Data Center Maturity Model

Facility

Cooling

			Level 0 Minimal/No Progress	Level 1 Part Best Practice	Level 2 Best Practice	Level 3	Level 4	Level 5 Visionary - 5 Years Away
2.1	PUE - Cooling Contribution		• Annual average of 1	• Annual average of 0.5	• Annual average of 0.35	• Annual average of 0.2	• Annual average of 0.1	• Annual average of 0.05
2.2	RCI (hi) & RCI (lo) - if applicable		• Not measured	• One as low as 50%	• One as low as 75%	• 100% for both		
2.3	Mechanical/Refrigerant Cooling reduction		• Inefficient cooling infrastructure	• Variable speed fans, motors, pumps, compressors etc. • Optimize current infrastructure to take advantage of economization available based on local climate data (e.g. local BIN weather data & The Green Grid Economization Maps)	• No mechanical/refrigerant cooling (e.g. economization) for 50% of annual hours - 4,380 hours	• No mechanical/refrigerant cooling (e.g. economization) for 75% of annual hours - 6,570 hours	• No mechanical/refrigerant cooling (e.g. economization) for 90% of annual hours - 7,884 hours	• No mechanical/refrigerant cooling (e.g. economization) for 100% of annual hours - 8,760 hours
2.4	Environmental - set point range at inlet conditions to IT equipment		• Temperature and humidity unnecessarily controlled		• Humidity parameters widened to ASHRAE guideline • Increase temperature to higher limits of ASHRAE guideline taking into account server fan power energy change	• Increase temperature of coolant in step with the computer room change to maximize the hours of no mechanical/refrigerant cooling (e.g. economization) achieved • Increase temperature and humidity ranges to the higher end of equipment supplier specifications taking into account server fan power energy changes	• Increase temperature and humidity ranges in order to achieve Level 4 on the Mechanical/refrigerant cooling reduction	• Increase temperature and humidity ranges in order to achieve Level 5 on the Mechanical/refrigerant cooling reduction
2.5	Environmental - monitoring and control		• Temperature and humidity unnecessarily controlled	• Move temperature control point AWAY from CRAC return, begin controlling at CRAC supply	• Use rack level (average) reported temperature data to monitor and control the room cooling systems	• Use IT (server, storage, network) reported temperature data to monitor and control the room cooling systems		
2.6	Operations		• Overcooled areas • Mixing of hot and cold air • Leaking floor • Minimal maintenance and monitoring • Minimal control over air	• Align CRAC (Computer Room Air Conditioning)/CRAH (Computer Room Air Handling) output • Match cooling to heat emitted and need of servers - periodic manual review • Tile optimization • Line up equipment to have air movement from front to back • Hot/Cold aisle configuration • Remove gaps/holes in the floors and racks to reduce leakage between hot/cold aisles • Blanking panels to fill the gaps in the cabinets • Proactively remove redundant cabling • Intentional air flow segregation • Variable control of airflow (e.g. at the CRAC, floor tile) - manual	• Proactive air management studies (possibly including CFD modelling) to identify and execute on further optimization activities • Hot/Cold aisle physical segregation/containment • Separate Data Center temperature and air/water flow controls • Variable control of airflow (e.g. at the CRAC) - automated	• Matching cooling to heat emitted and need of servers - through automated controls • Full containment of supply or return air		• Dynamic changes to improve environment based on continuous monitoring