App Note: The Virtual Facility for an Enterprise DC

CBRE

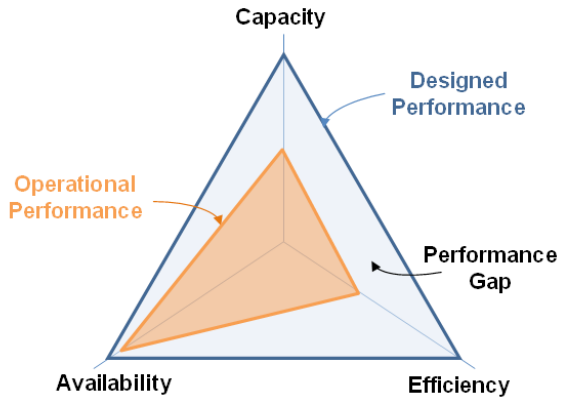
When **CBRE's** global finance customer wanted to improve energy efficiency in a Tier IV data center - without compromising availability or sacrificing capacity - they selected the **Virtual Facility** (VF) to make it happen. Developed by **Future Facilities**, the VF safely assessed and evaluated a wide range of improvement plans, saving the bank an estimated **$10+ million** through combined efficiency and capacity gains in a single data center.

The Virtual Facility was used to calculate what we call the **ACE data center performance score** - a score that measures server availability (A), usable capacity (C) and energy efficiency (E). This 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.

Acting under the guidance of Future Facilities, CBRE used the VF in three distinct stages: **assess**, **improve** and then **maintain**.

Assess

The first stage was to determine the designed configuration of the data center. First, Future Facilities' data center engineers built the VF model using the **6SigmaDCX suite.** Then, the VF automatically brought in asset data, live data and other data from the bank's comprehensive DCIM stack. Finally, the VF was used to simulate a range of what-if scenarios - filling the data center's racks to maximum power capacity, failing redundant cooling units, and so on. Through use of the VF's powerful visualization tools, and by extracting key performance data, the ACE performance score for the operational facility was calculated.



THE ACE PERFORMANCE SCORE MAPS THE DESIGNED AND THE ACTUAL (ORANGE INNER TRIANGLE) PERFORMANCE OF YOUR DATA CENTER

Improve

Having calculated the ACE performance score, and with the VF clearly showing where the data center's shortcomings were, the bank could now use its business objectives to drive potential improvements to the facility. In this case, they decided to protect availability and capacity, and to then pursue energy saving improvements.

With this in mind, the VF was used to predictively simulate a wide range of potential solutions and energy-saving measures, and to generate resultant ACE performance scores. By simply comparing the different ACE scores, technical and non-technical managers alike were able to assess the viability of the various proposals.

At the conclusion of the improvement stage, the VF had been used to increase the ACE performance score to: **A100%** (from 97%), **C96%** (from 86%) and **E81%** (from 74%). The estimated value of these improvements exceeded **$10 million**.

future facilities

"This was the first time that the client had been able to *reliably* map out the consequences of IT changes without first making those changes in the actual facility."

Maintain

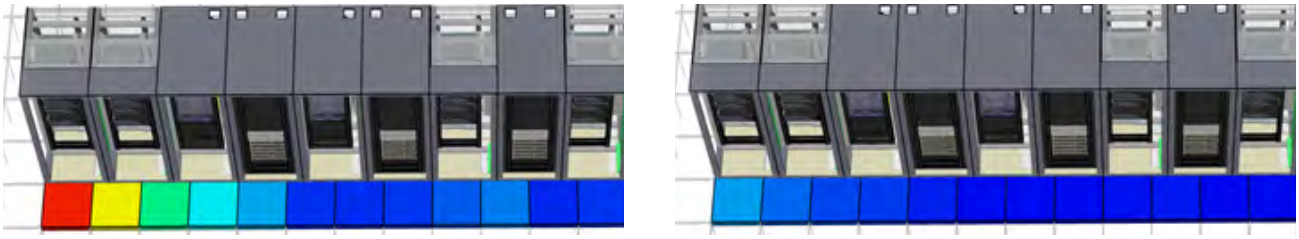
Finally, with a much improved ACE performance score creating cost savings, the VF enabled the banking giant to maintain the DC's newly improved performance.

Combining integration with asset management systems and live power monitoring, the VF gave the bank the tool it needed to simulate **day-to-day changes** in the facility. Today, by refering to the results of the VF's simulations, the bank can make informed decisions about their current and future IT plans, and the effect they have on the ACE performance score.

Conclusion

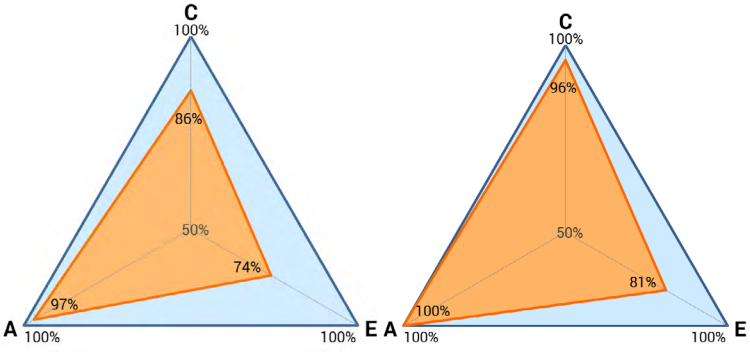
CBRE's experience proved that the VF provides the best tool with which to optimize **all three** components of a data center's ACE performance score. It offers a simple, cost-effective and sustainable way to achieve your business' data center goals.

- Visualize the performance gap between intended design and actual operational status
- Align the goals of the stakeholder groups in a suitable ACE balance.



(Above) The VF identified that the cabinets at the row ends had higher inlet temperatures than the cabinets towards the center. In plain English, they were sucking in cooling air that was actually too hot, as shown by the red and yellow grilles (left). To address this, the VF was used to predictively simulate different types of floor grilles at these locations, eventually establishing - without actually having to install a single grille in the data center - which grille offered the best results, as shown by all blue grilles (right).

(Below) The Tier IV mission critical data center was well run and well equipped with a DCIM stack, but despite this had still experienced availability, capacity and efficiency problems at only 45% design loading (left orange ACE triangle). The VF enabled dramatic improvements to be made with confidence (right).



(Below) One of the first issues identified through the VF was recirculation of hot air within cabinets (left), causing servers to overheat (increasing downtime). The VF was used to create customized blanking that prevented internal recirculation and reduced the risk of overheat (right).