App Note: The Virtual Facility for a Colocator

When **Compass Datacenters™** wanted a tool to let them confidently capacity plan, they chose the **Virtual Facility**. As a colocator whose disaster-resistant, future-proofed data centers have met with critical acclaim, the company has used the Virtual Facility from their first day of trading to design and commission DCs that **maximize revenue** and ensure that **service level agreements** (SLAs) remain unbreached.

Compass Datcenters

Compass is a wholesale provider focused on delivering dedicated data centers for businesses seeking 1MW to 4MW of 'day one' IT load capacity.

Crucially, it offers customers "future growth in the location of their choice". For that to be possible, Compass must have exceptional capacity planning tools at its fingertips.

Introducing the VF Model

The Virtual Facility is used to calculate and predict control over three key '**ACE**' performance areas:

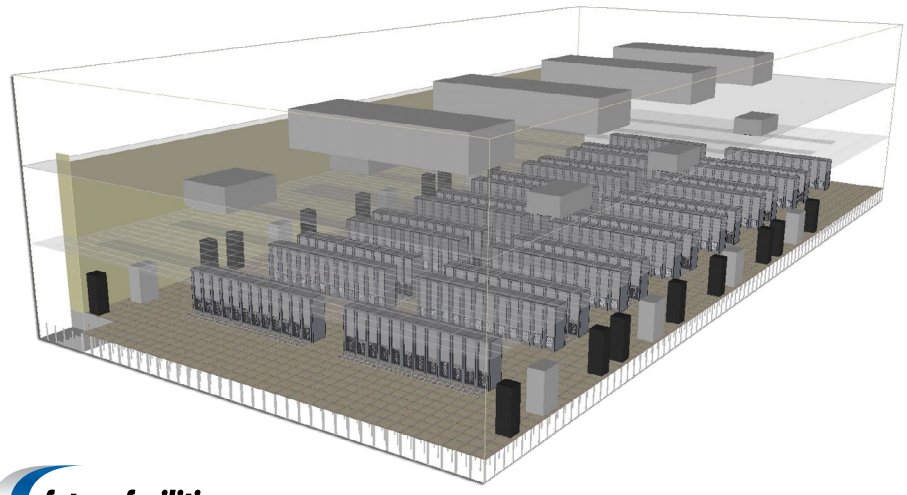
- the ability to meet immediate rack-level SLA requirements (**a**vailability)
- the ability to meet rack-level SLA requirements over the facility's lifecycle (**c**apacity)
- cooling **e**fficiency.

The **ACE performance** is a crucial measure for a data center owner-operator: it expresses not only the current performance of a facility, but also its future potential.

By combining the physical elements of IT equipment, racks, cables, AHUs, PDUs, etc. with airflow and power modeling, the VF enables designers and operators to predict the impact of their planned configurations on future data center performance.

Design and Commission

Compass used the VF to predict outcomes of future decisions before a single brick was even laid at the facility.



(Left) The Shakopee, MN, data center as modeled in the Virtual Facility. The facility has 13,000 ft² raised floor space with no columns; a 12 ft drop ceiling used as a return air plenum; a 36" raised floor; 1.2 MW of critical IT load; four roof top air handlers in an N+1 configuration; and 336 25%-open perforated tiles with dampers installed.

"The VF is an essential tool in an environment characterized by dynamism and increasing applications complexity."

At the design stage, the VF ensured that the design met a range of critical specifications, including baseline cooling, cabinet layouts, and airflow delivery and extraction.

During commissioning, the VF was calibrated following integrated systems testing results. This gave Compass the ability to confidently predict the performance of the new facility. The VF told them whether the DC could do what it had been designed to do.

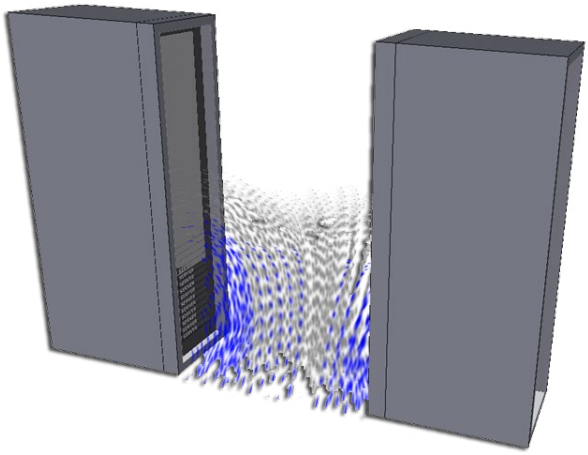
With the VF providing highly reliable predictions of future performance, Compass then used it for the purposes of cooling path management. This complex process allowed flow rate, pressure and temperature specifications to be checked for floor grilles, equipment inlets and exhausts, and AHU supplies and exhausts. In doing so, Compass proactively avoided the cooling problems and inefficiencies that can creep in over time.

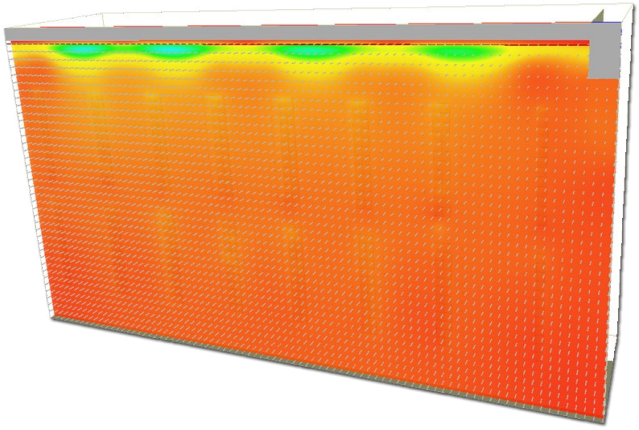
With the DC in operation, Compass can now track their customers' IT loads and capacity levels.

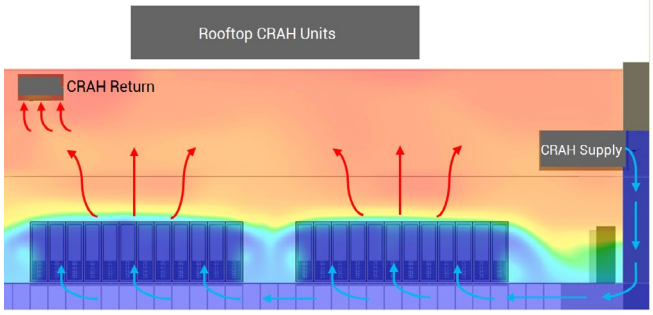
Conclusion

A lack of evaluative tools has historically forced colocators to accept "on faith" their new data center's ability to meet its design requirements.

However, the Virtual Facility from **Future Facilities** is a real game changer. Compass™ have used it since day one, evaluating the ACE performance of all their data centers, and maximizing revenues by ensuring that they can meet the service level agreements agreed with their customers.







(Above) During design, the VF was essential to accurately predict the behavior of ACE within the planned design. Here, it shows the temperatures of the air as it passes the air dam, enters a 36" raised floor and is released into the floor above by 336 25%-open floor grilles. Hot air from the servers is then extracted through ventilation grilles placed in the 12' false ceiling.

(Above Left) The VF determined that inlet temperatures to the cabinets were on the lower scale of the ASHRAE allowable range, as shown by the blue streamlines (cool airflow). This created energy-saving options (raise the air temperature within the room) without risk of breaching SLAs.

(Left) The first part of the cooling path management process used the VF to instigating the under-floor pressure. The image shows the pressure distribution in the raised floor is fairly uniform (orange), thereby ensuring an even flow rate distribution.