Energy Efficiency Metrics From an EPA Energy Star and EU Code of Conduct Perspective

Liam Newcombe
BCS Data Centre Specialist Group Secretary
EU CoC Data Centres – Chair, Best Practice Working Group

Energy Benchmarks

Goals of Benchmarks

Types of Benchmark

Generalised Benchmarks

Standard energy reporting

Next phase

Goals

- EU CoC - “Select efficient hardware”
- EU CoC - “Select efficient software”
- Drive improvements by enhancing competition
- Improve market efficiency

Energy Benchmarks

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Next phase

Maximum performance

- A broad range of benchmarks which effectively;
  - Test peak *available* performance
  - Test hardware and software
- Performance per capital $ / £ / €

Maximum performance

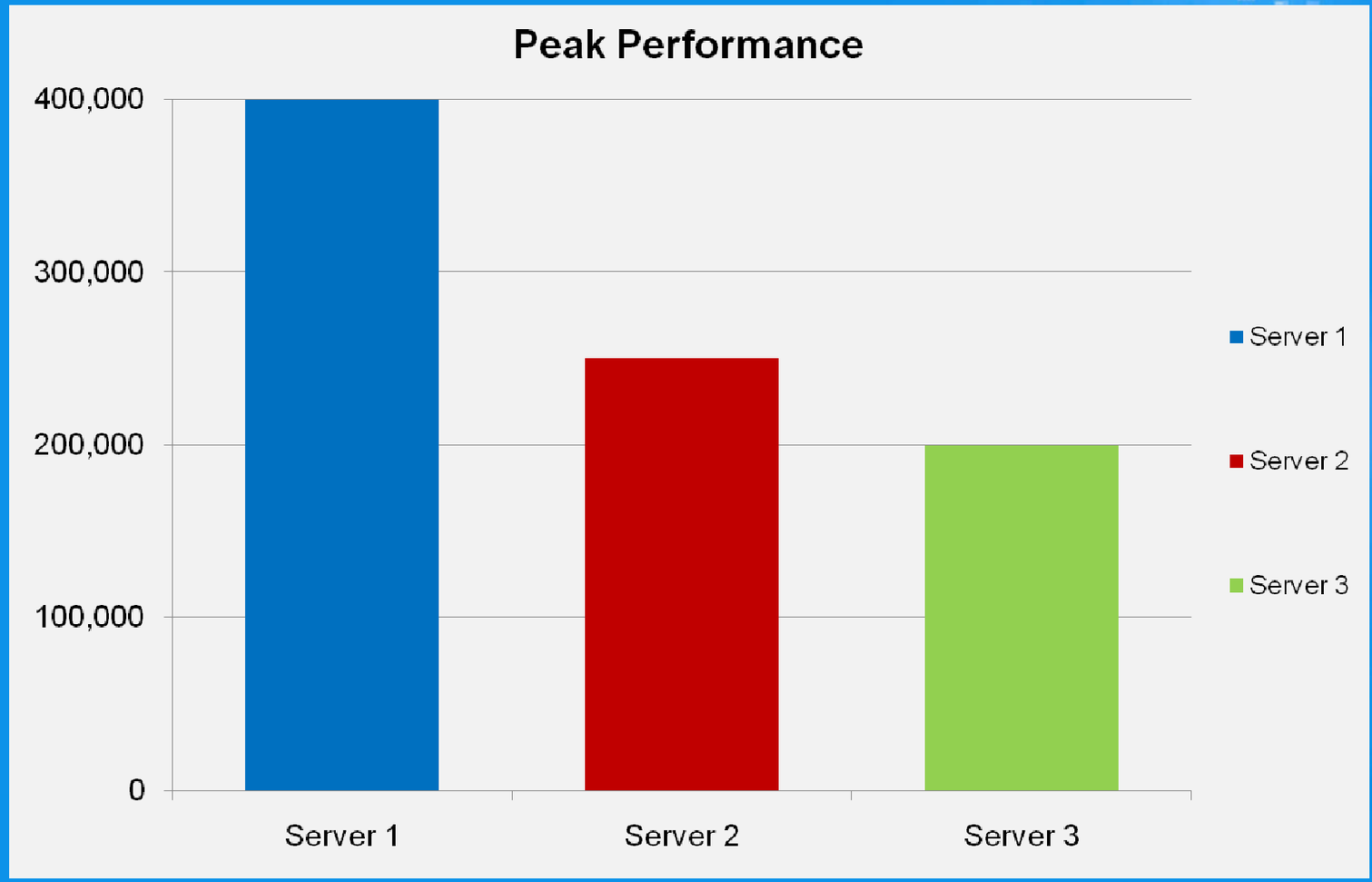
- These structured benchmarks have benefits;
  - Broad expert input
  - Transparent and trusted
  - Structured versioning
  - Established presence

Changing Cost Balance

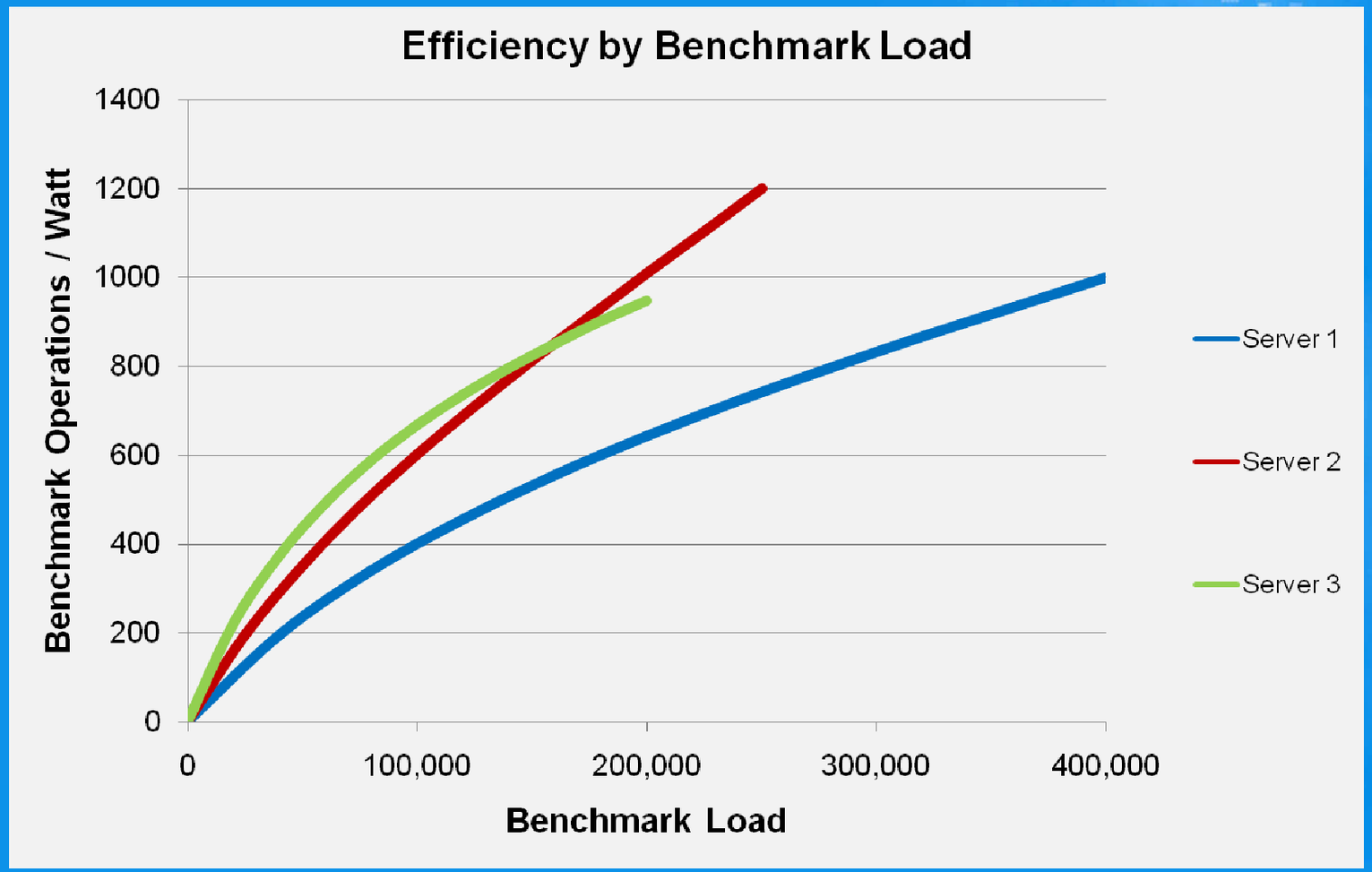
Energy and Cost efficiency

- To deal with this we seek benchmarks which;
  - Report energy consumption
  - Report a range of *actual delivered* load
  - Represent real deployment scenarios

Energy and Cost efficiency



Energy and Cost efficiency



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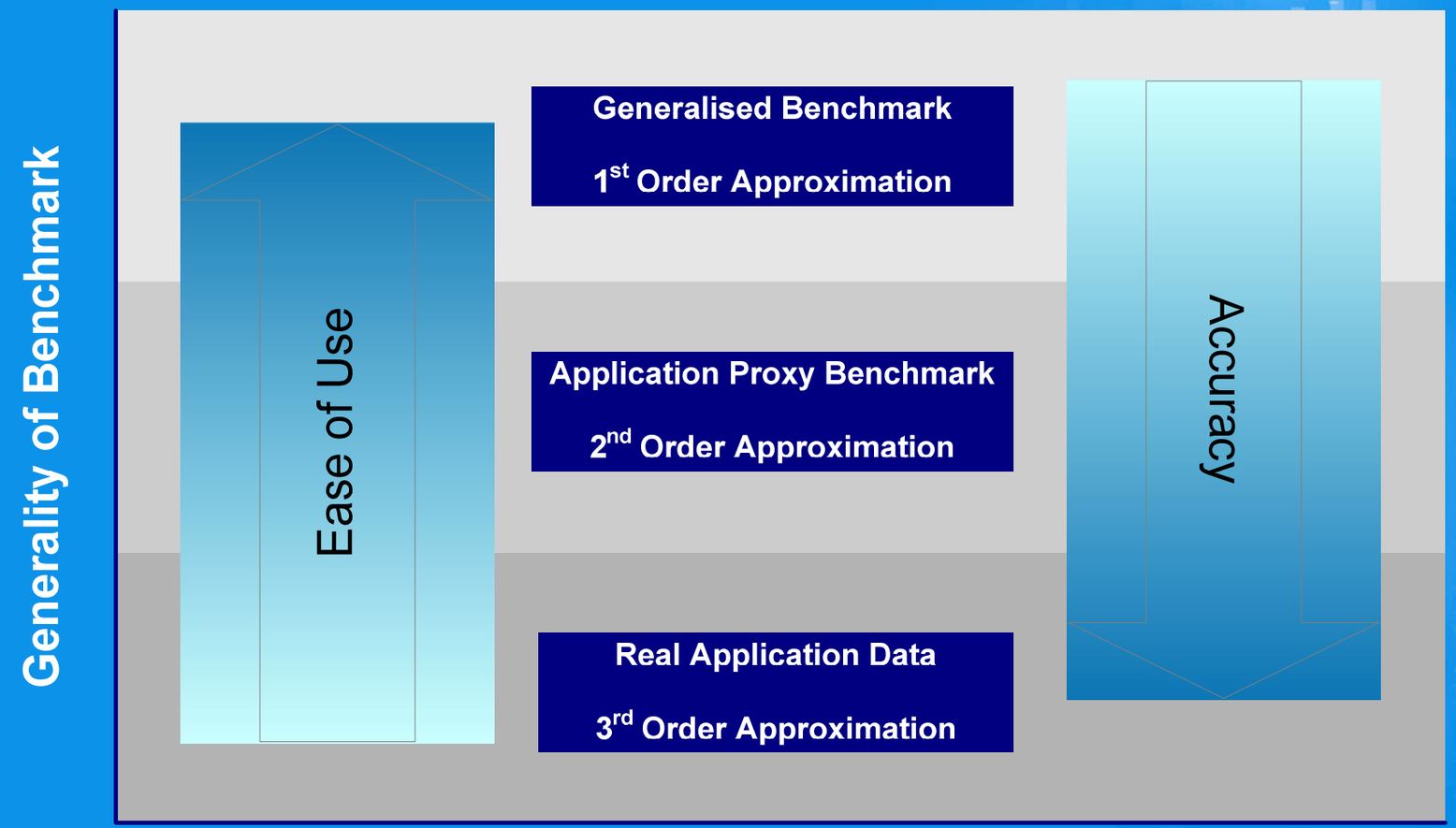
Generalised Benchmarks

- Can we have an ‘Overall Score’?
- Can we preserve any value?

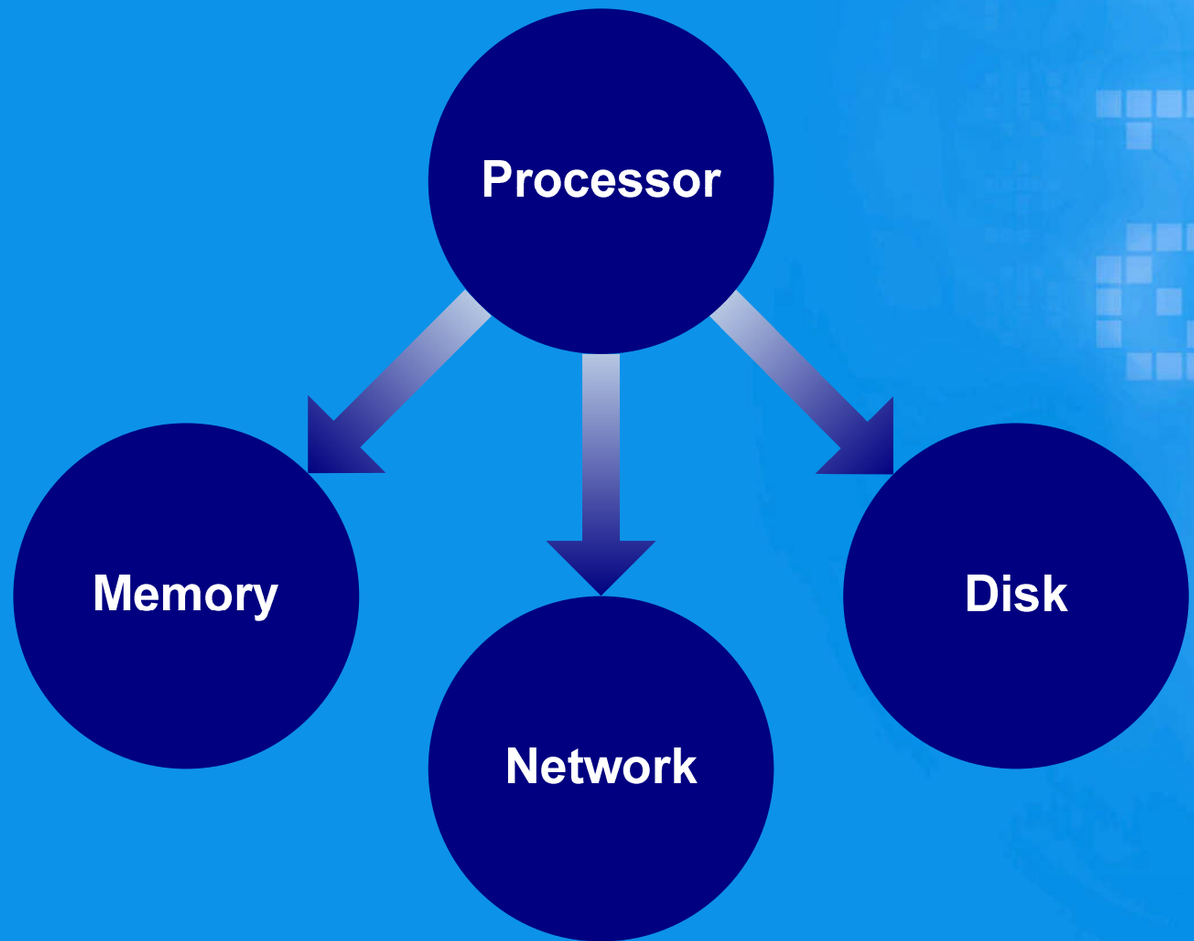
Workload generality



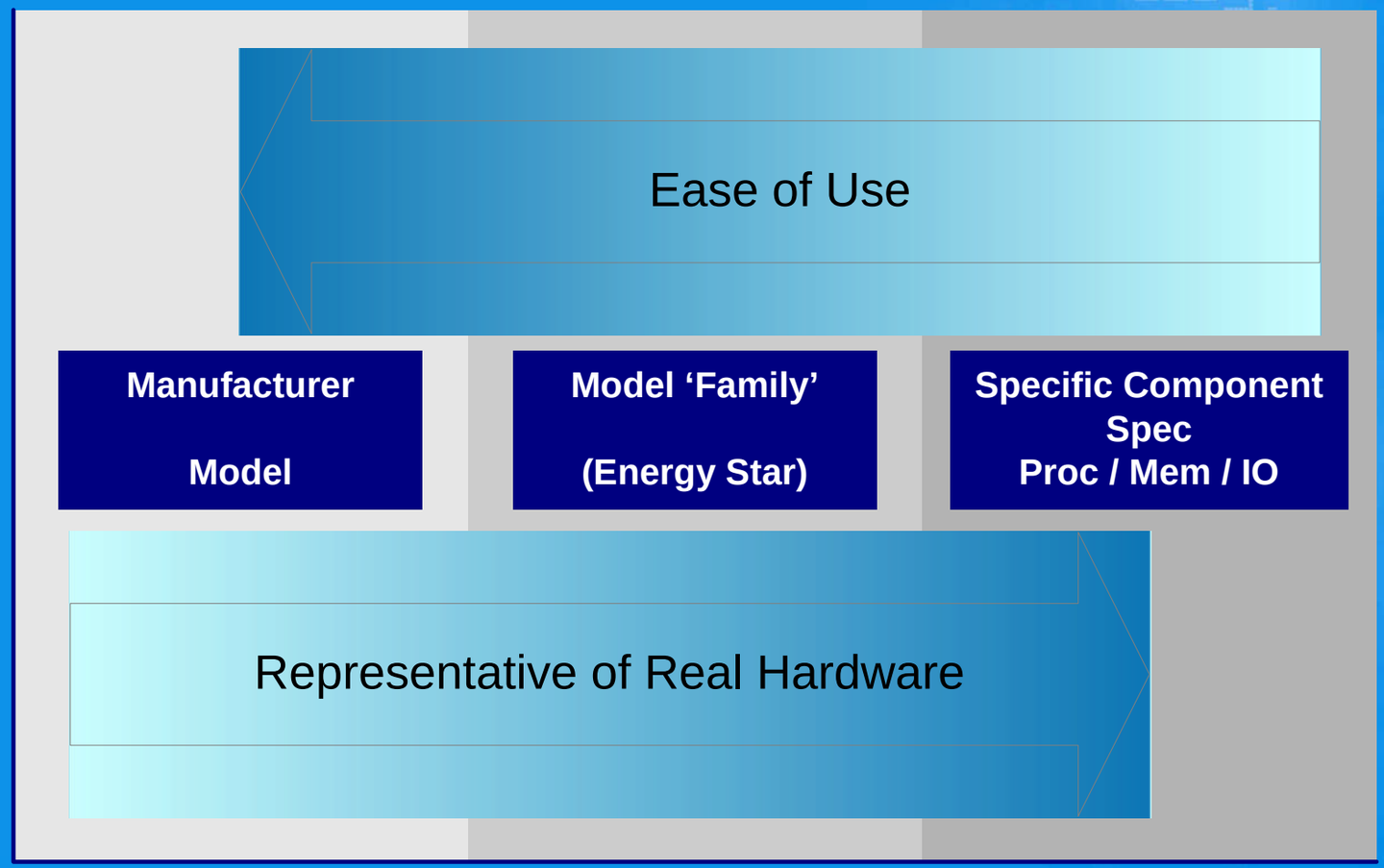
Issues

- May drive ‘benchmark engineering’ toward the benchmark not real use cases
- A general score may be misleading
  - Scores must have context
  - Limitations must be clear
- Hardware combinations

Issues

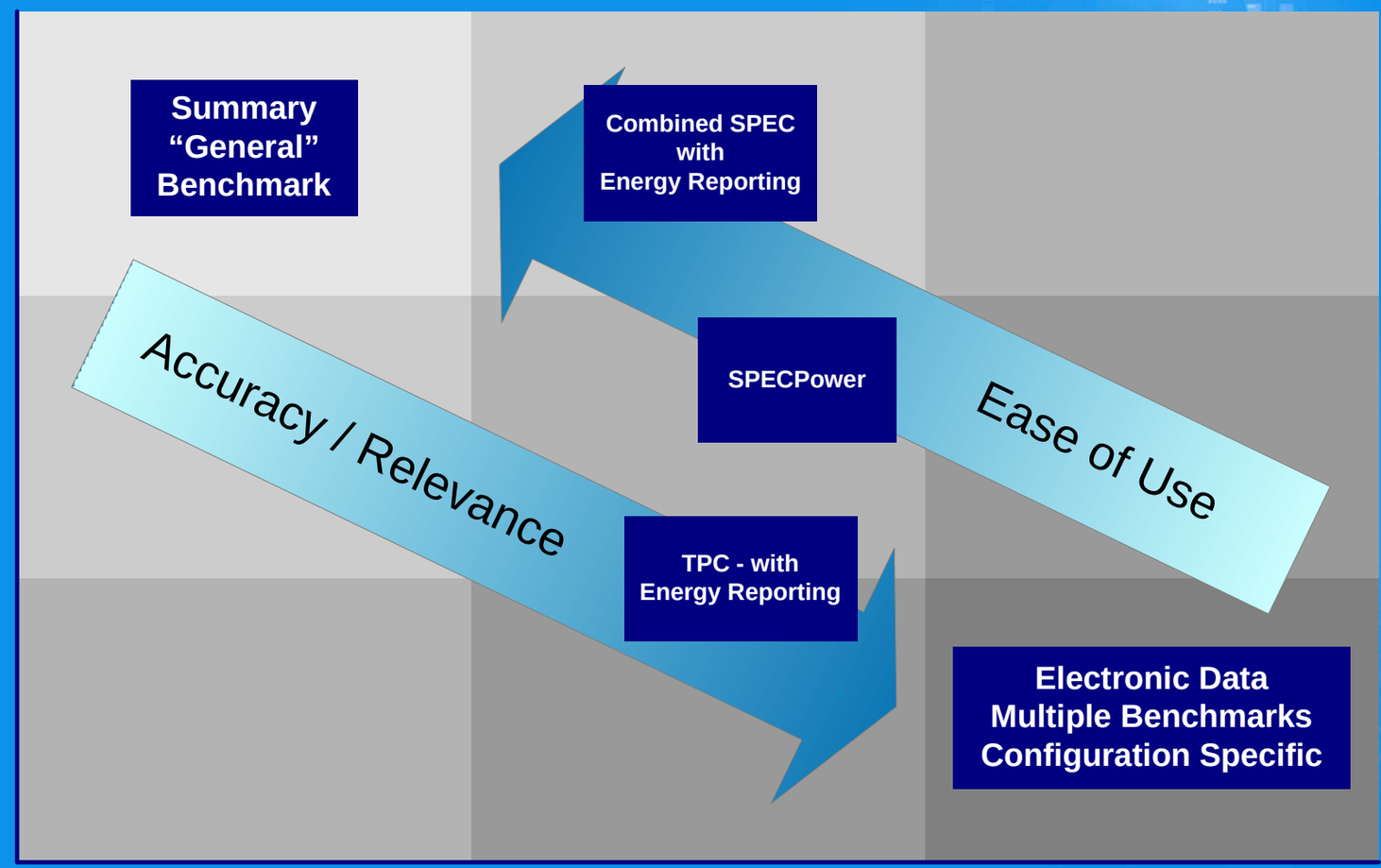


Hardware



Device and Component Combinatorics

Combined


Summary
"General"
Benchmark
Combined SPEC
with
Energy Reporting
SPECPower
TPC - with
Energy Reporting
Electronic Data
Multiple Benchmarks
Configuration Specific
Accuracy / Relevance
Ease of Use
Generality of Benchmark
Device and Component Combinatorics

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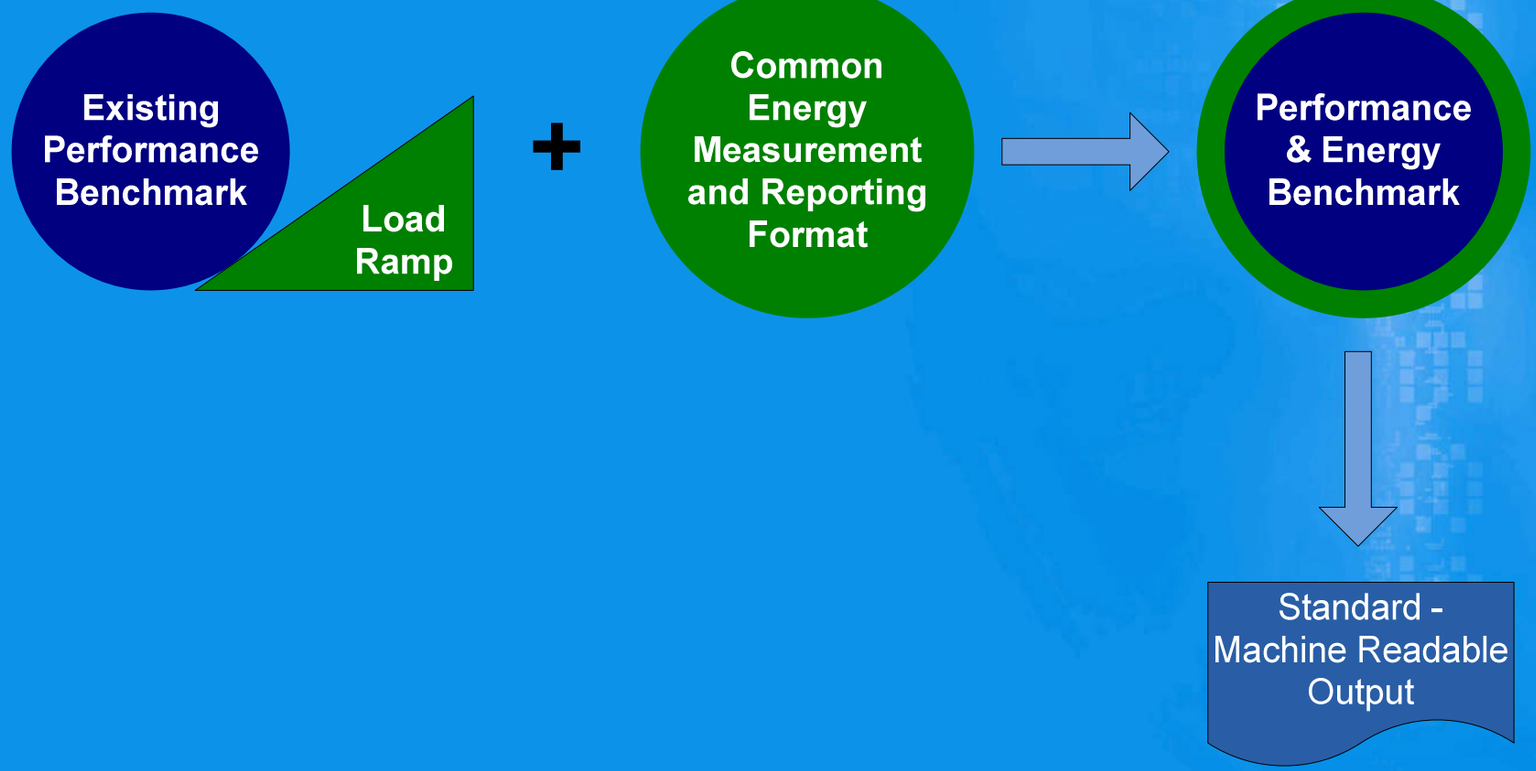
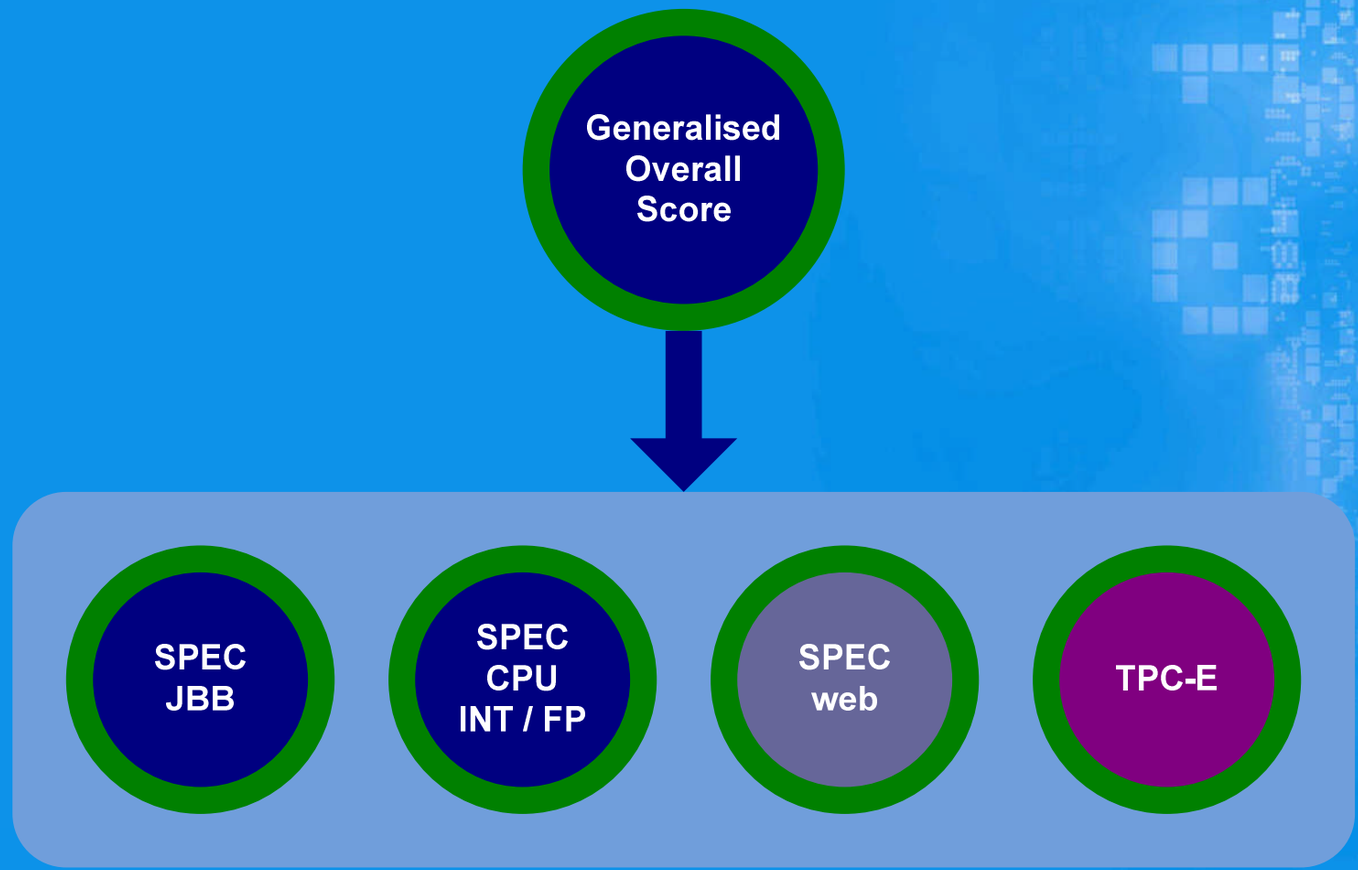
Standard energy reporting



Overall and Individual



Requires

- Tools to acquire and view this complex data
- Tools to evaluate achieved cost and energy efficiency in a specific environment

Server Data

BCS

BCS Supported by CARBON TRUST data centre simulator v0.11

Simulation Menu

- Scenario List
- Compare Scenarios

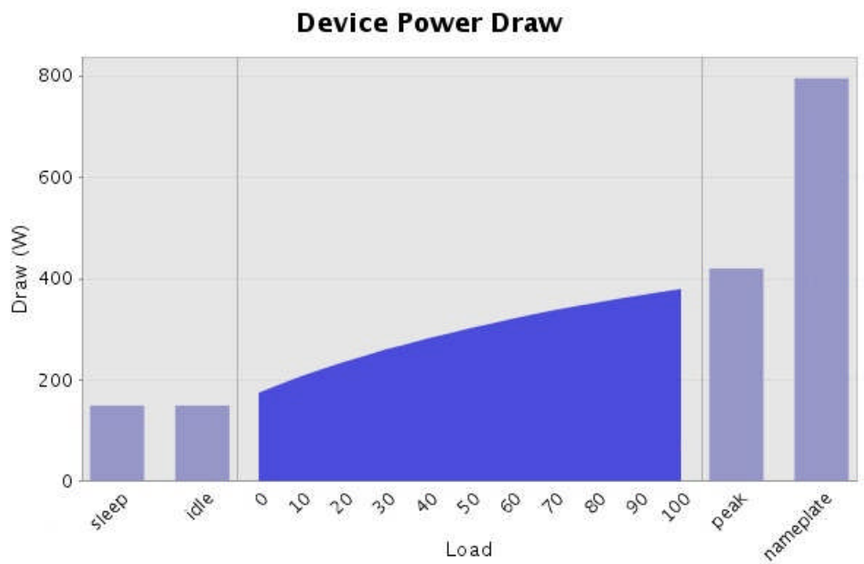
Current Scenario: Demo Full IT Scenario

Configuration
- Scenario Settings
- Data Centre Layout
- Data Centre Capacity
- Operational Settings
- M&E Settings
- IT Settings

Actions
- Run Simulation
- View Results

IT Settings -> IT Device Settings -> Edit IT Device Specification -> Load Power Profile

View Chart



Return

developed by Romonet

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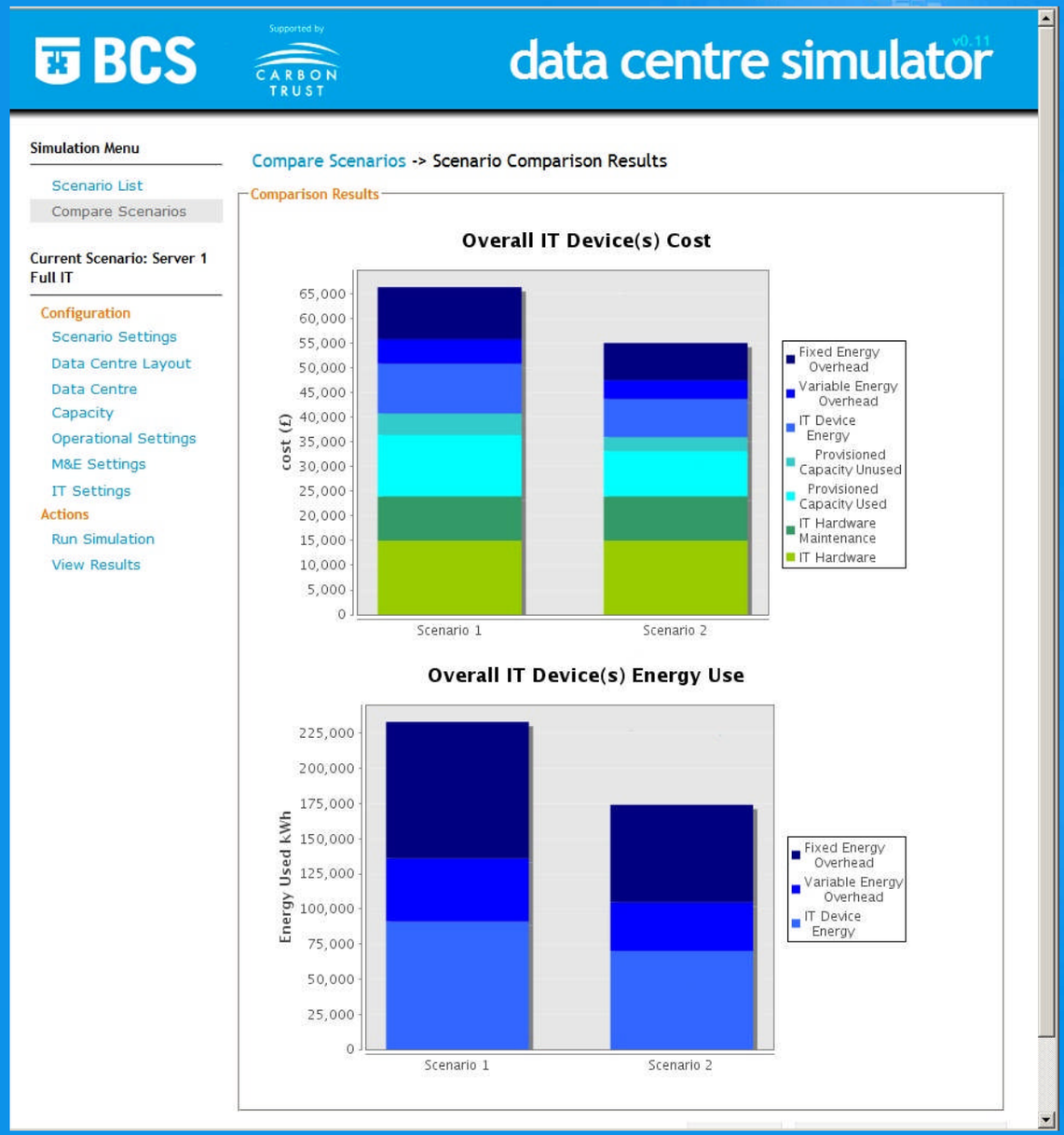
BCS

Simulation Tools

Simulation tools allow users to compare using this detailed data



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Next phase

The next phase

- Automatic management and optimisation
  - Data centres are too complex for human tuning
- Allocate cost and energy to delivered services
  - Virtualisation and shared infrastructure have broken our ability to relate services to physical environments and costs
  - Monitoring and billing systems need this data

Thank you

Liam Newcombe
liam@romonet.com