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The Green Grid's Data Center Maturity Model

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DCMM – an introduction

- DCMM: a multi-dimensional tool to evaluate resource efficiency of individual data centers
- Target: owner/operators assessing the performance of both facilities and IT functions in their data centers
- Goal: drive self-improvement through goal-setting and targeted changes
- The rating scheme is reassessed every ~4 years to ensure relevance

Overview

- Assesses 8 categories
 - Power, Cooling, Other Facility, Management, Compute, Storage, Network, Other IT
- Over 5 levels
 - From No Progress, through Partial and Full Best Practice, to Visionary (5 years away)
- Each category has subcategories for different elements and components

Users of DCMM

- Hundreds of owners/operators use it to assess their data centers and plan improvements annually
- US Dept. of Energy uses it as a primary reference in its Better Buildings Data Center Challenge
- ISO/IEC JTC 1/SC 39 is incorporating it into technical reports on data center evaluation

DCMM Storage Extract

| | No Progress | Part Best Practice | Best Practice | Level 4 | Visionary (5 yrs out) |
|--------------|---|--|--|--|--|
| Workload | <ul style="list-style-type: none"> Duplicated and unnecessary data | <ul style="list-style-type: none"> Deduplication (backup data) | | | |
| Architecture | <ul style="list-style-type: none"> Data held on high availability/high cost storage | <ul style="list-style-type: none"> Classifying data/tiering | <ul style="list-style-type: none"> Tiering according to business need | | |
| Operations | <ul style="list-style-type: none"> Redundancy not matched to business need Inefficient capacity management – requests & allocations | <ul style="list-style-type: none"> Storage decommissioning/repurpose - aligned to other decommissioning initiatives (e.g. server, application) Share resources between similar types of business units | <ul style="list-style-type: none"> Storage consolidation Assess estate against data policy and business need Power down hot spares Demand Management - challenge business requests for storage | <ul style="list-style-type: none"> Operational media choice (solid state vs. tape vs. optical vs. disk vs. MAID vs. Cloud, etc.) based on TCO model, energy usage, operational carbon footprint and business need | <ul style="list-style-type: none"> Improve application use and creation of data Operational media choice based on TCO model, energy usage, embedded carbon footprint and business need |
| Technology | <ul style="list-style-type: none"> Inefficient storage hardware | <ul style="list-style-type: none"> Utilize low power drive technology. Use small form factor drives | <ul style="list-style-type: none"> Utilize low power consuming technology (e.g. solid state drive technology) | <ul style="list-style-type: none"> Use variable speed components such as drives and fans | <ul style="list-style-type: none"> Use/enabling of low power states for storage |
| Provisioning | <ul style="list-style-type: none"> Shared storage not utilized (dedicated systems) | <ul style="list-style-type: none"> Shared storage (h/w - SAN, iSCSI, etc.) without robust capacity control | <ul style="list-style-type: none"> Thin provisioning | <ul style="list-style-type: none"> Dynamic capacity provisioning | <ul style="list-style-type: none"> Ability to shift storage - abstract from h/w and linked to application - "Follow the Moon" strategy |

DCMM Server Extract

| | No Progress | Part Best Practice | Best Practice | Level 4 | Visionary (5 yrs out) |
|-------------------|---|---|--|---|---|
| Utilization | <ul style="list-style-type: none"> Utilization not measured | <ul style="list-style-type: none"> Tracking avg monthly and peak utilization across the data center | <ul style="list-style-type: none"> Average monthly CPU utilization >20% | <ul style="list-style-type: none"> Avg monthly CPU utilization >50% Understand apps use of CPU | <ul style="list-style-type: none"> Avg monthly CPU utilization >60% Manage spare capacity to reach target |
| Workload Mgmt | <ul style="list-style-type: none"> No policy, strategy for management No rationalization initiatives in place Unknown number & location of servers | <ul style="list-style-type: none"> CMDB adoption enabling understanding of workload Rationalization of applications | <ul style="list-style-type: none"> CMDB = 95%+ accurate workload understanding Rationalize apps by TCO and biz need Rationalize workload | <ul style="list-style-type: none"> Automated workload mgmt between 2 data centers Dynamic applications provisioning and commissioning | <ul style="list-style-type: none"> Automated workload mgmt between all data centers - "Follow the Moon" strategy Apps tied to TCO of architectures, etc |
| Operations | <ul style="list-style-type: none"> Application installed on servers not visible | <ul style="list-style-type: none"> Audits/reviews to decommission unutilized servers | <ul style="list-style-type: none"> Decomm based on system characteristics Use benchmarks for perf per watt | <ul style="list-style-type: none"> Usage/demand for compute resource by need and history | <ul style="list-style-type: none"> Improve application use of major power consuming components |
| Power Mgmt | <ul style="list-style-type: none"> Power mgmt disabled No Pwr Monitoring Onboard sensors (Pwr, Temp, etc.) not utilized | <ul style="list-style-type: none"> Basic monitoring and measurement (estimate via power distribution equipment) Embedded mgmt on low risk systems | <ul style="list-style-type: none"> Power information directly from the server - understand utilization Embedded mgmt enabled where there is no business impact | <ul style="list-style-type: none"> Power mgmt of all servers driven by external policies where there is no business impact | <ul style="list-style-type: none"> Power Management that has no impact on performance or application |
| Server Population | <ul style="list-style-type: none"> Policy for hardware refresh not in place | <ul style="list-style-type: none"> Refresh policy based on years of service Exception for biz or operational reasons | <ul style="list-style-type: none"> Policy based on TCO model plus value of new technology | <ul style="list-style-type: none"> Tech refresh driven by analysis of TCO and ROI on a server by server basis | <ul style="list-style-type: none"> Tech refresh - analysis server Energy proportionality |