

TPC Express – Reinventing the TPC

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Presented by:

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Agenda – TPC Express: Reinventing the TPC

- Overview and Need
- TPC-Express vs. Enterprise-Class Benchmarks
- TPC-Express Targets
- Benchmark Life Cycle
- A First Project
- Invitation to Participate

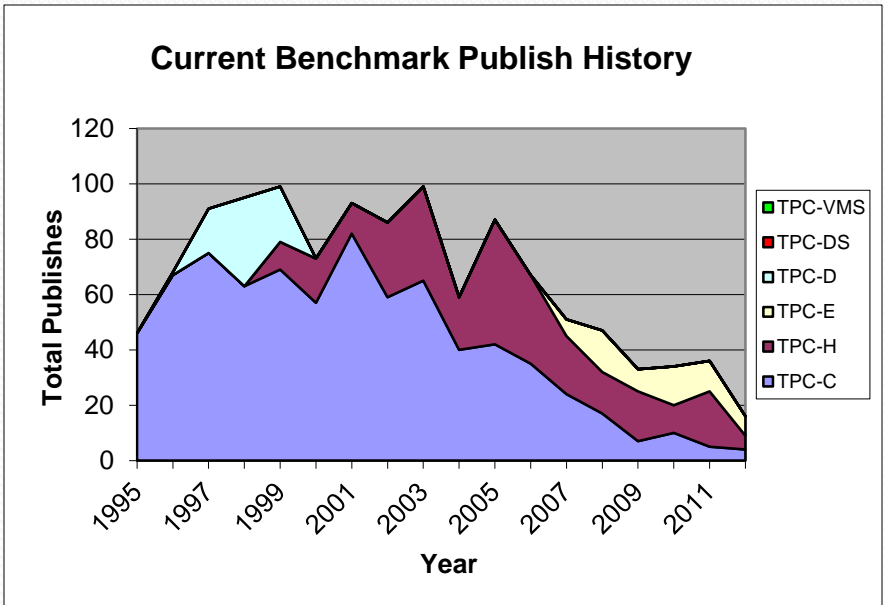
TPC-Express: Overview and Need

- “Is There a Kit Available for this Benchmark?”
 - Most commonly asked question of the TPC Administrator
 - Today, the answer must be “no”
 - (...followed by some guidance for who to talk to for help)

The TPC defines transaction processing and database benchmarks and delivers trusted results to the industry.

TPC-Express: Overview and Need

- TPC Reputation for Strong DB Benchmarks
 - Over 6 dozen of the papers selected for the VLDB2012 International conference used a TPC benchmark as a reference
 - However, official publishes of TPC benchmark results have dwindled
 - Even at its peak, the total official publishes was only slightly higher than the academic papers using unofficial versions



TPC-Express: Overview and Need

- Contrast: Systems Performance Evaluation Corporation
 - Not all SPEC benchmarks are wildly successful
 - SPEC's most popular benchmarks have seen substantial use in the industry:
 - Consider SPEC's 3 most popular benchmarks

	Publishes in last 2 active quarters	Lifetime publishes
SPECpower_ssj2008	19	440
SPECjbb2005	39	746
SPECcpu suite	729	4391

TPC-Express: Overview and Need

- What makes a popular benchmark - - - popular?



1. Easy order/delivery/execution/validation process
 - Benchmark does not require massive personnel investment



2. Meaningful subset of compute industry function
 - Important stuff tested



3. Economical test environment
 - Can be run on almost any configuration

4. Useful for academic research
 - Result of above 3

5. Strong base of existing results
 - Result of above 4

TPC Express – Overview and Need

- Who Publishes/Uses TPC Benchmarks?
 - Computer HW and SW manufacturers
 - The TPC Membership, generally
 - Some publications
 - Much internal engineering work
 - Academia
 - Dozens of the papers selected for VLDB conferences reference TPC benchmark
 - **None** of them were able to use an official TPC Benchmark Result
 - Consumers
 - Many consumers require TPC-related projections in their RFPs
 - **No** consumers actually exercise TPC benchmarks
 - Analysts
 - Prepare results under contract or as a part of an analysis project
 - **Almost never** publish official results

Need a solution to strengthen the first group, and make TPC benchmarks more readily available for the others.

TPC-Express vs. Enterprise-Class Benchmarks

- Existing TPC Benchmark Model:
 - Enterprise Database Applications
 - Business Case Model
 - Inputs and Outputs defined
 - Implementation left to the implementer
 - Full System Configurations
 - Enterprise database applications access a lot of - - - data
 - Absolutely valid model
 - Allows implementation on wide variety of products
 - But
 - Expensive to get started
 - Expensive to implement

TPC-Express vs. Enterprise-Class Benchmarks

- Proposal and Challenge:
- Create a benchmark model that retains the strengths of the Enterprise model, while enveloping the basic requirements for a “popular” benchmark.
- Named “TPC Express”

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TPC-Express vs. Enterprise-Class Benchmarks (1/2)

<i>Enterprise</i>	<i>Express</i>
Specification Based with some TPC code	Kit based enhanced by specification
RYO implementation	OOB implementation
Price required	Price eliminated
ACID	ACI testing
Full system configuration	Limited configuration focused on key benchmark requirements
Substantial implementation costs	Reduced implementation costs

The TPC defines transaction processing and database benchmarks and delivers trusted results to the industry.

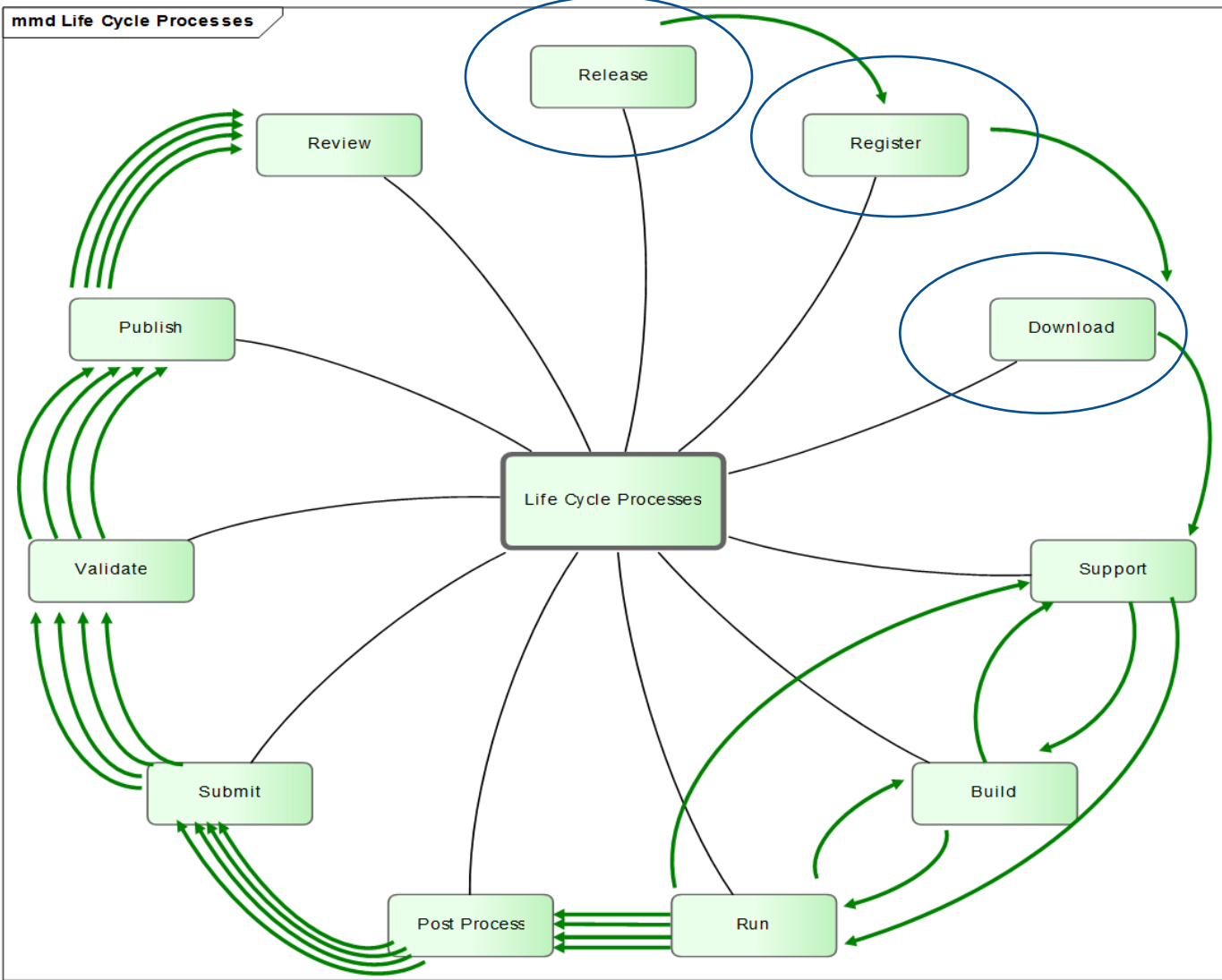
TPC-Express vs. Enterprise-Class Benchmarks (2/2)

<i>Enterprise</i>	<i>Express</i>
Highly tuned – best possible optimization allowed	System and DBMS tuning, but not application or kit
Full Audit	Much self validation
Any product allowed	Some pre-qualification of products required (no audit)
TPC revenues from benchmark registration	TPC revenues from license sales and benchmark registration
Ability to promote results on Sponsor’s schedule	Ability to promote results on Sponsor’s schedule

Target: Increased use and publication of official TPC Benchmarks.

The TPC defines transaction processing and database benchmarks and delivers trusted results to the industry.

TPC-Express Benchmark Life Cycle – Target “Ease Of...”



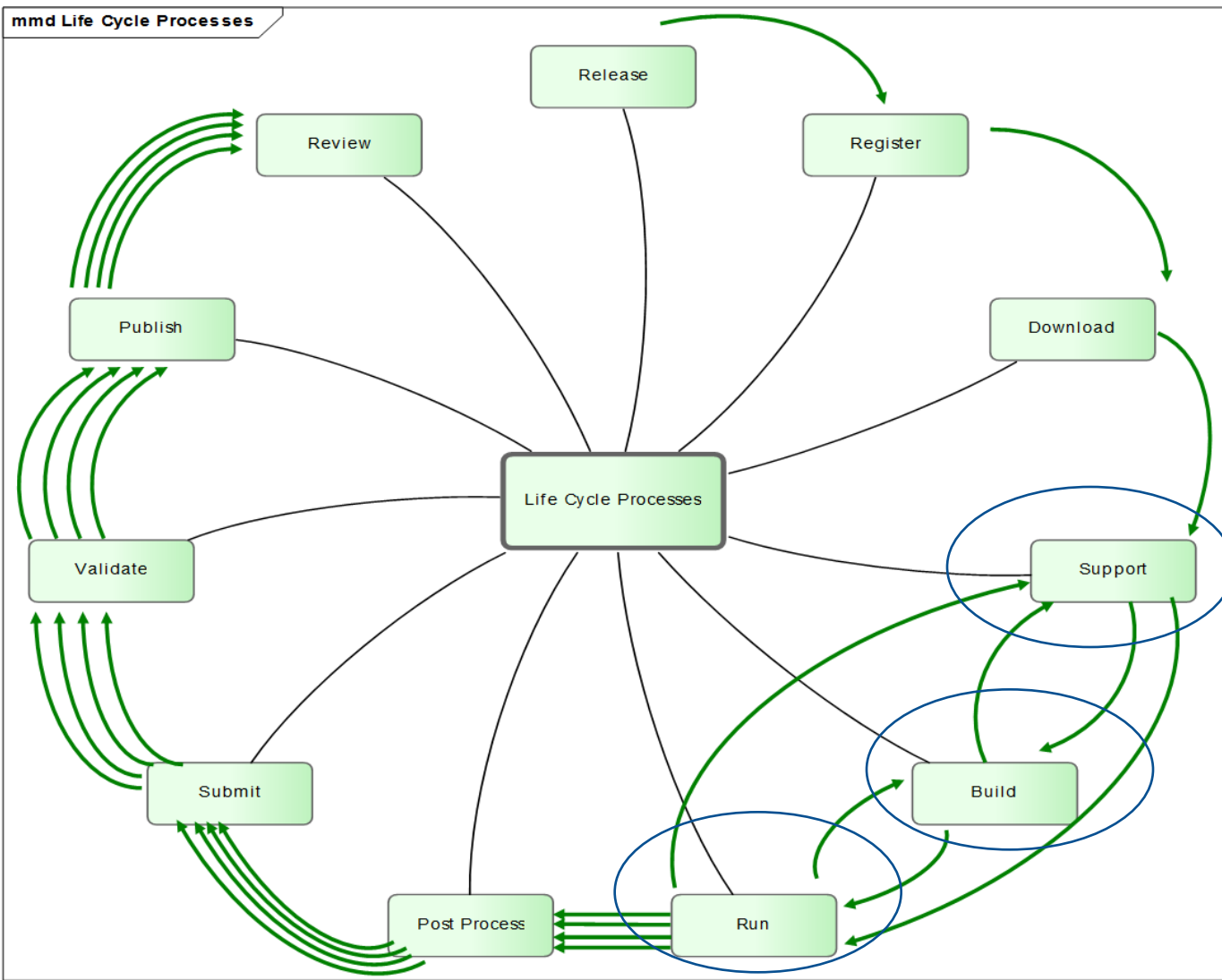
Each part of the process must be examined.

Release is a substantial change - - Executable kit instead of paper specification.

Register and **Download** involve a licensing process.

The TPC defines transaction processing and database benchmarks and delivers trusted results to the industry.

TPC-Express Benchmark Life Cycle – Target “Ease Of...”

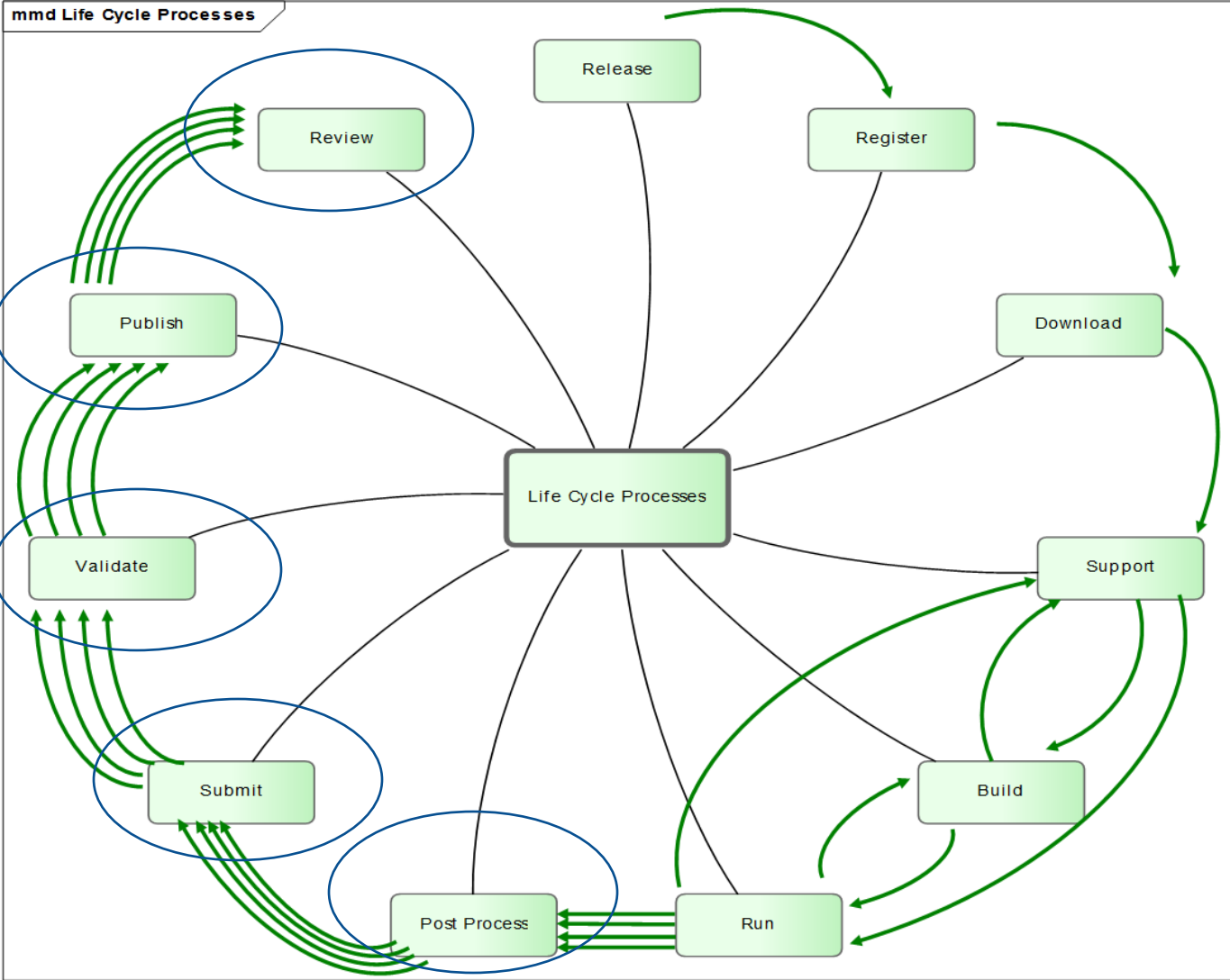


Additional **Support** from the TPC is needed for a licensed product.

Build and **Run** are “kit-tested”, but still require analysis.

The TPC defines transaction processing and database benchmarks and delivers trusted results to the industry.

TPC-Express Benchmark Life Cycle – Target “Ease Of...”

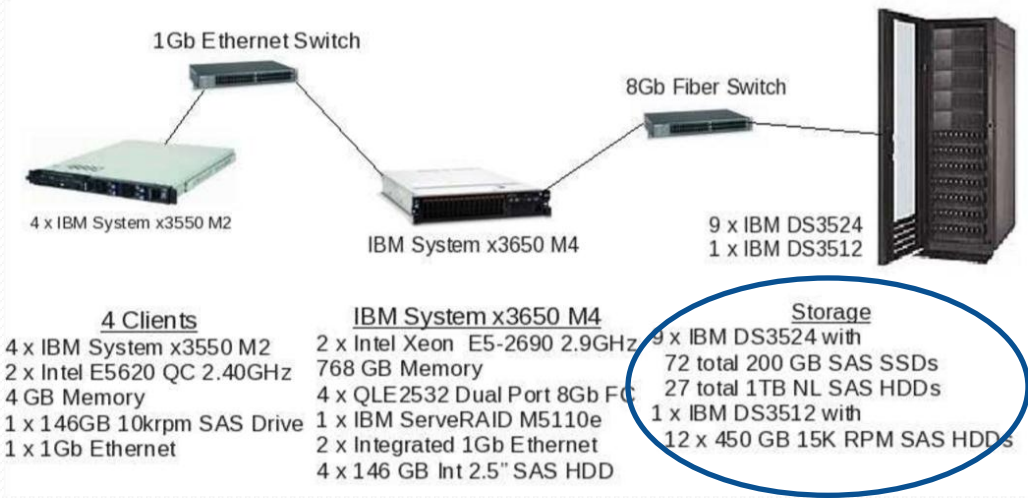


Post Processing replaces a 3rd party audit with self-validation; much included in the kit.

Submission, Validation, Publication, Review likely to be similar to Enterprise model.

The TPC defines transaction processing and database benchmarks and delivers trusted results to the industry.

TPC-Express Target Cost to Implement



4 Clients
 4 x IBM System x3550 M2
 2 x Intel E5620 QC 2.40GHz
 4 GB Memory
 1 x 146GB 10krpm SAS Drive
 1 x 1Gb Ethernet

IBM System x3650 M4
 2 x Intel Xeon E5-2690 2.9GHz
 768 GB Memory
 4 x QLE2532 Dual Port 8Gb FC
 1 x IBM ServeRAID M5110e
 2 x Integrated 1Gb Ethernet
 4 x 146 GB Int 2.5" SAS HDD

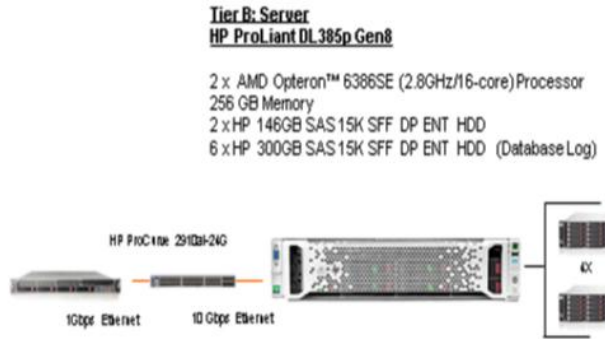
Storage
 9 x IBM DS3524 with
 72 total 200 GB SAS SSDs
 27 total 1TB NL SAS HDDs
 1 x IBM DS3512 with
 12 x 450 GB 15K RPM SAS HDDs

Recent TPC-C publish on 2-socket server.

List Price of HW:
 Approximately
\$600,000

Recent TPC-E publish on 2-socket server.

List Price of HW:
 Approximately
\$120,000



Dominant Costs:
Storage,
Memory

Tier A: Client
 1 x ProLiant DL360 G7
 2x Hex-Core Intel Xeon X5670 Processor 2.93Ghz
 6 x 2GB PC3-10600 Memory
 2 x 300GB 6G SAS 10K SFF DP
 4 x Onboard 1Gbps Ethernet
 1 X HP NC360T PCI-E Dual Port Gigabit Server Adapter

Storage
 4 x HP Smart Array P421/1GB
 4 x HP StorageWorks D2700 Disk Enclosure
 24 X HP 400GB 6G SAS MLC SFF (2.5-inch) SSD

Priced Only
 5 x 500GB 6G SAS 15K SFF DP ENT HDD (60 Day Space)

TPC-Express Target Cost to Implement



Target TPC Express
Configuration for 2 socket server:

- Server
- 2 mirrored SSDs for Logs
- 2 mirrored HDDs for DB
- 256-512GB memory
- 'Nothing' else.

Approximate list price of HW:
\$20-25,000

Still too high? Perhaps. The typical server is sold with 32-128GB of memory.

TPC is examining whether appropriate stress of DBMS can be done with less memory in a benchmark environment.

TPC-Express - - A First Implementation

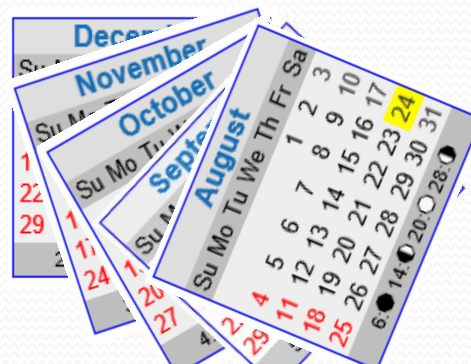
- Much infrastructure to adjust, enhance, or invent
- First benchmark needs to be a known environment
- Member company donating key parts of their kit for TPC-E
- Major adjustments to the kit to
 - Create a unique benchmark
 - Greatly reduce scope of system under test
 - Build compatibility with multiple DBs
 - Package the kit for general distribution

TPC-Express - - A First Implementation

- New benchmark is NOT intended to replace TPC-E
 - Enterprise and Express models compliment each other
- Not comparable to TPC-E for a variety of reasons
 - Substantially different DB access pattern
 - Almost no use of Storage Management functions
 - Different level of optimization allowed
 - Different level of functional compliance checking required

TPC-Express - - A First Implementation

- What you can expect:
 - Focus on all three of the key “popularity” criteria
 - Licensed product from the TPC
 - Including a nominal license fee, not unlike other benchmark organizations
 - Tested to work with specific DB and OS products that have worked with the TPC to prove compliance
 - Some (tbd) method for accepting new DB and/or OS products as supported by the kit
- When you can expect it?



TPC-Express Targets

- Target Audience for TPC-Express:
 - Computer Manufacturers
 - Complements, does not replace Enterprise model
 - Less expensive, more rapid implementation
 - Relief of pricing and durability requirements allow publication in broader range of environments – including Cloud
 - Research – Academia
 - Already use TPC one-offs
 - TPC Express allows use of an official TPC benchmark without being encumbered by durability testing, huge configurations, audit, price
 - Analysts
 - Ability to use full TPC benchmarks for research and for contracts with manufacturers and customers
 - Actual customers
 - Potential to use Express benchmarks as an internal validation tool to ensure system updates are working as expected

TPC-Express Summary and Invitation to Participate

- TPC is responding to the needs of prospective benchmark analysts with the TPC-Express model
- Targeting essential features of a successful benchmark
 - Pre-developed kit
 - Important tested features
 - Economical configurations and measurement processes
- First example will be based off existing TPC benchmark
 - Allows TPC to build necessary infrastructure to support the new benchmark model

TPC-Express Summary and Invitation to Participate

- TPC Express model is extensible to a wide range of benchmarks
 - Existing TPC environments
 - New environments waiting for an industry standard measure
- TPC invites participation in this exciting shift
 - Express model better suited to environments such as Cloud, Big Data, hybrid storage/memory, DB appliances, etc.
 - Express model better suited to academic and research communities
- TPC membership is open
 - Best opportunity to help create new industry standards
 - Anticipate free licenses for TPC members

Q&A