
Tom Lindblom

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CKE Restaurants, Inc.



INTEROP

Company Profile

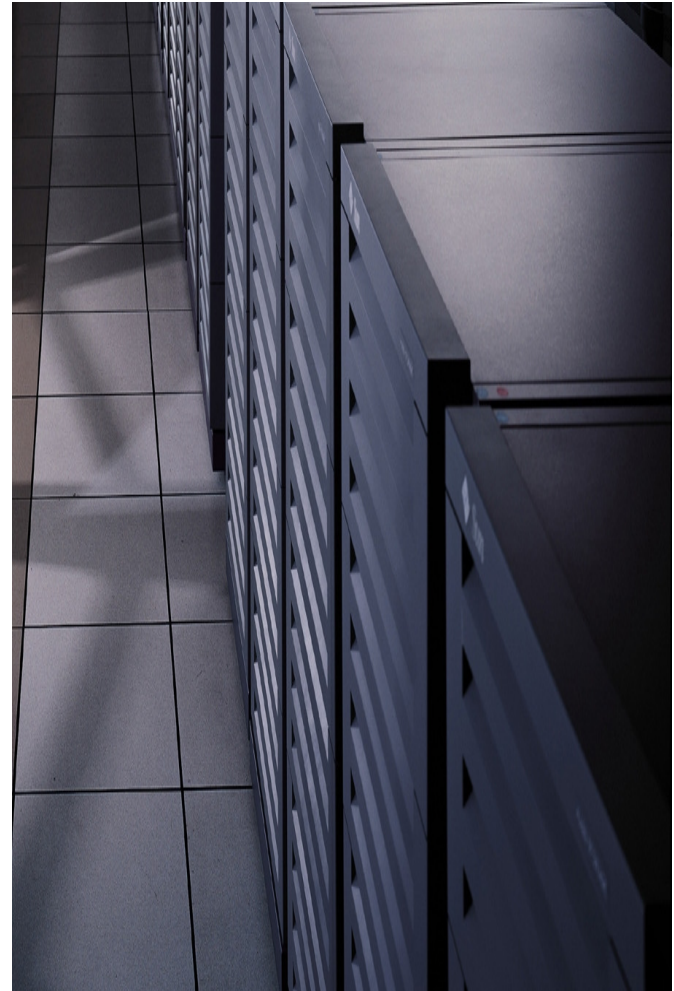
CKE Restaurants, Inc., through its subsidiaries operates over 3,100 franchised or company operated restaurants in 43 states and 13 countries under the Carl's Jr., Green Burrito, Hardee's, Red Burrito and LaSalsa brands.



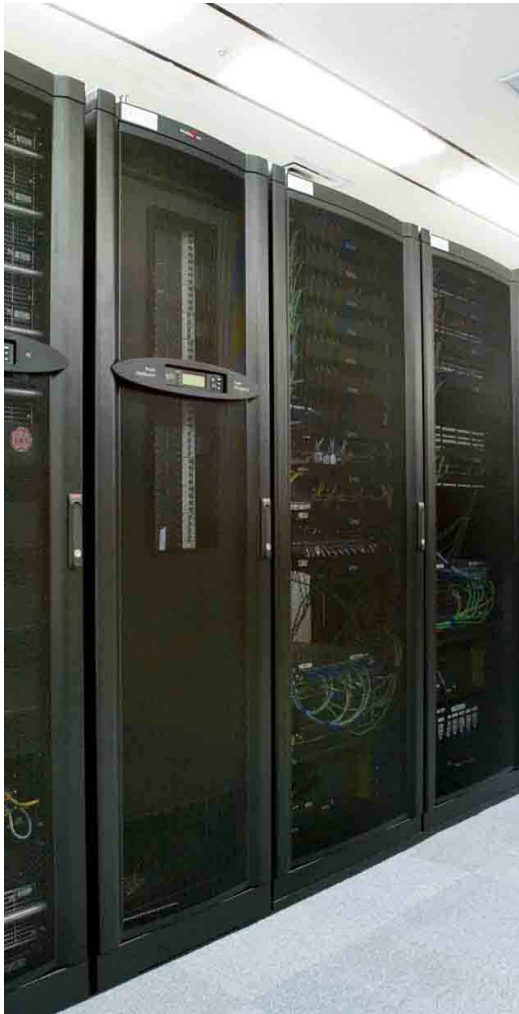
CKE Data Center Project

Issue:

Despite significant mechanical and electrical enhancements in recent years, we were running out of available power and cooling in our data centers.



Data Center Project Objectives



- Long term solution for the power and cooling issues we were facing including provisions to address ever increasing server/rack density.
- Achieve reasonable space and cost efficiencies.
- Consolidate to a primary and backup data center.
- Co-locate with existing corporate facilities.
- Achieve 15 year life if new facility.

Data Center Remodel/Rebuild Decision

- What about power?
- What about cooling?
- What about space?
- What about longevity?
- What choices did we ultimately make?

What about power?

- In 2000 a typical rack consumed just under 2 KW.
- In 2007 we no longer have a “typical” rack.
 - ✓ Many racks are under 3 KW.
 - ✓ Some racks are 20+ KW.
 - ✓ Intel, AMD and other CPU vendors are going “greener”.
- Despite “green” initiatives, the overall power consumption trend for data centers is still increasing.

What about power?

- Modular UPS offers significant flexibility, is very appropriate at low and moderate density, and scales well.
- When UPS units are located in the data center, high density designs may introduce conflicts with battery containment requirements and require as much space as server racks.
- Pre-wiring new/remodeled facilities to accommodate potentially high power consumption is very cost effective.
- Considered and decided against alternatives such DC.
- Considering 208v and potential for 240v.

What about cooling?

- Raised floor cooling with typical perforated tiles maxes out at around 750 CFM. 500 CFM is more typical, depending on the height of the raised floor and available supply air flow.
- Even with high flow floor tiles, it is extremely difficult to cool quantities of high density racks solely with raised floor air.
- 20 KW racks require almost 6 tons of A/C and around 3,000 CFM each.
- Limited quantities of high density racks in spaces with average heat loads can be accommodated by combining raised floor cooling and rack-based exhaust systems.

What about cooling?

- Increasing the height of a raised floor to provide additional supply air negatively impacts the seismic and load capacity properties of the raised floor.
- Isolation of hot exhaust from room air maximizes cooling efficiency and effectiveness.
- Overhead/rack-top, ceiling mount and in-line cooling units using chilled water/refrigerant are available to handle virtually any potential heat load.
- In high density environments in-row or floor mount units may occupy nearly as much space as the server racks.

What about space?

- The portion of space occupied by power and cooling equipment is increasing as rack density increases.
- More than modest increases in an existing facilities average rack density may not be possible due to the increased space requirements for UPS and cooling.
- Very high density configurations are best suited to newly constructed or upgraded facilities.
- For very high density configurations, savings on data center space may be offset by higher costs for equipment.

What about longevity?

- Facility power and cooling designed to scale to 20 KW / rack *average*, expandable to 40 KW / rack *average* and beyond.
- Universal 42U racks pre-wired for 18 KW / rack – with additional extra power available in each row.
- Install chilled water and power lines for current and future UPS and cooling units during construction phase.
- Concrete pads, wiring and other provisions for phased future expansion of chiller, generator and electrical infrastructure.
- Provisions for potential future use of 240v (European hot to neutral standard).

What about longevity?

- Consider plans to allocate a portion of data center space for uses such as NOC's or secure storage that are easily relocated outside of the fire suppression system perimeter when/if additional data center space is needed.
- Consider avoiding raised floor and instead maximize overhead space.
 - ✓ Effectively eliminates floor load limitations.
 - ✓ Enhanced seismic properties.
 - ✓ Eliminates ramps and associated wasted space.
 - ✓ Facilitates high capacity rack-top/overhead cooling options.

What about longevity?

- Maximize cost effective future expansion opportunities.
 - ✓ Dedicate adjacent unused real estate if practical.
 - ✓ If possible locate easily convertible space such as storage rooms in the space adjacent to data centers.
 - ✓ Assume unexpected future data center growth and avoid locating restrooms, utility closets and other costly spaces in the surrounding spaces.

Data Center Project Decision



- Construct a new data center facility on our existing Anaheim, CA campus to replace our 32 year-old primary data center – targeted occupancy late 2008.
- Utilize newest (2006) existing data center in St. Louis, MO high-rise as our backup facility.

Rationale

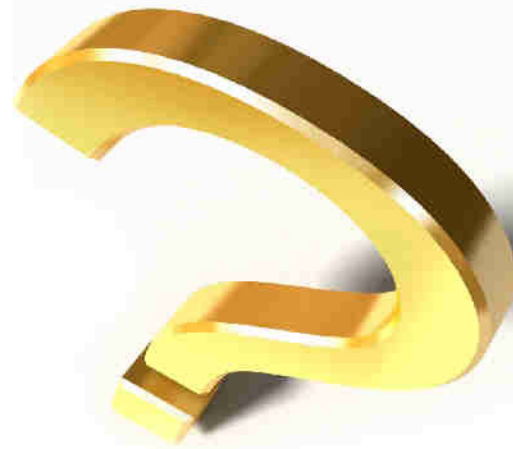
- Geographically diverse for DR and Business Continuity.
- Co-located with existing corporate facilities.
- Leverages state of the art St. Louis facility.
- Leverages existing Anaheim staff and available land.
- Meets requirement for diverse, robust connectivity.
- Consideration for initial and ongoing facility costs, including power*.

* Anaheim has a municipal owned power utility and some of the lowest rates in California.

What lessons did we learn?

- Achieving 160 lbs/sq foot in a high rise building requires advance planning and working closely with structural engineers.
- 8 KVA / rack seems to be a sweet spot for existing facilities but higher density makes sense for new construction.
- Reduce upfront CAPX by purchasing and installing cooling and UPS units in phases as needed.
- Consider local utility cost and availability.
- Engineering, permits and construction will take longer than expected.

Questions?



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Contact Information



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