SPEC's

Server Efficiency Rating Tool™

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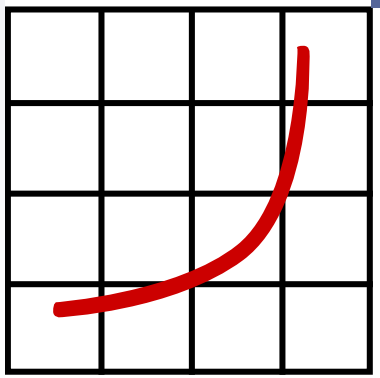

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Agenda

Energy Star® for Computer Server - Stakeholder Meeting

September 25, 2009 – San Jose, CA, USA

- SPEC - Overview and Philosophy
- Milestones
- SPECpower_ssj2008 - Lessons Learned
- Current Project - SPEC's Server Efficiency Rating Tool™
  - Requirements
  - Taxonomy of Platform Evaluation Tools
  - Development Cycle
- Summary
- Q & A

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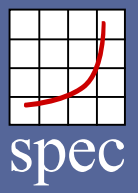
Standard Performance Evaluation Corporation (SPEC)



- A world-wide non-profit consortium formed in 1988 to establish, maintain and endorse a standardized set of relevant benchmarks that can be applied to the newest generation of high-performance computers
- Comprised out of over 80 computer hardware and software vendors, educational institutions, and government agencies
- Developed over 30 Industry-standard benchmarks for system performance evaluation in a variety of application areas
- Largest public repository of well documented, peer reviewed, benchmark results. (20,000+)
- In-depth understanding of workloads, benchmark code, fair comparisons across different platform

SPEC's Philosophy

- To ensure that the marketplace has a fair and useful set of metrics to differentiate systems
  - A good benchmark, that is reasonable to utilize, will lead to a greater availability of results in the marketplace
- To provide a standardized suite of code that has already been ported to a wide variety of platforms
  - The licensee can immediately start with the measurement on all supported platforms without code-porting
- SPEC welcomes organizations to join and participate in our work, and stands ready to offer guidance on workloads and benchmarks
  - Membership is open to any interested company or entity

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Milestones

SPEC Power and Performance Methodology

- An introduction on power and performance metrics for computer systems
- Guidance for Power and Performance benchmark development (existing and new designs)

SPEC Power Temperature Daemon (PTDaemon)

- Infrastructure software to connect, control, and collect data from power and temperature measurement devices.

SPECpower_ssj2008

- First industry standard benchmark that measures the power and performance characteristics of server-class compute-equipment.

SPECweb2009

- First industry standard benchmark that measures the power and performance characteristics of web serving compute-equipment.

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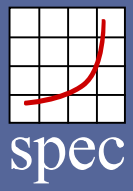
SPECpower_ssj2008 - Lessons Learned

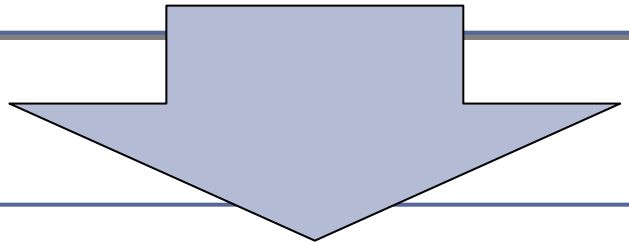


A leap forward in power and performance analysis of Enterprise Computer Servers

- Released end of 2007
- 100+ published results at http://www.spec.org/power_ssj2008/results/power_ssj2008.html
  - All x86 server architecture
  - Submission from 20 companies worldwide
  - Highly competitive market
- ~3x energy efficiency gain since SPECpower_ssj2008 released
  - 698 - 2066 overall ssj_ops/watt
    (best result from first submission cycle to the best current result)
  - Due to hardware and software improvements
- Identified Areas for Improvements

Current Project

The SPECpower committee is currently working on the design, implementation and delivery of the next generation tool set that will measure and evaluate the performance and power of computer servers over a wider spectrum of functionality.



This tool set will have the potential to be adopted for the use in the EPA Energy Star® program for Computer Server and to form a solid basis for the next generation SPECpower benchmarks.

Requirements

Differences from Conventional Benchmarks

More economical, easier to use, minimal equipment and skills requirements

- Through highly automated processes
- Free from super-tuning

Updates - long term ownership

- Adapt to latest technologies and EPA specification changes
- More frequent updates than current SPEC practice

Industry EPA stakeholder partnership

- Collaborate on workload, metric and the Energy Star® program Tier 2 Framework

Avoid the potential misuse of detailed performance data for competitive gain in marketing

- Concern free data disclosure will lead to more Energy Star® qualified servers

Energy efficiency by first order of approximation

- Absolute score is less relevant for end user

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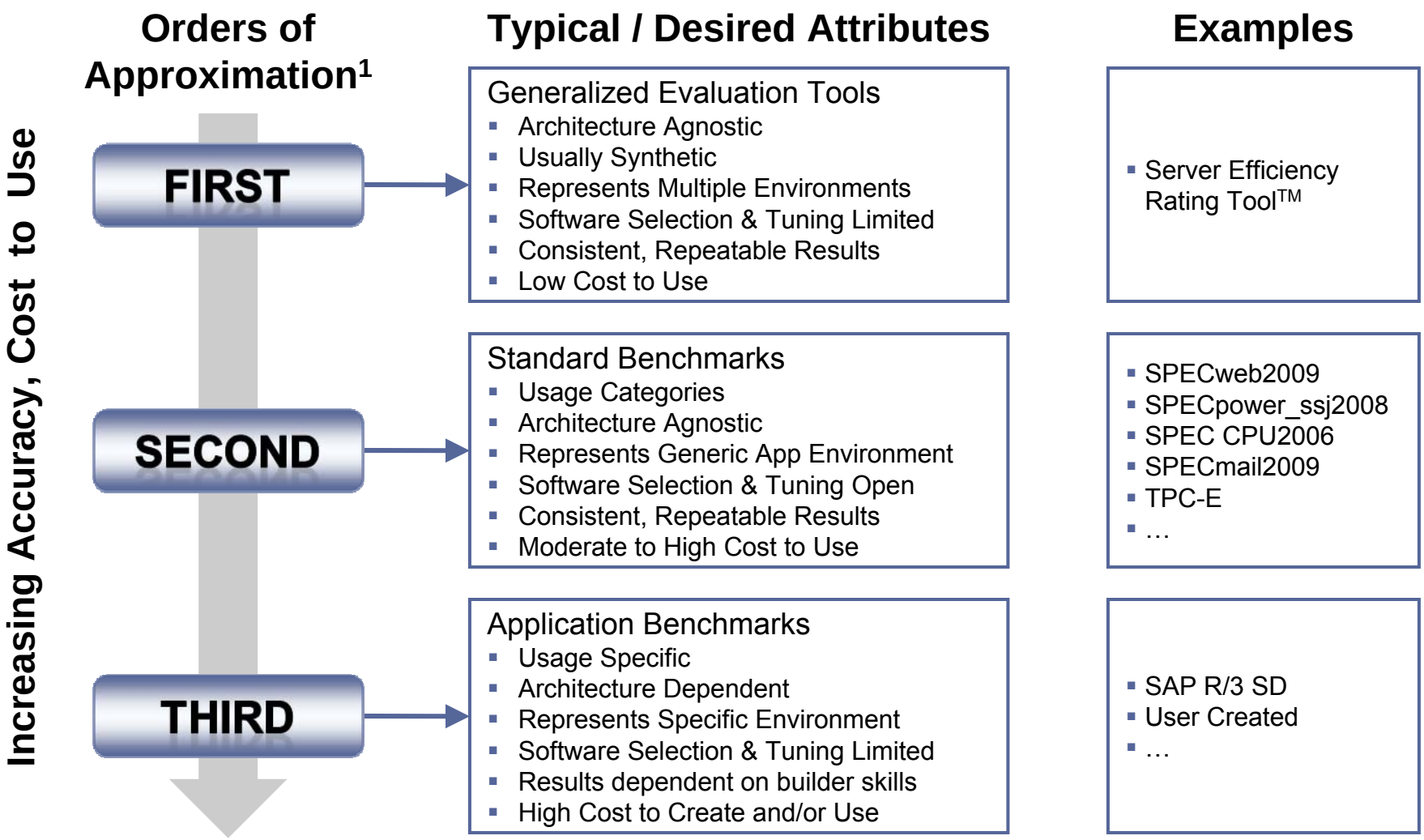
Taxonomy of Platform Evaluation Tools



1. Taxonomy from: "*The State of Energy and Performance Benchmarking for Enterprise Servers*" ; A. Fanara, E. Haines, A Howard; August 2009

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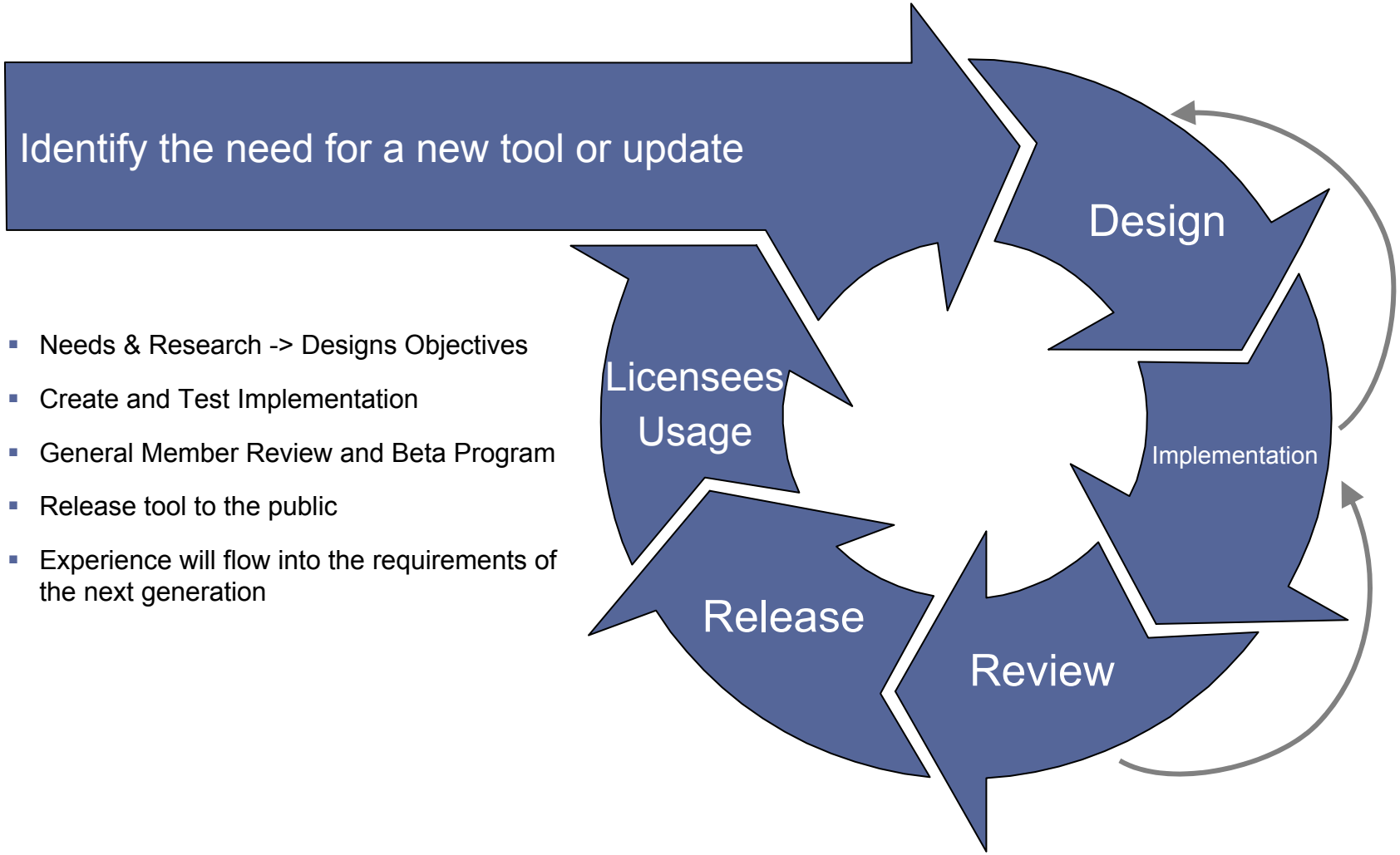
Development Cycle



- Needs & Research -> Designs Objectives
- Create and Test Implementation
- General Member Review and Beta Program
- Release tool to the public
- Experience will flow into the requirements of the next generation

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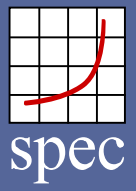
Summary



A Server Efficiency Rating Tool™ rather than a benchmark
- Better fit for the Energy Star® for Computer Server Environment

Under development
- Concrete design requirements
- Collaborate with industry on scoping and specifications
- Prototyping

Goal of the framework
- Flexible to adaptable to a range of server platform architectures and capabilities

Leverage existing SPEC methods, code-base and expertise

The leading engineers and scientists in the fields of benchmark development and energy efficiency have been committed by AMD, Dell, Fujitsu, HP, Intel, IBM, Sun to tackle this task in the SPECpower Committee.

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