

UNDERWRITER CASE STUDY

## Uptime Institute Symposium 2010

### **The Chameleon Data Center: "Transforming to meet your business needs..."**

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*Real flexibility will be forced upon the data center as the biggest challenge in the coming years; the result of both increasing speed of change in and increasing uncertainty of the IT environment. The Chameleon Data Center has been designed and engineered to dynamically adapt when meeting the current and future requirements of the market -- allowing maximum flexibility of data center use in terms of IT space, cooling, power, and TIER level, whilst maintaining energy efficiency and sustainability. The Chameleon Data Center changes the way we do business and answers current and future demands of space, reliability, flexibility, and investment.*



## Introduction

The uncertain nature of the current business landscape requires companies to be flexible, adaptive, and responsive to a fast paced and ever changing technological scenario, as well as, to the customer demands driven in many cases more by opportunity than well thought out strategic requirements. In the Data Center world, this calls for a highly innovative model that can address these needs, whilst conforming to ever increasing business, social, and regulatory demands for high energy efficiency. The solution is the Chameleon Data Center, an innovation breakthrough in flexibility, adaptability, responsiveness, and energy efficiency.

## New Market Demands

While energy efficiency has been the most significant driver in data center developments in recent years, a new driver that is as important, if not more so, than energy efficiency has arrived: “extreme” flexibility. With IT developments moving ever faster and the effects of virtualization and the resilience of software impacting the data center, everything is changing with ever increasing speed.

However, few, if any at all, know how this will eventually transform the data center environment. Therefore, these uncertainties result in a need for extreme flexibility in:

- White space: from containers to DC power supply, water-on-the-chip-cooling to non-UPS power supply
- Power requirements: ranging from a conservative 10 kVA average per rack to hotspots of 80 kVA per rack (and rising)
- Room environmental conditions: ranging from recommended ASHRAE thermal guidelines to desert conditions
- TIER level: from TIER I to TIER IV

Given the very short market forecast or IT horizon common to the Data Center market, these uncertainties result in a new demand to be able to ‘change on the spot’ – that is, to effect change once the Data Center is operational. This new driver must be coupled with a sound business case, while reflecting a responsible environmental conscience or corporate social responsibility.

Together, these demands have generated a new objective. However, any building feature can be adapted, but at what cost and impact? We chose to rethink the design starting with a foundation of guiding principles such as flexibility and operational efficiency, and constraints such as architecture and utility services. By rethinking the data center we have reconciled the demand for extreme flexibility with that of extreme cost effectiveness. LB Metric here could help clarify extreme cost effectiveness

## The Chameleon Data Center

To meet these objectives, Deerns has created the Chameleon DC (see figure 1), which changes on the spot to meet your business needs. It utilizes the GC-DC<sup>®</sup> technology, leading to astounding annual average PUEs of 1.15, and also incorporates a unique combination of centralized and decentralized systems. This unique configuration enables us to deliver IT power and cooling at different power densities, TIER levels and total IT power capacities, all from the same systems – resulting in significantly reduced investment outlay. The selection of the definitive set of requirements needs only be made upon IT fit out.

When combined with the GC-DC<sup>®</sup> technology, an extremely modular and scalable data center is obtained, with reduced initial investment outlay associated with the

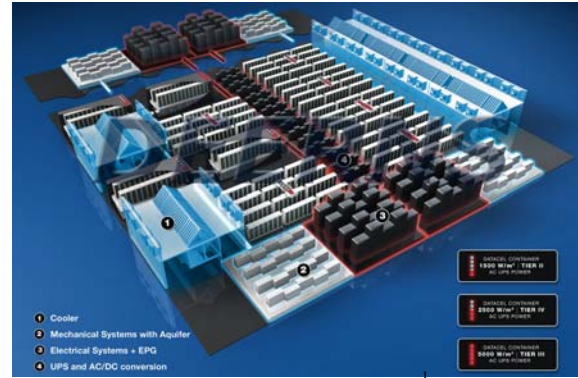


Figure 2. Chameleon Data Center Layout.

## Conclusion

The challenge with flexibility is to avoid additional costs. Chameleon Data Center design achieves just that through an infrastructure that is:

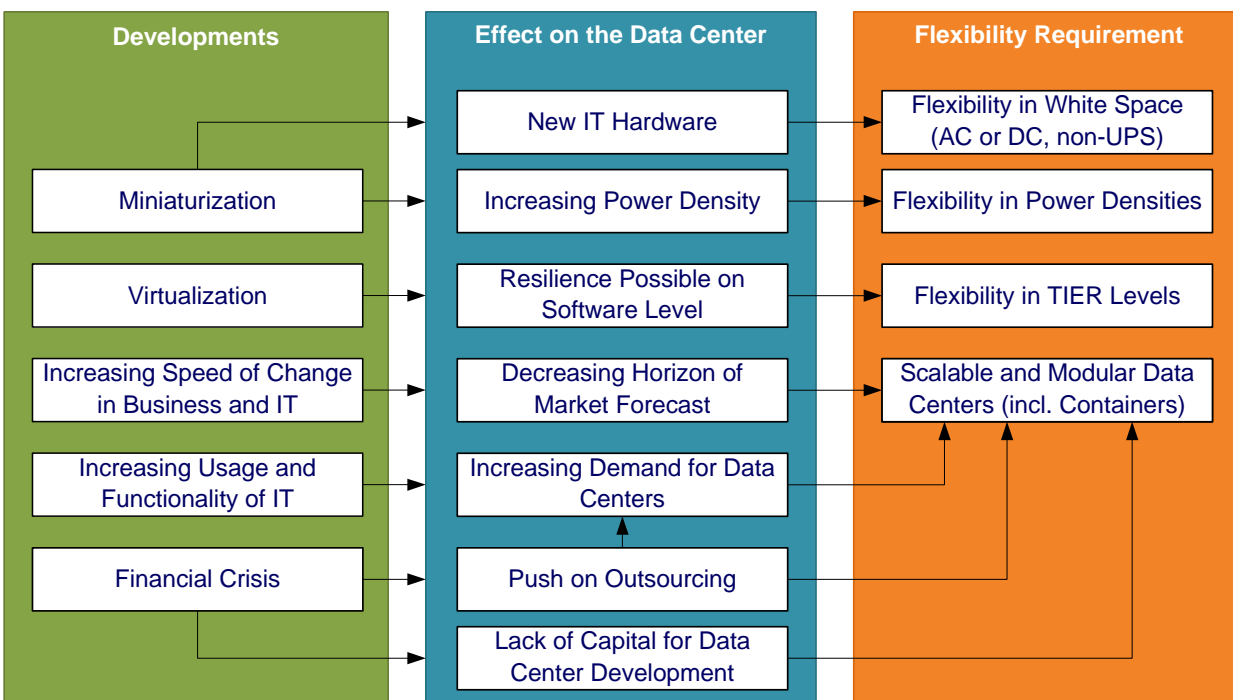


Figure 2: Developments in IT lead to extreme flexibility requirements

cooling systems.

Complementing all of this with equipment selection based upon operational and technical requirements and applying in-depth Total Cost of Ownership analysis, will result in an extremely costs effective data center facility.

- Flexible and easy to adapt:
  - AC or DC, non-UPS or UPS power
  - Conventional or container white space
  - Range of power densities
  - Range of TIER levels
- High value proposition:

<sup>1</sup> Deerns Consulting Engineers 2009

- Minimal initial investment outlay
- Phased investment to match cash flow
- Minimal operational costs through a PUE of 1.15

The Chameleon Data Center hence meets the new market demand for a facility that allows the IT users to decide how they want to use the white space, until the moment they start to fit out their IT equipment. This allows data center operators to develop a facility for end-users that cannot specify their demands 12 or 6 months up front.

## References

Deerns Uptime Institute Conference 2009 White paper entitled: “Three Steps to Perfectly Green.”

GC-DC is a registered name for the Deerns “Green Cooling for Data Centers” free cooling solution design, which is pending Patent approval.

ASHRAE is a registered name of the American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.

PUE or Power Usage Effectiveness is a metric generally attributed to The Green Grid.

TIER classification refers to the Data Center infrastructures requirements published by the Uptime Institute and described within TIA-942: Telecommunications Infrastructure Standard for Data Centers.

## About the Authors

Ms. Starr has over 15 years of experience in the electrical design and technical project management of high technology and mission critical facilities. She combines this experience with a passion for sustainable design and credentials including LEED AP and Certified Sustainable Building Advisor to help clients realize their projects with a sustainable approach.

Mr. Garcia de la Noceda is an IT and Telecommunications sector professional with over twenty years of experience in managing complex systems, services and solutions into government and enterprise customers in Europe and the US. He has personally managed the design and execution of several large data centers, as well as managing

operations for a large US-based data center operator in Europe. His experience has been gained with international industry leaders such as Computer Sciences Corporation, BBN, Amdocs, Lucent, Terremark, and The Climate Project. Mr. Garcia de la Noceda holds a Doctorate degree, and an MBA focused on Information Systems.

After studying Aerospace Engineering at the Technical University in Delft and obtaining a postgraduate in Management Consultancy, Wouter Kok started his career at Deerns Consulting Engineers in 2003. He has been involved in projects for Universities, ‘Blue Chip’ companies, Ministry of Defense and collocation facilities. One of the milestones has been developing the GC-DC concept (Green Cooling for Data Centers; patent pending). Wouter Kok successfully combines a high level technical background with a sharp mind to improve, innovate and realize datacenter infrastructures. His Post-graduate degree in Management Consultancy leverages on the development of the data center practice within Deerns.

## About the Underwriter

Deerns Consulting Engineers is an independent Mechanical & Electrical consultancy firm, designing “state above the art” data centers throughout the world. The firm excels in robust, extremely flexible facility designs, genuine average PUE values below 1.15 and ASHRAE compliant chiller-less facilities. Deerns enables clients to attain their goals of cost-effective, efficient, and robust projects. In doing so, Deerns challenges itself and its clients to achieve the greenest solutions possible. A highly innovative and cost effective example of this is Deerns’ critically acclaimed “Green Cooling for Data Centers” (GC-DC ©), a free-cooling solution through indirect air heat exchange, which has proven to reduce cooling energy consumption by up to 80%.

## About the Uptime Institute LLC

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