we need to know if we can support 10 new tenants who each need 100 kW in six months time, while minimizing overprovisioning?

**The answer is forecasting. Today's DCIM solutions need to do more than asset tracking – they need to support business objectives and enable all stakeholders in a data center to make risk-free decisions, whether their focus is facilities, IT, or the overall health of the enterprise.**

**The following discussion will present why a true DCIM requires not only capacity management functionalities but also must accurately assess current and future states within a data center.**

# Challenges: Why forecasting is a game-changer

The data center industry has come to a point where traditional inventory management and monitoring do not address the growing need for scalability and actionable information. Increased demand is putting more pressure on IT and facilities alike. In one report, it was noted that almost half of data center decision makers need to increase power and cooling capacity to guarantee service delivery. Among those decision-makers, 24% reported a loss of clients directly related to the lack of quality operational data <sup>[1]</sup>. In a market that's projected to grow by \$284 billion by 2023 <sup>[2]</sup>, complete visibility into data center operations is critical for business continuity, and represents a large opportunity to eliminate waste, increase utilization, and save money. Two key challenges stand in the way of driving business objectives while maintaining service continuity:

Ensuring that all end-users have continuous service and budgeting resources for current and incoming requests is a costly, time-consuming process. There are two primary issues when it comes to tenant management:

- Firstly, when a request for resources comes along, it's important to know if there's available capacity. Taking on a new client or project only to find a capacity shortfall is not only expensive but also stressful.
- Secondly, not knowing when the biggest contracts are going to expire and their effect on the data center space blocks the use of valuable capacity. It's important to plan how to use and, more importantly, sell space that will become available.

In short, effective planning of resources requires insight into the full lifecycle of datacenter assets, services, and users.

### 1. Overprovisioning

Lack of insight into existing and future installations has made overprovisioning the only option available for data center managers who need to maintain service continuity. It not only represents a heavy capital investment but also higher administration, staffing, and maintenance costs. In one assessment, it was found that due to overprovisioning 136% of operation budget was required to run the average data center, and that 3 data centers are built for every 2 that we need <sup>[1]</sup>.

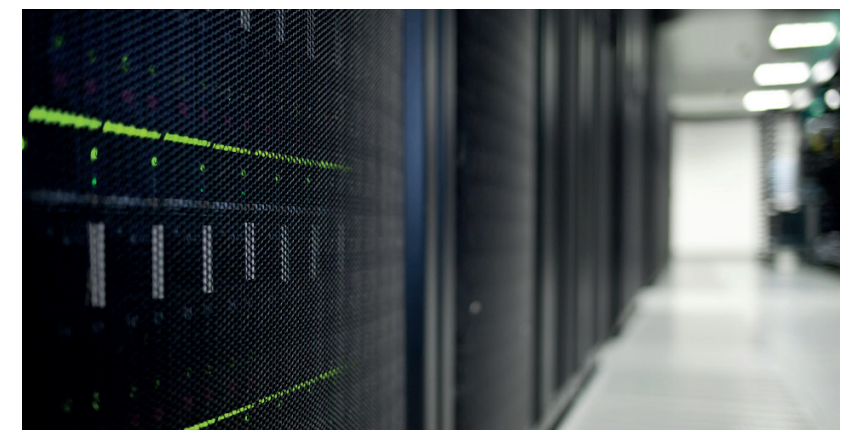
It's clear that this issue is pervasive, and that a simple asset inventory will not mitigate its effects. Imagine instead being able to predict when capacity will be released, measure the impact of new tenants and projects on existing infrastructure, and therefore plan effectively for incoming clients and installations. Instead of having reactionary, incident-driven strategies, a proactive approach can avoid unnecessary CAPEX investments and extend the lifecycle of existing assets. Actionable information needs to be available to all stakeholders that enables them to make the best decisions, rapidly and confidently.

### 2. Tenant management

For this discussion, we define tenant management as the management of infrastructure with consideration of the end-user to whom the resources are assigned. The end-user can be an internal group or a colocation tenant.

The best way to counter the above challenges is with a DCIM with integrated forecasting. DCIM alone tends to focus primarily on asset management and doesn't permit effective planning. On the other hand, even the best forecasting tool needs to be driven not only by contract and project timelines but also by real-time data and asset management information.

Thus, a holistic DCIM solution is one that includes forecasting capabilities, and therefore permits the management of upcoming deployments as well as current installations. This enables the development of insightful capacity metrics that support business objectives, rendering the data center profitable.





# Forecasting: Asset management amplified

To have optimal business value, a comprehensive asset management solution needs to be structured, provide visibility, and deliver reliable data to decision-makers. Most importantly, it should provide a full lifecycle view of all resources and show how the data center evolves over time.

A full lifecycle view not only tracks resources over their lifetime, but also details the applications and tenants supported by those assets. To do all of this simultaneously, it's necessary to go beyond traditional asset management and enhance the analysis with added tiers of information, such as the date of decommissioning, contract start and expiry date, associated end user, and more. Once this data is consolidated, powerful forecasting reports that show the evolution of the data center can be constructed. These analyses form the foundation of forecasting.

So, what is forecasting exactly? For the scope of this discussion, forecasting is defined as follows:

The use of past, current, and future operational data to monitor and predict the impact of data center deployments on capacity metrics, including but not limited to power, space, and cooling usage. A true forecasting solution gives insight into current usage and allows operators to construct predictive analyses based on "extended" metrics, such

as revenue and cost per rack or tenant. A true forecasting solution enables data center operators to answer the following:

- What is my current capacity and when will I run out of resources?
- How many new projects can I accommodate today? When will I be able to accommodate more?
- Do I have enough capacity to accept new tenants and future expansions of existing tenants and/or applications?

In addition, to be advantageous and profitable, the results rendered from the analysis must enable rapid, risk-free decision-making. The analysis cannot stand alone and needs to be intuitive and easy to understand. To effectively leverage forecasting, there are a few essential components that greatly aid in data processing:

- Ability to see, at any point in time, if capacity is being used to its optimal potential.
- Ability to automatically generate reports of aggregated data showing current and future capacity data.
- Ability to visualize data in a meaningful way.
- The above capabilities can be leveraged in a variety of use-cases. This discussion will focus on two: Capacity Planning and Supporting the Sales Cycle.



# Operational use-cases

## Capacity planning

### The challenge:

As we've seen, traditional capacity planning gives an overview of existing assets. For example, in a high-performance computing (HPC) Infrastructure, a monitoring and inventory system might tell us how many racks are installed, how full they are, and how much power they're consuming. With this information, we understand how much capacity we have remaining in real-time. When it comes to expansions, however, this information does not help us understand the impact of future deployments on capacity, or when expansions will be necessary. Here, the challenge is that there's a general picture of the current state of affairs in the data center, but it's difficult to correlate the data center's current state with the capacity requirements of incoming projects, and therefore complicated to plan for upcoming deployments. This represents a large risk. There's no way to know if there is an urgent need to pour money into procuring more capacity, or if current, occupied resources will be released and therefore be available for future applications. Simply put, there's no visibility into the impact of upcoming installations on KPIs and critical equipment.

### The solution:

A tool to solve the challenges above requires several components. First, operators need to shift their focus from just current capacity to current capacity plus potential capacity (i.e. not just "There are 400 racks installed," but "There are 400 racks installed with a potential of 550"). This simple change already allows data center operators to expedite decision-making and provisioning – they know exactly where there is room to grow and can assign capacity when needed.

Next, a complete forecasting tool should allow operators to reserve capacity for different applications, over specific periods. Allocated capacity can then be aggregated by the tool for any given point in time. Then, by associating the timeline of proposed projects, expansions, and tenants with specific resources or quantity of capacity, operators know:

1. The amount of resources allocated to particular applications
2. When that capacity is going to be freed
3. When more capacity will be required

A complete forecasting tool should be able to perform this type of analysis and tell operators when capacity that is currently being used will become available again, allowing them to effectively allocate existing capacity. With this data, a timeline can be constructed showing how the data center will evolve over time, giving maximum visibility into operations for years to come.

Finally, a true forecasting tool also allows operators to consider asset lifetime. Overlaying the amount of capacity used, contract (or project) expiration date, and the predicted asset decommissioning date gives a powerful overview of how the data center will grow and change over time.

### Benefits:

1. Anticipate the utilization of key capacity metrics
2. Use actionable data to avoid delays in approval and execution of expansion plans
3. Optimize utilization of existing installations

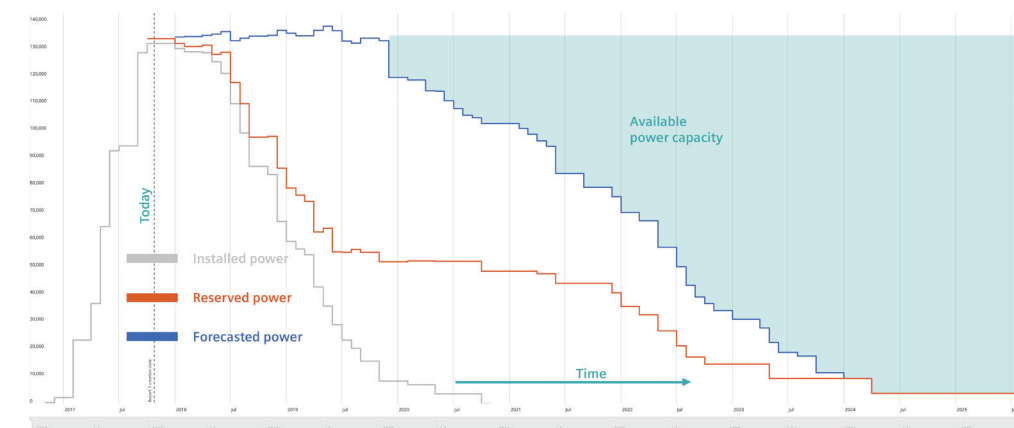


Figure 1: By forecasting capacity usage, operators can predict capacity shortfalls far into the future. The image above shows current power allocated, reserved power capacity, and forecasted power needs over a span of 9 years.



# Operational use-cases

## Supporting the sales cycle

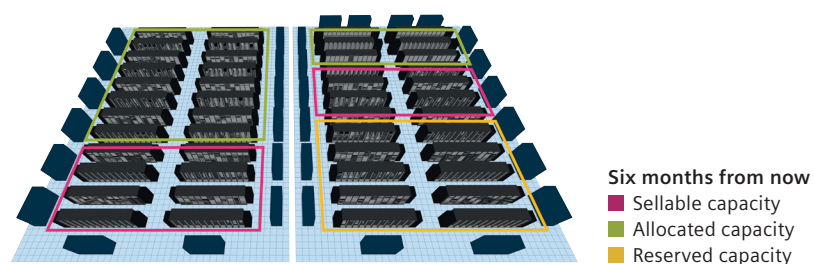
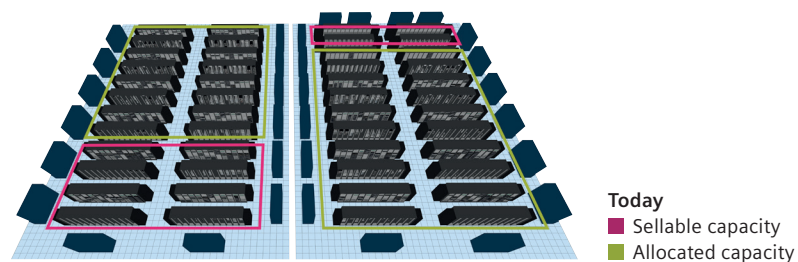
### The challenge:

Current capacity planning and inventory tools don't give a full picture of operations over time, preventing effective allocation of resources. Without this information, sales managers do not have a panoramic view of when contracts expire (in other words, capacity over time), and therefore can't identify sellable space, leading to costly overprovisioning for upcoming contracts. Planning and critical decisions are consequently slow, costly, and based on unreliable data.

### Solution:

Leveraging a forecasting solution can help sales managers gain insight into operational data and the data center's evolution over time. A comprehensive forecasting tool gives the ability to correlate the timeline of a project or the duration of a contract to a distinct set of resources. When that timeline finishes, that set of resources becomes available.

While that sounds trivial, structuring this information in an intuitive way delivers incredible value, as managers can see how and where to allocate resources far into the future and can identify sellable space even if it's currently occupied. In addition, it's possible to predict when capacity will finish, eliminating costly over-provisioning for upcoming tenants. With minimal input, a powerful and advantageous outcome can be achieved.



Furthermore, extracting the business-critical data associated with contracts, such as revenue, enables a powerful analysis in which the value of every resource in the data center can be assessed. It is then possible to map projected profits as they relate to data center resources, putting the business intelligence required to make provisioning and resource-allocation in the hands of decision-makers.

### Benefits:

1. Identify available, sellable space
2. Visualize and be prepared for when your biggest contracts are going to expire
3. Uncover and optimize capacity allocation for existing tenants

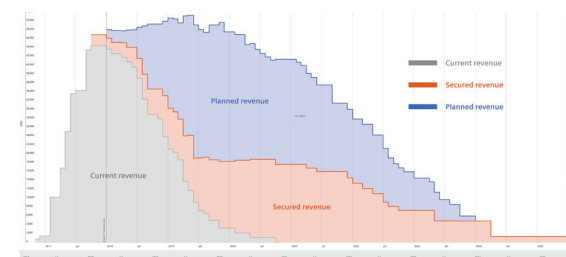


Figure 4: Linking resources to specific uses or contracts enables powerful analyses of the overall health of the data center. In the image above, secured revenue refers to revenue to-be from finalized contracts, whereas the planned revenue is the result of a forecasting analysis and refers to revenue that could be incurred by selling space that will become available. We can see that the overall health of the business is not great in the case above!

Figure 2: Traditional Capacity Planning gives an overview of current capacity usage and how much capacity is assigned to each end-user.

Figure 3: Leveraging a forecasting-enabled DCIM solution can help identify sellable space long before it becomes available, allowing for the efficient allocation of resources and preventing costly overprovisioning. In the image above, allocated capacity refers to capacity that is already assigned to and will be in use by a tenant, whereas reserved capacity might be occupied today but has already been put aside for another tenant in the future. Sellable capacity is capacity that will be available after some time but may be currently occupied.

# The future of DCIM and forecasting

Forecasting-enabled DCIM offers many opportunities to reduce costs and increase profitability. By gaining visibility into capacity usage over time, data center operators can plan effectively and maximize utilization. In turn, they can reduce overprovisioning and anticipate the effect of upcoming deployments on critical infrastructure. For sales managers, forecasting means knowing and preparing for when contracts are going to expire and the ability to identify and sell available space. When combined with network power and cooling infrastructure, today's newer DCIM software systems provide the necessary tools for efficient and effective management "out of the box".

Complexity is now manageable. When it comes to capacity planning, visibility in real-time is not enough to combat the uncertainty and lack of information that prevent effective decision-making. In today's data center environment, planning is crucial. Luckily, effective solutions such as forecasting are already available to transition us to the next phase of data center management, where insight into the future is critical for business continuity.

### References

- [1] Datacenter Dynamics, "The True Cost of Data Center Over-Provisioning," Datacenter Dynamics, 2019.
- [2] Business Wire, "Global Data Center Market Outlook 2019-2023," 2019.
- [3] eWeek, "Report Finds Over-Provisioned Hardware an Expensive IT Problem," 2018.



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**Published by  
Siemens Switzerland Ltd**

Smart Infrastructure  
Global Headquarters  
Theilerstrasse 1a  
6300 Zug  
Switzerland  
Tel +41 58 724 24 24

**For the U.S. published by  
Siemens Industry Inc.**

100 Technology Drive  
Alpharetta, GA 30005  
United States

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