IBM Systems & Technology Group

Price and the TPC

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An assessment of the value of including a price metric and recommendations to enhance this value
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Disclaimer

- **Opinions expressed in this presentation and the associated paper are those of the author – They represent neither the opinions of the TPC nor the author's employer**
- **But the opinions may have some authority:**
- **Karl Huppler**
  - IBM analyst since 1980.
  - Deeply involved in the performance benchmark community since 1987
  - Actively involved with TPC benchmarks soon after the TPC's first benchmark was released in 1989.
  - Currently
    - IBM's primary representative to the TPC,
    - Chairman of the TPC and the TPC's Steering Committee
    - Chairman of the TPC Pricing Maintenance Committee.
  - Prior – ten years on TPC's Technical Advisory Board (TAB), where many price-related issues came forward
  - Began leading TPC efforts to enhance rules for price-related metrics in TPC benchmarks in October, 2002, as chair of the workgroup that eventually became the Price Maintenance Committee

Discussion Points

- **Advantages of including a price metric**
  - And a couple of disadvantages
- **Price, in relation to TCO**
- **Price-related challenges and proposed enhancements**

Why include price?

- **Consider - - - - - - - - - >**
- **Both have 1 engine and space for 2 passengers**
- **If the "benchmark" involves capacity to tow a large load, the truck has a clear advantage**
- **However, the "performance" is only part of the story**
- **Clearly, the truck costs more to purchase and more to maintain – You would not buy it if the "quality of service" you needed could be satisfied by the car**
- **This is an exaggerated example: The differences are visible and clear - - - not always the case with computer systems and software**
  - The use of high-priced fast memory, deep-sorted processors, expensive custom software, etc. can all be hidden from "view"

TPC's Innovation

- **Price/Performance as a Primary Metric**
  - Some benchmarks require a "bill of material" to allow the reader to research the price
  - TPC includes Price and Availability Date as Primary Metrics that are equal in stature to the Performance Metric
    - Forces Price anomalies to be very visible when comparing Results
    - Provides the "economy car" with a $/passenger metric to compete with the large truck
- **TPC's Total Solution perspective**
  - Price includes: Server, Storage, Software, Networking; and originally included workstations
  - Also includes a level of maintenance
  - Enhances the value of the price/performance metric
  - Relies on the benchmark to require a "normal" configuration

Is there a down-side to a price-related metric?

- **Performance is measureable**
- **Prerequisite functionality is testable**
- **Price is a function of Marketing – full of intangible, less than scientific influences that are difficult to measure and verify**

- **There are ways to improve the opportunity for the represented price to be measureable and verifiable - - fundamentally focused on delivery of a price that is meaningful to the ultimate customer**

Price (particularly TPC Price) and Total Cost of Ownership

- **With the inclusion of ongoing maintenance, TPC Price is sometimes referred to as "Cost of Ownership"**
- **It is NOT "Total" Cost of Ownership**

- **TPC Price covers the items in the list that are in *blue italic text.***
  - TPC Price is important, because these areas are important parts of TCO
  - The relevancy of TPC Price depends on how well it reflects reality for these components, for a "typical" environment

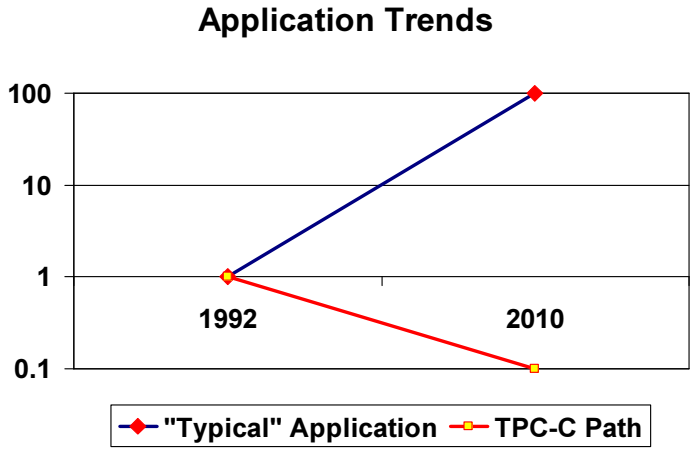
- **TCO includes:**
  - ***Initial HW cost***
  - ***Initial OS***, Middleware, ***Database SW*** cost
  - Initial Application SW cost
  - HW upgrade cost
  - OS/Middleware/Database SW upgrades cost
  - Application upgrades cost
  - ***HW maintenance***
  - *OS*/Middleware/ *Database maintenance*
  - Application maintenance
  - Application set-up, customization
  - DB administration
  - Systems operations
  - Electricity
  - Floor-space, building costs
  - Training
  - Unscheduled down-time costs
  - Scheduled down-time costs

  - And more…..

"Reality Configurations"

- **The first TPC-C Price/Performance leader was published in September of 1992**
  - 33.81 tpmC at $2462 USD/tpmC
  - 30 simulated users
  - 24 MB of memory
  - 5 disk drives totaling 3.7GB
- **The current** (as of 27 August, 2010) **TPC-C Price/Performance leader is somewhat different**
  - 290,040 tpmC at $0.39 USD/tpmC
  - 240,000 simulated users
  - 96 GB (98,304 MB) of memory
  - 13,928.3 GB of storage split between
    - 24 Solid State Devices
    - 25 Rotating Disk
  - Supported by 3 additional "client" servers handling application logic
- **Some differences**
  - Workstations no longer included in price
  - Physical storage requirements reduced to 1/3

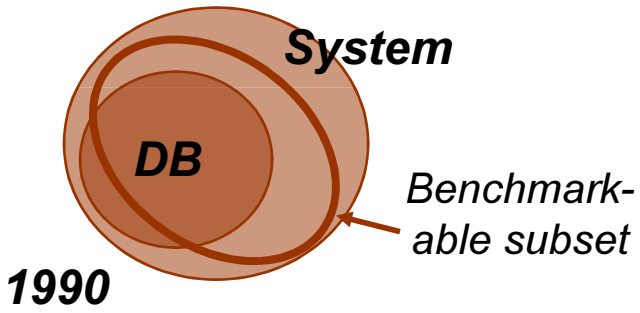
- **In 1992, the overall path of the database transactions and associated application were close to reality**
- **The rapid growth in compute technology has enabled transactions of greater and greater complexity**



- **While at the same time, HW and SW suppliers have worked to dramatically improve the TPC-C transaction path**
  - This does not mean that TPC-C is without value – It is simply no longer a "total system" benchmark

The TPC's Transition

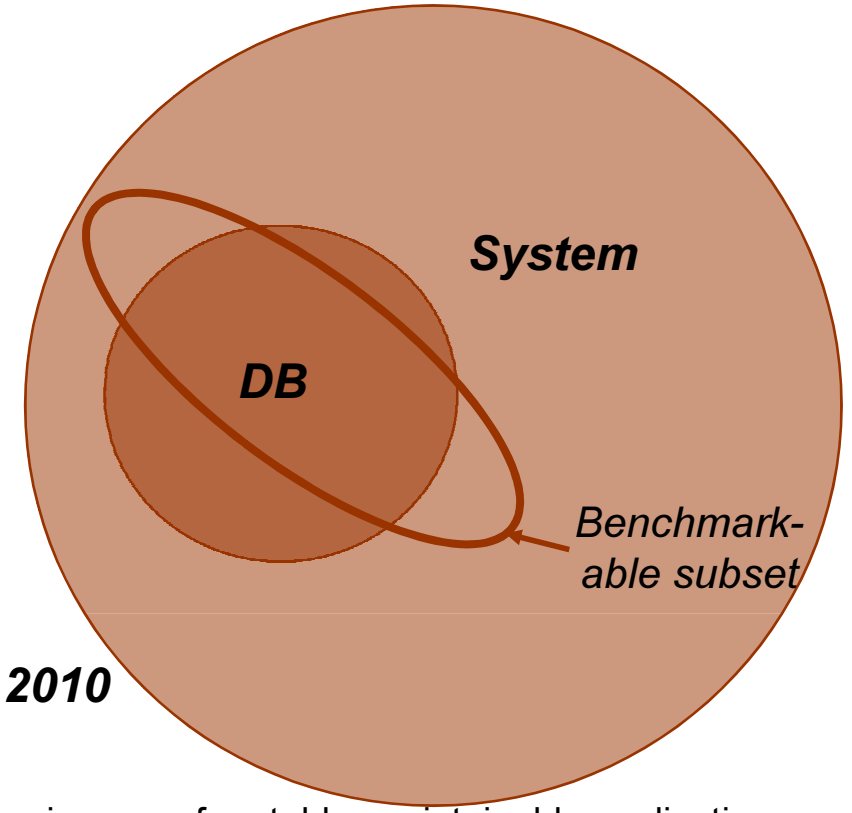
The TPC has made a conscious and intelligent choice to shift from "total system" benchmarks to Database "subsystem" benchmarks



Applications optimized for specific needs.

DB transactions modeled after the 80-column card

Total System included dedicated, attached workstations, roll-your-own order-entry-like applications, with minimal other activity



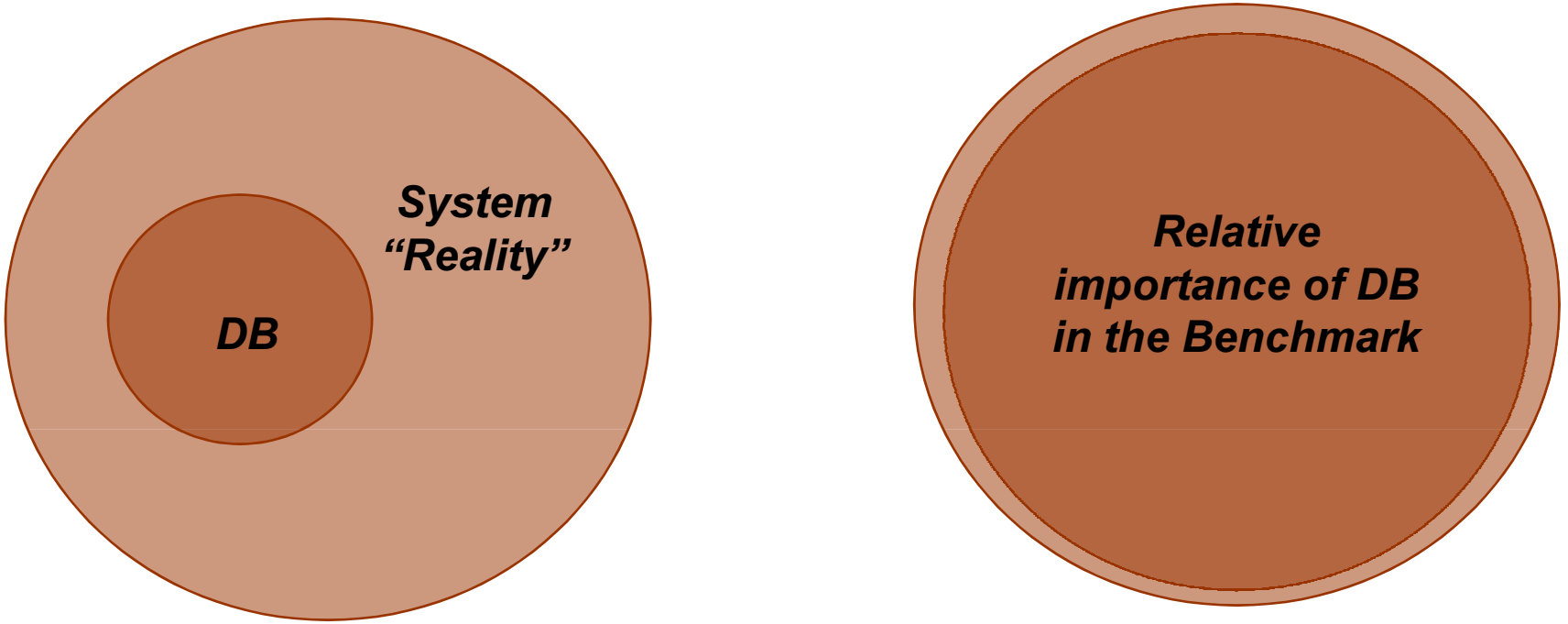
Extensive use of portable, maintainable application management tools.

Broad mix of business-optimization applications that are far more complex than were possible on 1990 servers

DB transactions much more complex, but "applications" have grown faster

Total System much, much more variable and difficult to define and compare

The TPC's Transition – Affect on Price



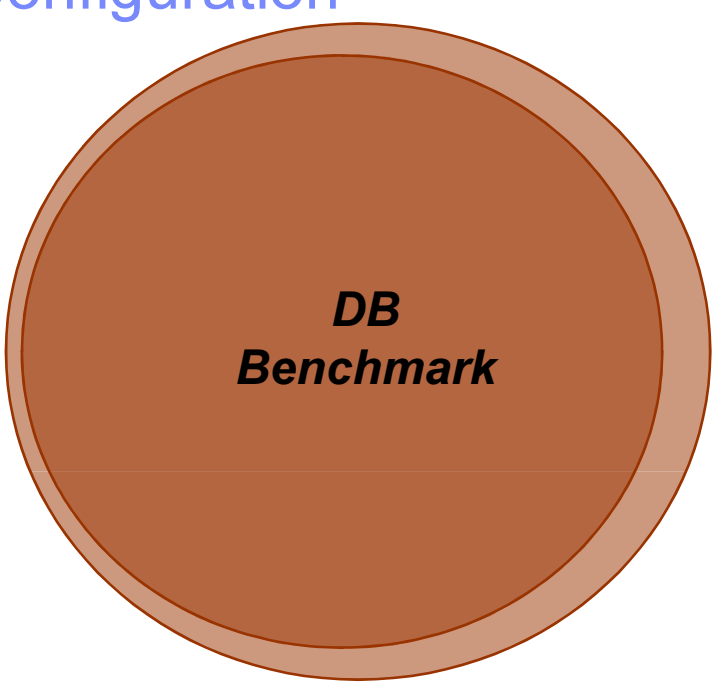
Resources configured to support the database-only activity are exaggerated from "reality"

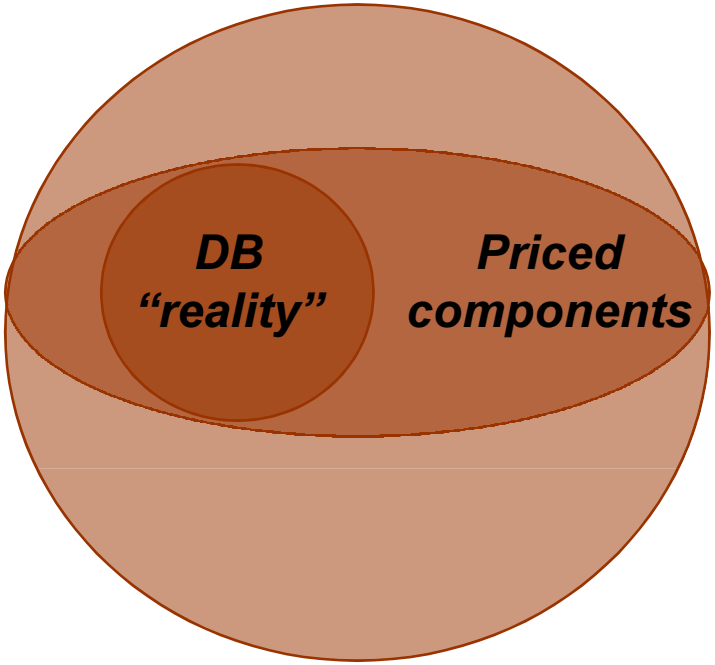
Typical "other" components use more processor and less disk or memory - - forcing DB Subsystem benchmarks to configure far more disk and memory than would be "typical"

Resulting configuration is one that only "atypical" consumers would use.

The best way to verify a market-driven quantity like price, is to verify that someone in the "market" has paid it - - but this is difficult when the configurations used are not configurations that many would buy.

Improvement Recommendation: Reduce the "Priced Configuration"





Each benchmark is artificially focused on DB activity:

- Less other activity in system
- Driven to 100% of capacity

Recommendation: Each benchmark should adjust the amount of the configuration that is priced to reverse this - - - yielding priced configurations that are more representative of what is typically installed.

Other Potential Areas of Improvement

Recommended Change	Why
Require all products to be orderable on day result is announced	Easier to verify pricing; mechanisms exist for pricing upgrades to existing products if new versions are not available
Change Availability Window from 185 days to 90 days	Easier to verify pricing; proven to work in other organizations
Require perpetual software licenses	Consistent with the treatment of hardware, with residual value at the end of the “price period” of the benchmark
Create a “reality-based” licensing requirement, similar to the “reduced hardware” recommendation	Deliver a priced configuration more in line with what consumers typically purchase
Require 5 years of maintenance	Matches typical depreciation schedules
Split first year and “per year” prices	More closely matches “Capital” and “Expense”
Require much more robust maintenance, including education, software updates, operator assist	More reflective of consumer reality – easier to verify

Recommendations Affect on TCO Measures (1 of 2)

TCO Element	Included in TPC-Price?	Affect of Recom-mendations	Comment
Initial HW cost	Yes	Improved	More “consumer-appropriate” configuration
Initial OS, Middleware, Database SW cost	OS & DB	Improved	Perpetual licenses on a “typical” number of processor cores
Initial Application SW cost	No	No	not possible to include in a generic benchmark
HW upgrades cost	No	No	Can be a key factor in a purchase decision, but is not included, here.
OS/Middleware/Database SW upgrades cost	No	Yes	Proposed support costs include SW upgrades
Application upgrades cost	No	No	Another missing element that cannot be in a generic benchmark
HW maintenance	Yes	Improved	Extending from 3 to 5 years and differentiating between capital and expense
OS/Middleware/ Database maintenance	OS & DB	Much Improved	Requiring a more robust level of support that is appropriate for mission-critical computing
Application maintenance	No	No	See other “application” entries
Application set-up, customization	No	No	See other “application” entries

Recommendations Affect on TCO Measures (2 of 2)

TCO Element	Included in TPC-Price?	Affect of Recom-mendations	Comment
DB administration	No	Minor	Includes a level of operational support
Systems operations	No	Minor	Includes a level of operational support
Electricity	No	No, but	This growing area of cost of ownership is covered by the TPC's new TPC-Energy metrics, available on all TPC benchmarks
Floor-space, building costs	No	No	This is quantifiable area that could be a candidate for inclusion in a future price metric.
Training	No	Yes	Included in support/maintenance recomendation
Unscheduled down-time costs	No	No	While it is difficult to quantify, this is not only a major part of the TCO, but can be extremely disruptive to the business. See the proposal in the TPC-TC '09 from Marco Vielra and Henrique Maderia, recommending the creation of a "dependability" benchmark.
Scheduled down-time costs	No	No	If a resiliency benchmark is created, it should cover both planned and unplanned down-time

Summary

- **The inclusion of Price/Performance and Availability Date Primary Metrics enhances the value of TPC Benchmarks**
- **However, the value of any metric is based on its ability to represent relevant information for the business model of the benchmark**
- **A number of improvements can be made to enhance the ability of the TPC's Price/Performance and Availability metrics to more closely match consumer reality – Thereby enhancing the overall value of these metrics and TPC benchmarks**