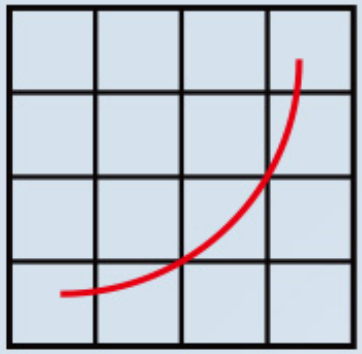


spec®

SPEC 2016亚洲峰会
SPEC 2016 ASIA SUMMIT

Worldwide Standards and Regulations

Henry Wong
Chief Technologist
E³HS IT Consulting, LLC

JTC1 SC39 WG1 Convenor

Henry M Wong the Chief Technologist at E^{3}HS IT Consulting, enabling and evangelizing a holistic approach to resource efficiency of and by data centres and data centre equipment. Mr. Wong has over 32years of IT industry experience in computer system development, manufacturing, and deployment, including technical standards, best practices, and policies. Mr. Wong's experience ranges from leading edge product development, e.g. low power server processors, to enabling data centre level technologies, e.g. modular data centres and 380VDC, For the past 10+ years, Mr. Wong has led and supported many of the enterprise industry energy-efficiency initiatives, technologies, and policies with organizations such as the US EPA, US DOE, Lawrence Berkley National Labs, and The Green Grid. Mr. Wong has represented IT industry's technical positions to policy organizations such as the US DOE, Japan METI, California's Energy Commission, Korea's KEMCO, and China's standardization bodies. Mr. Wong has also coordinated technical assessment and policy positions between industry organizations such as IT Industry Council, the Green Grid, Storage and Networking Industry Association (SNIA), and SPEC. Mr. Wong is a 1984 graduate of Yale University with a degree in semiconductor physics.

Working with the industry on Data Centre and IT infrastructure efficiency and effectiveness….

Global Product Energy Efficiency Landscape: 2016

ISO JTC 1 IEC
Information Technology Standards

Map is a snapshot and not comprehensive
Symbols are for illustration purpose only. Actual program and logos may be different and are property of their respective programs

Data Centre Product Energy Efficiency Hotspots: 2016/17

Emerging: Servers, Plug load

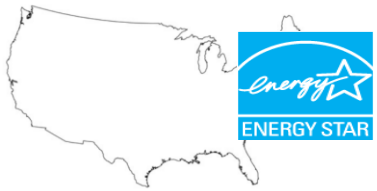
In effect:
- Lot 6/26, Lot 3, DC CoC

In development:
- Lot 9, DC CoC v2

Emerging:
- M462, G20, EN, ETSI/ITU, Cloud, security/privacy, Smart Cities, IoT

In effect:

In development: Servers
- Server EE Standard by CNIS, CCSA
- **Emerging: servers Top Runner**



In effect:
- Servers v2, Large Network Equipment v1, Storage v1, Buildings/Data Centres

In development:
Servers v3

In effect: FEMP
In development:
- TBD

International Standards

In effect:
ISO/IEC 30134-1, -2, -3; IEC 62301
In development: see list

ISO/IEC JTC1 SC39

Title: Sustainability for and by Information Technology

Scope: *Standardization related to the intersection of resource efficiency and IT which supports environmentally and economically viable development, application, operation and management aspects.*

As internet and computing trends drive growth in demand for data centers, the energy and resources consumed by data centers is attracting more and more attention, especially from industry and governments around the world. A number of efforts have sought to quantify the energy consumed by data centers, promote energy efficient methods and to develop ways to maximize productivity while conserving resources such as energy.

The ISO/IEC Joint Committee SC39 intends to establish and converge efficiency standards for Data Centres and ICT equipment. June 2012 Plenary established:

- **Working Group 1 (WG1) : Resource Efficient Data Centres; Development of**
  - Data centre resource efficiency taxonomy and vocabulary;
  - Holistic suite of metrics and Key Performance Indicators;
  - Guidance for resource efficient data centres; and
  - Energy management system standard specifically tailored for data centres.
- **Working Group 2 (WG2) : Green ICT**
  - Prepare guidance for the development of energy efficient ICT excluding the scope of WG1
- Study Group 1 (SG1) : Gap analysis with other activities and results, and to initiate dialogue with relevant SDOs, consortia and fora.

ISO/IEC JTC1 SC39

Leadership

- Chairperson: Jay Taylor ; Secretary: Sally Seitz ;
- WG1 Convenor: Henry M Wong ; WG2 Convenor: Yong-Woon Kim

Experts & Technical Contributors from around the globe

- Australia, Belgium, China, Canada, Finland, France, Germany, Japan, Korea, Luxemburg, Singapore, Netherlands, United Kingdom, United States

In collaboration standard bodies and external organizations including:

- Other JTC 1 entities;
- ISO TC 207, ISO TC 242, ISO TC 257;
- IEC TC 100, IEC TC 108, IEC TC 111, SMB SG 4, IEC/PC 118, IEC TC 57/WG 21, IEC TC 9 and SMB SG 3;
- ITU-T SG 5, CENELEC TC215, ETSI, ECMA, The Green Grid, SPEC

WG1 Work Items

Completed Standards (IS) and Technical Reports (TR)

- ✓ IS 30134-1, Requirements for data centre resource efficiency key performance indicators
- ✓ IS 30134-2, Data Centre KPI, Power Usage Effectiveness (PUE)
- ✓ IS 30134-3, Data Centre KPI, Renewable Energy Factor (REF)
- ✓ TR 20913, Holistic Approach to Data Centre Operations

In Process (dates are estimates)

- IS 30134-4, Data Centre KPI, IT Energy Efficiency-Servers (ITEEsv) 1H2017
- IS 30134-5, Data Centre KPI, IT Energy Utilization- Servers (ITEUsv) 1H2017
- TR 30133, Guidelines for Resource Efficient Data Centres 2H2017
- Updates to 30134-1, -2, -3 to clarify & specify logical & physical boundary 2H2017
- **IS 21836, Server Energy Efficiency Metric (SEEM) 1H2018**
- IS 30134-6, Data Centre KPI, Energy Reuse Factor (ERF) 1H2018
- TR 21897, Primary Energy 1H2018
- TR xxxxx, use of excess energy generation 1H2018
- Internationalization of EN 50600 series of data centre specifications 1H2018…

Topics Under Consideration

- IS Water Usage Effectiveness (WUE)
- IS Carbon Usage Effectiveness (CUE)
- IS Water Reuse Factor (WRF)
- IS Resiliency Class or Type of Data Centre
- IS Data Centre Cost eXpense (DCCX)
- IS Data Centre Cost Effectiveness (DCCE)
- IS Cooling Effectiveness Ratio (CER)
- IS Data Centre Utilization (DCU)
- IS IT Equipment Effectiveness Networking (ITEEnetw)
- IS IT Equipment Utilization Networking (ITEUnetw)
- IS IT Equipment Effectiveness Storage (ITEEstor)
- IS IT Equipment Utilization Storage (ITEUstor)
- IS Seasonally adjusted Energy Efficiency Ratio (SEER)
- IS Coefficient of Performance (COP)
- TR Economic Output
- TR Resiliency Risk Impact
- TR Data Centre Life Cycle Impact
- TR Boundaries of Software Defined Data Centre
- TR Boundaries of Software Defined Subsystems
- TR Waste Impact to Local Area
- IS/TR Security and Privacy
- TR DC Integration for Smart Cities
- TR DC and IoT integration

Always welcoming more

- ❑ Technical contributors
- ❑ Editors
- ❑ Examples

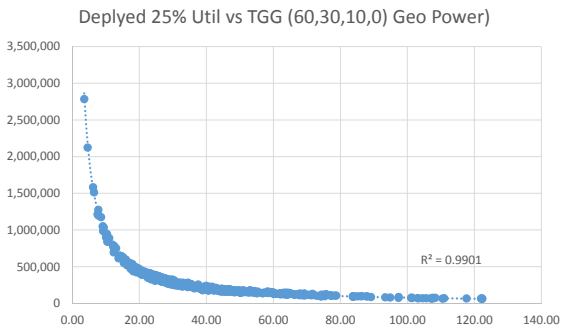
Server Energy Efficiency Metric (SEEM)- IS 21836

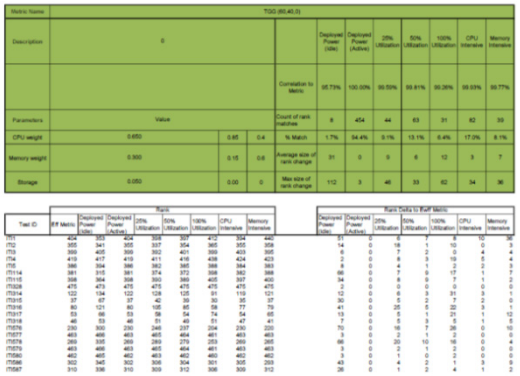
Server EE metric for energy efficiency programs

- **SEEM: Objectives**
  - Convergence of energy efficiency assessment methods and requirements
  - Establishes common metric and methods to reduce product requirement complexity
  - Incorporates data centre level considerations and impact
- **Standardizing Energy Efficiency Metric**
  - Worklet Performance and power aggregation
  - Validation method: Deployed Power
  - Common run rules
  - Common terms and data publications
  - Normative (estm) : Run rules, aggregation method, validation method, terms and data publication
  - Informative (estm) : Application, examples, tools
- **Harmonization Plans**
  - EU Lot 9, ETSI
  - ENERGY STAR for Computer Servers v3
  - TBD….

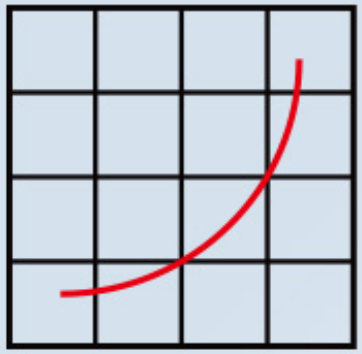
Deployed Power

- **What is "Deployed Power"**
  - **Assessment method to validate a metric compared to data centre power impact as installed**
  - **Establishes correlation baseline to assess impact of the grading proposal**
  - **Mimics procurement and deployment processes employed by data centre IT professionals**
- **Attributes**
  - Provisioning based on 100X Peak Performance of the highest performing system in the data set
  - Performance provisioning assessment can be used to assess any weighting of SERT workloads or other performance/power metric
  - Impact assessment at various load levels mimicking the range of operational power demand in the data centre
  - Rank order comparison between an efficiency metric and data centre operational power demand
- **Data centre level incentives**
  - Right sizing
  - Consolidation
  - Energy savings at data centre level





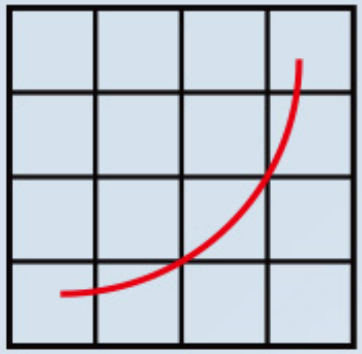
Ensuring an efficiency metric correlates to ***LOWER*** data centre energy consumption



spec®

SPEC 2016亚洲峰会
SPEC 2016 ASIA SUMMIT

Q&A



spec®

SPEC 2016亚洲峰会
SPEC 2016 ASIA SUMMIT

Thank you!