Stay ahead of the curve

Software Licensing Metrics: The Challenge in a Multicore Environment

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Pricing Director
Macrovision
Agenda

- Definitions
- Why is CPU-based licensing a problem?
- Key stakeholders
- Licensing comparison & examples from ISVs
- Alternate license models
- Personal experience
- Recommendations
Definitions

• Multicore processors
• Multithreading
• Virtualization
• Grid computing
Multicore Processors

Source: Microsoft “Multicore Processor Licensing”, Updated: June 7, 2005
Multithreading

- Multithreading refers to running several processes at the same time or in parallel as opposed to sequentially.
- To take full advantage of the benefits offered by multicore processors, software applications need to be multithreaded.
- Oftentimes software applications are not multithreaded.
- “Multicore is hard. There are ways to make it easier, but there’s a lot of history around sequential programming that makes it hard to move to multicore. A lot of code is written in a single-threaded way, and people don’t want to start from scratch and rewrite.” Tomas Evensen, CTO of Wind River Systems

- Therefore the performance gains realized by running software on multicore CPUs is sometimes restricted by the software design.

1 In the article “Dearth of Software Tools Could Stall Multicore Processing Onslaught”, published by InformationWeek, April 2, 2007
Virtualization

- Virtualization involves deploying software (i.e. VMWare) to partition a single physical machine into several independent (or virtual) machines.
- The result is more efficient utilization of the physical machine.
- Questions raised with CPU-based licensing metric:
  > Determining the number of CPUs the software is deployed on.
  > What if the software is not being used by all the processors (or cores) in the virtualized environment? Are full or fractional (per-CPU) license fees calculated?
Grid computing

- Grid computing involves deploying software to distribute pieces of a program across several machines that allow the separate machines to behave as if they were one.
- The result is workloads can be balanced and managed dynamically across multiple systems without the complexity of installing software on each individual system.
- Questions raised with CPU-based licensing metric:
  > Determining the number of CPUs the software is deployed on.
  > What if the software is not being used by all the servers in the grid but could be? Are license fees still applicable on every server / CPU / core in the grid?
Why is CPU-based licensing a problem?

• Hardware is evolving
  > “CPU” is not easily defined
• Value of the software is not tied to the hardware
• Calculations required to determine a license price
• Not clear direction in the software industry regarding multicore environments
Key stakeholders

- ISVs
- Customers of ISVs
- Hardware vendors, esp. chip manufacturers
ISVs and their customers

• CPU-based licensing was common and acceptable several years ago
• Pricing / licensing needs to be simple, fair, predictable and measurable
• Determining a value-based license metric is challenging
Hardware vendors

• ISVs should not change licensing policies just because the hardware has evolved
• A CPU is a CPU is a CPU, regardless of the number of cores
• ISVs need to adapt and embrace new hardware technologies
# Licensing Comparison

<table>
<thead>
<tr>
<th></th>
<th>Per-CPU Pricing</th>
<th>Per-Core Pricing</th>
<th>Other licensing options, charges</th>
</tr>
</thead>
<tbody>
<tr>
<td>BEA</td>
<td>✓</td>
<td>✓</td>
<td>Uses primarily CPU-based licensing</td>
</tr>
<tr>
<td>BMC</td>
<td>✓</td>
<td></td>
<td>Policy has been made public but is not published</td>
</tr>
<tr>
<td>CA</td>
<td>✓</td>
<td></td>
<td>Offers annual subscription model, as well as per-CPU model</td>
</tr>
<tr>
<td>EMC</td>
<td>✓</td>
<td>No published policy</td>
<td>None offered</td>
</tr>
<tr>
<td>HP</td>
<td>✓</td>
<td>✓</td>
<td>None offered</td>
</tr>
<tr>
<td>IBM</td>
<td>✓</td>
<td>✓</td>
<td>None offered</td>
</tr>
<tr>
<td>Microsoft</td>
<td>✓</td>
<td></td>
<td>Adds client access license charges for server products</td>
</tr>
<tr>
<td>Oracle</td>
<td></td>
<td>✓</td>
<td>Per-user pricing available</td>
</tr>
<tr>
<td>SAP</td>
<td>✓</td>
<td>No published policy</td>
<td>Most revenue comes from per-use licenses</td>
</tr>
<tr>
<td>Sun</td>
<td>✓</td>
<td></td>
<td>Per-employee subscriptions available</td>
</tr>
</tbody>
</table>

*Source: Forrester Report “What IT Sourcing Pros Need to Know About Multicore Software Pricing”, Nov. 2006*
Examples from ISVs

- Oracle
- IBM
- Microsoft
- BEA
Oracle

“As the software landscape continues to transform, we anticipate that software licensing will continue to transform along with it.”

Oracle

- Assigns “Processor Factors” to classes of CPUs

<table>
<thead>
<tr>
<th>Oracle Processor Licensing:</th>
<th>Cores</th>
<th>Processor Factor</th>
<th>CPUs for SW (other than SE and SE One programs) Licenses</th>
</tr>
</thead>
<tbody>
<tr>
<td>UltraSPARC T1</td>
<td>8</td>
<td>0.25</td>
<td>2</td>
</tr>
<tr>
<td>AMD / Intel</td>
<td>4</td>
<td>0.50</td>
<td>2</td>
</tr>
<tr>
<td>All other Multi-core Chips (IBM Pseries, SM, USIV, etc.)</td>
<td>2</td>
<td>0.75</td>
<td>2</td>
</tr>
<tr>
<td>Single Core Servers</td>
<td>1</td>
<td>1.00</td>
<td>1</td>
</tr>
</tbody>
</table>

Oracle

• Pricing example:

<table>
<thead>
<tr>
<th>Oracle Processor Licensing:</th>
<th>Cores</th>
<th>Processor Factor</th>
<th>CPUs for SW (other than SE and SE One programs) Licenses</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMD / Intel</td>
<td>4</td>
<td>0.50</td>
<td>2</td>
</tr>
</tbody>
</table>

• An HP ProLiant DL145 G2 with two AMD Opteron 200 Series dual-core processors Model 280 will require
  4 cores*0.5 processor factor = 2 processor licenses

Oracle

“Oracle’s software pricing per processor has not increased for customers using dual-core processors. The effective price per processor has decreased.”

“Eventually, IBM will move toward a pay-per-use, "utility computing" model. "That's the way we're going to address virtualisation down the road," Tieszen said. "We're not announcing that today, but we're definitely headed in that direction."

IBM spokesman Jeff Tieszen, in the article “IBM plans revamp of server pricing”, published by ZDNet UK, July 25, 2006
**IBM**

- Assigns “Processor Value Unit” to classes of CPUs

<table>
<thead>
<tr>
<th>Processor Families</th>
<th>PVUs per Processor Core</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vendor</td>
<td>Brand</td>
</tr>
<tr>
<td>IBM</td>
<td>POWER6</td>
</tr>
<tr>
<td>IBM</td>
<td>POWER5</td>
</tr>
<tr>
<td>Fujitsu</td>
<td>SPARC64 VI</td>
</tr>
<tr>
<td>HP</td>
<td>PA-RISC</td>
</tr>
<tr>
<td>Intel®</td>
<td>Itanium®</td>
</tr>
<tr>
<td>Sun</td>
<td>UltraSPARC IV</td>
</tr>
<tr>
<td>IBM</td>
<td>System z</td>
</tr>
<tr>
<td>Any</td>
<td>Any single core</td>
</tr>
<tr>
<td>IBM</td>
<td>PowerPC 970</td>
</tr>
<tr>
<td>IBM</td>
<td>POWER5 QCM</td>
</tr>
<tr>
<td>AMD</td>
<td>Opteron</td>
</tr>
<tr>
<td>Intel®</td>
<td>Xeon®</td>
</tr>
<tr>
<td>Sun</td>
<td>UltraSPARC T2</td>
</tr>
<tr>
<td>Sun</td>
<td>UltraSPARC T1</td>
</tr>
</tbody>
</table>

*Notes: 1. IBM SW defines “Processor” as a Core
2. One IFL or engine*
IBM

- Pricing example from IBM’s Value unit calculator:

![Value unit calculator](image)

Value unit calculator

- Download or print the summary below.
- Use the action buttons below to edit or update the summary.
- Use the Start over button to make new selections from the beginning.

### Value units summary

<table>
<thead>
<tr>
<th>Server vendor</th>
<th>Server brand</th>
<th>Processor vendor</th>
<th>Processor brand</th>
<th>Processor type</th>
<th>Value units per core</th>
<th>Processor core quantity</th>
<th>Total value units</th>
</tr>
</thead>
<tbody>
<tr>
<td>x86 architecture</td>
<td>HP</td>
<td>ProLiant AMD</td>
<td>Opteron</td>
<td>Quad-core or Dual-core</td>
<td>50</td>
<td>2</td>
<td>100</td>
</tr>
</tbody>
</table>

**Your value units total** 100

The Value Unit Table or the Value Unit Calculator tools are provided for your convenience. Errors in the tools are unintentional and will be corrected immediately upon being brought to IBM’s attention. Should any such errors occur, this does not relieve customers from their responsibility to obtain licenses for, and to be in compliance with, the required level of authorized use for each program.
“When PVUs were initially introduced in July 2006, our focus was on converting customers from per processor to processor value units without changing customer prices for IBM middleware deployed on existing processors.”

Source: IBM, “The advantages of Processor Value Units [PVUs]”
Microsoft and BEA

- **Microsoft**
  - No price differentiation for number of cores
- **BEA**
  - Some price differentiation for number of cores

<table>
<thead>
<tr>
<th>Chip type</th>
<th>IBM</th>
<th>Oracle</th>
<th>BEA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single-core (all chips)</td>
<td>1.0</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>RISC dual-core</td>
<td>1.0</td>
<td>0.75</td>
<td>0.50</td>
</tr>
<tr>
<td>x86 dual-core</td>
<td>.5</td>
<td>0.50</td>
<td>0.50</td>
</tr>
<tr>
<td>RISC Sun T1 octi-core</td>
<td>.38</td>
<td>0.25</td>
<td>0.25</td>
</tr>
</tbody>
</table>

Challenges to multicore pricing

- Multicore price calculations are perceived to be complicated
- Approach taken by Oracle and IBM requires hardware benchmarking be established and maintained (not a trivial issue for the costs and resources incurred with this)
- Benchmarks (as they influence pricing) likely to be challenged by customers and therefore should be independent and verifiable
- Customers must track which servers the hardware is deployed on and determine impact to licensing costs if hardware is upgraded, partitioned or becomes part of a grid
  - May lead to (unintentional) violations of license compliance agreements
  - May lead to increases in software license costs
- If a customer has not yet purchased the hardware, software costs may vary depending on the hardware purchased
Now what?
Alternate license models

Software Vendor: Most Prevalent License Models in Use Today

- Seat (per machine/per server)
- Concurrent User
- Seat (named user)
- Usage Metric
- Financial Metric
- Processor/Processor Core
- Other

Alternate license models

Enterprises: Preferred License Model


Respondents could select more than one answer
## Alternate license metrics

<table>
<thead>
<tr>
<th>Metric</th>
<th>Simple</th>
<th>Fair</th>
<th>Predictable</th>
<th>Measurable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Processor/Core</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
</tr>
<tr>
<td>Concurrent User</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Seat (named user)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Usage Metric</td>
<td>✓</td>
<td>✓</td>
<td>✗</td>
<td>✓</td>
</tr>
<tr>
<td>Financial Metric</td>
<td>✓</td>
<td>✓</td>
<td>✗</td>
<td>✓</td>
</tr>
</tbody>
</table>
Selecting a new license metric

• Depends on:
  > Type of software
  > Customer base
    • Is one license metric feasible for all customers?
  > Competition
  > Customer expectations
    • How they use the software
    • How they purchase other software
Personal experience

• Application was licensed on a CPU-basis
• Thorough investigation included:
  > Alternate models
  > Analyst feedback
  > Customer feedback
  > Sales feedback
  > Analysis!
• Decided on a model, set new price points
• Implement and adjust, if necessary
Recommendations

• Tie the metric to value delivered
  > Not easy to choose a license metric

• Consider:
  > Customer’s expectations
  > Competition
  > Sales force
  > Installed base implications
  > Think long-term
  > Impact to ISVs financials with conversion to new metric

• Test
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