Overview

HP Instant Capacity is available on HP Integrity Mid-range servers (rx7640 & rx8640), Superdome and Superdome 2 servers. It also provides enablement capability; Right to Use, Temporary Instant Capacity and Global Instant Capacity for prior generations of Instant Capacity servers.

HP Instant Capacity, or "iCAP," offers inactive hardware; on HP Integrity Mid-range and Superdome server processors and cell boards with memory and on HP Integrity Superdome 2 server blades and memory at a fraction of the price of equivalent active components. The remainder of the active component purchase price, along with costs for software licenses and hardware and software support, are incurred only when the hardware is activated.

HP Instant Capacity consists of both a hardware and software component. Instant Capacity hardware is priced at a small fixed percentage of the active component price, installed in the server but not used by the operating system. When the resource is needed, the Customer purchases the usage rights for the hardware. Once applied to the system, the Customer can then activate and use the component.

HP Instant Capacity Software on HP Integrity Mid-range and Superdome servers, which is included with both HP UX 11i and later and OpenVMS 8.3 and later, is responsible for activating and deactivating hardware and maintaining the system inventory stored in complex firmware. The system inventory maintains the number of usage rights owned by the system, which in turn is used to determine the maximum number of components that can be active.

On Superdome 2 servers at initial release, iCAP was included with HP-UX 11iv3 and commands were provided to allow customers to self-enforce their compliance with the iCAP contract. With new release of iCAP, it is included with HP-UX 11iv3 and the Superdome 2 Onboard Administrator firmware released as part of the Dynamic cores firmware release. This new version of iCAP performs automatic inventory management and iCAP contract compliance enforcement directly from the firmware. This iCAP version is responsible for activating and deactivating hardware and also maintaining the system inventory.

This document will focus on the latest offering of iCAP on Superdome 2 servers and not on the offering that was available at initial release. Please note that all existing iCAP customers on Superdome 2 servers are expected to upgrade to this version in order to remain in compliance with the iCAP contract.

The HP Instant Capacity portfolio for HP Integrity rx7640, rx8640 and Superdome servers include:

- Instant Capacity for processors
- Instant Capacity for cell boards with memory
- Temporary Instant Capacity (TiCAP) for processor cores
- Global Instant Capacity (GiCAP) for processor cores

The HP Instant Capacity portfolio for HP Integrity Superdome 2 includes:

- Instant Capacity for blades
- Instant Capacity for memory
- Temporary Instant Capacity (TiCAP) for processor cores
- Global Instant Capacity (GiCAP) for processor cores

Overview

Benefits and Applications

HP Instant Capacity allows Customers to pay for resources when they need them, and to move resources *where* they need them.

HP Instant Capacity hardware is priced at a small portion of the active component price, and does not require software licenses or support while inactive. Therefore, the majority of hardware costs (as well as 100% of the associated software and support costs) are deferred until the resources are actually needed.

HP Instant Capacity is a fully Customer managed solution that requires no connection to HP or metering appliance on site. Some common benefits and applications of HP Instant Capacity are listed below:

- Simplify capacity planning-Plan IT procurements based on actual demand, not estimations.
- Eliminate over provisioning-Size only for what you need today. Instant Capacity hardware can be activated permanently or temporarily depending on application demand.
- Consolidate with confidence-Instant Capacity allows resources to move as needed between partitions without any impact to production.
- Extend server lifespan-A server configured with active and Instant Capacity components has more potential to grow with the business and extends the upgrade path for your hardware.
- Minimize impacts of upgrades-Instant Capacity hardware reduces upgrades to a simple command with no downtime.
- Improve system availability-Instant Capacity provides spare processors that can be used to replace failed processors at no additional cost to the Customer.
- Handle fluctuating workloads cost effectively-Active resources can be sized to meet average utilization and short term peaks can be met with Temporary Instant Capacity.
- Move resources where you need them, when you need them-Instant Capacity Software can be used to move usage rights between partitions, and, with Global Instant Capacity, even between servers. By consolidating server resources, utilization of existing resources is optimized without incurring costs related to over provisioning.
- Automate with the Matrix Operating Environment for HP-UX-Instant Capacity is an integral part of the HP Virtual Server Environment and is compatible with all components of the HP Matrix Operating Environment for HP-UX. For example, activation and deactivation of processors can be automated with Global Workload Manager to meet changing service level objectives.
- Implement cost effective high availability and disaster tolerant solutions-Combinations of Instant Capacity, Temporary Instant Capacity, and/or Global Instant Capacity can be used to implement cost effective disaster tolerant environments that move your resources in the event of a failover. Instant Capacity is compatible with ServiceGuard which allows customer to automate disaster recovery configurations.

Pricing

Customers assume title for Instant Capacity hardware at the time of purchase. HP Instant Capacity hardware is priced at a small percentage of the active component purchase price, as shown below in Table 6.3.5.1. The "Right to Use" the hardware, which allows activation of the component, is the remaining percentage of the active component price purchased at time of activation, not at the time of original purchase of the iCAP hardware.

QuickSpecs

Overview

Instant Capacity Pricing			
Architecture	**Component Type**	**Instant Capacity Hardware Price**	**Right to Use Fee**
HP Integrity Mid-range and Superdome servers**	Processors*	30% of active component purchase price	70% of active component purchase price at time of activation, divided by the number of cores
	Cell Boards		70% of active component purchase price at time of activation
	Memory Modules		
HP Integrity Superdome 2	Blades	40% of active component purchase price	30% of active component purchase price at time of activation. One RTU allows activation of 4 cores; not all need to be applied at the same time. Two RTU's are needed to fully activate a blade.
	Memory Modules		60% of active component purchase price at time of activation
HP 9000***	Processors	Not available	80% of active component purchase price at time of activation, divided by the number of cores
	Cell Boards		70% of active component purchase price at time of activation
	Memory Modules		

* Montvale and Montecito processors. Other Integrity processors Right to Use Fee is 75%.
** Options for sx1000 servers are not longer orderable however RTU's are still available
*** Options for HP 9000 servers are no longer orderable however RTU's are still available.

There is no premium for HP's Instant Capacity program-at any given point in time, the price of the Instant Capacity Hardware plus the price of the Right to Use to fully activate that hardware is always equal to the active purchase price. All Customers that participate in the HP Instant Capacity program must sign the applicable Instant Capacity contract prior to placing an order.

Hardware Usage Rights (Right to Use)

HP Instant Capacity is based on the concept of hardware usage rights. Active hardware implicitly includes usage rights, whereas HP Instant Capacity Hardware does not. On HP Integrity Mid-range, Superdome and Superdome 2 servers for components without usage rights the Instant Capacity Software will not allow the operating system to use the hardware. The usage rights for HP Instant Capacity Hardware are purchased separately and called the "Right to Use" or "RTU."

NOTE: All Instant Capacity Right to Use products must have either Option 02A or Option 0D1 selected. Select Option 02A when activating a component at the Customer's site, and select Option 0D1 to activate a component in the HP Factory. For HP Integrity Superdome 2 servers Option 0D1 for memory RTUs has been disabled. The quantity of the selected option must equal to the quantity of the usage rights ordered.

Granularity and Product Structure

The product structure of Instant Capacity Hardware is identical to the equivalent active hardware. For example, if an active processor module contains a single dual core processor, the Instant Capacity product will also contain a single dual core processor. The structure is similar on HP Integrity Superdome 2

Comparing active and Instant Capacity product structures

Server	Description	Processors	Cores	Active PN	iCAP PN
HP Integrity Superdome	Intel Montvale 1.6 GHz processor with 24 MB cache	1	2	AD374A	AD375A
HP Integrity Mid-range	HP Mid Montvale 1.42-GHz/12-MB Processor	1	2	AD362A	AD363A
HP Integrity Superdome 2	HP Superdome blade fast 1.73GHz/24MB-two quad-core Intel Itanium Tukwila processor modules	2	8	AM253A	AM254A
HP Integrity Superdome 2	HP Superdome 2 blade fast 2.53GHz/32MB-two 8-core Intel Itanium Poulson processor modules	2	16	AT121A	AT123A

Every Instant Capacity product has an associated Right to Use product which is the usage rights for that specific component. The Right to Use for an 8 GB memory module for an rx8640 is a different product than the Right to Use for an 8 GB memory module for an sx2000 Superdome. The number of usage rights needed to fully activate a component depends on the type of component. In HP Integrity Mid-range and Superdome servers a cell board or a memory module each will require one Right to Use, but a dual core Instant Capacity processor will require two (2) usage rights-one for each core on the module. However, in HP Integrity Superdome 2 every quad-core processor on a blade requires one Right to Use and every 4GB of memory on a blade requires one Right to Use.

NOTE: Except in HP Integrity Superdome 2, the Right to Use products for all HP Instant Capacity components activate a single unit only, where a unit is defined as a single processor core, cell board or memory module. In HP Integrity Superdome 2, a Right to Use unit for a quad-core processor activates 4 processor cores and that for an 8-core processor activates 8 processor cores. The Right to Use for a memory module activates 4GB but the customer must buy enough memory RTU's to fully activate all iCAP memory on a blade.

Hardware Usage Rights (Right to Use)

Moving Usage Rights

Usage rights are not tied to specific hardware components within an Instant Capacity system, and can in fact be transferred between identical hardware components. Deactivation of a component results in the usage right for that component being released and made available for use by another component. The available usage right can then be used to activate an Instant Capacity component in another partition within the same complex. This powerful feature of the HP Instant Capacity Software allows Customers to move resources between partitions within a complex. Usage rights can also be transferred in this manner between servers using Global Instant Capacity, described later.

HP Instant Capacity Software version 8.x or later allows Customers to deactivate active hardware. This means that a fully-owned system, including one without any Instant Capacity components, can leverage the benefits of moving usage rights with Instant Capacity Software or test Instant Capacity functionality.

NOTE: When moving processor core usage rights between partitions either within the same server or on different servers, the Customer is responsible for ensuring they remain in compliance with their software licensing obligations.

On HP Integrity Mid-range and Superdome servers the HP Instant Capacity Software tracks the total number of expected inactive components in a protected location in firmware called the system inventory. The Instant Capacity Software ensures that the number of inactive components in the complex is always equal to (or greater than) the number of expected number of inactive components that is recorded in the system inventory.

In HP Integrity Superdome 2 servers the HP Instant Capacity Firmware tracks the total number of expected active components. The Instant Capacity Firmware ensures that the total number of active components in the complex is always equal to (or lesser than) the number of available usage rights that is recorded in the system inventory.

Hardware Usage Rights (Right to Use)

HP Integrity Mid-range and Superdome server example

In the image below, an rx7640 has been configured with 12 active processor cores and four Instant Capacity processor cores, distributed over two partitions. The system inventory in this system would indicate that at least four processor cores are expected to be inactive in the complex at any given time.

Redistributing Usage Rights-the Initial System Configuration

HP Integrity rx7640

nPar 1
4 active + 4 iCAP cores

nPar 2
8 active + 0 iCAP cores
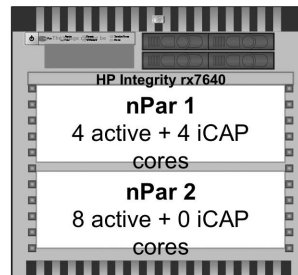
The Instant Capacity Software is not concerned with which specific cores are active, or in which partitions. Therefore, we can deactivate resources in one partition in order to activate iCAP resources in another partition. In the image below, we have deactivated two processor cores in nPar 2. We now have a total of ten active cores and six iCAP cores in the complex. This is possible because the actual number of inactive cores (6) is still equal to or greater than the expected number of inactive cores (4) stored in the system inventory.
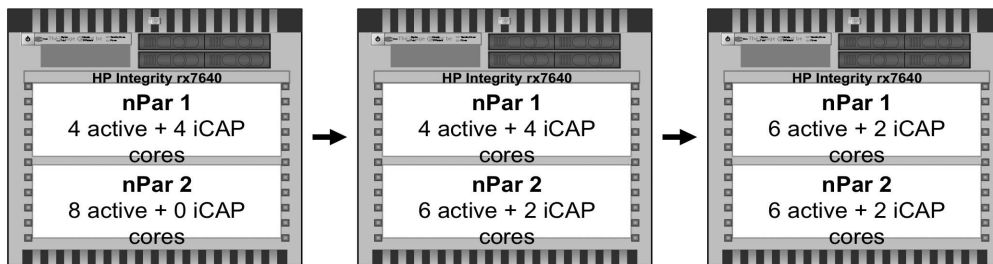
QuickSpecs

Hardware Usage Rights (Right to Use)

Redistributing Usage Rights-Deactivating Cores in nPar 2
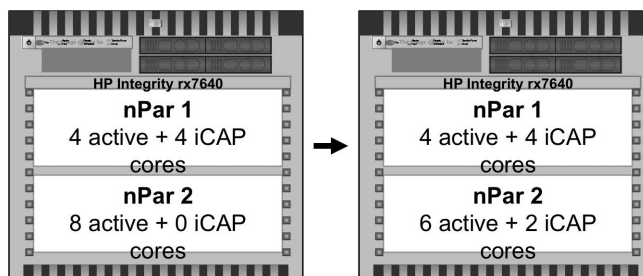
We can now activate two iCAP processor cores in nPar 1. The total number of active cores and iCAP cores in the complex has not changed but nPar 1 now has an additional two cores at its disposal.

Hardware Usage Rights (Right to Use)

Redistributing Usage Rights-Activating Cores nPar 1

| HP Integrity rx7640	HP Integrity rx7640	HP Integrity rx7640
nPar 1 4 active + 4 iCAP cores	**nPar 1** 4 active + 4 iCAP cores	**nPar 1** 6 active + 2 iCAP cores
nPar 2 8 active + 0 iCAP cores	**nPar 2** 6 active + 2 iCAP cores	**nPar 2** 6 active + 2 iCAP cores

Hardware Usage Rights (Right to Use)

HP Integrity Superdome 2 server example

In the image below, a HP Integrity Superdome 2 server has been purchased with 3 active blades and 1 iCAP blade. Also a factory integrated RTU for a processor has been purchased. An nPar has been configured with all 4 blades.

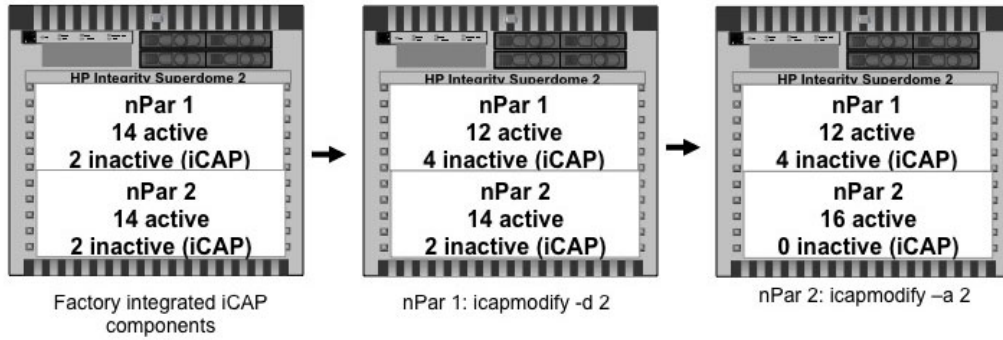**Superdome 2 Example - Factory integrated iCAP components**
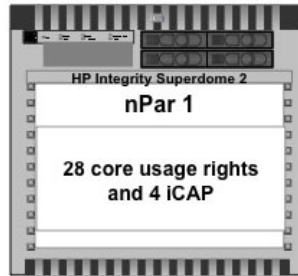
All iCAP hardware components are
integrated at factory

With the new version of Instant Capacity on Superdome 2 servers, factory integration of iCAP components is available. Therefore the customer is not required to set usage rights or deactivate components in order to remain in compliance with the iCAP Terms & Conditions. iCAP compliance is monitored and managed by the iCAP firmware automatically.

Hardware Usage Rights (Right to Use)

In the image below, with a similar HP Integrity Superdome 2 server purchase, two nPars have been configured with 2 iCAP cores each (center picture). Usage rights for 2 cores can be moved from nPar 1 to nPar2 (right picture).

Superdome 2 Example - Moving usage rights

HP Integrity Superdome 2
nPar 1
14 active
2 inactive (iCAP)
nPar 2
14 active
2 inactive (iCAP)
Factory integrated iCAP components

HP Integrity Superdome 2
nPar 1
12 active
4 inactive (iCAP)
nPar 2
14 active
2 inactive (iCAP)
nPar 1: icapmodify -d 2

HP Integrity Superdome 2
nPar 1
12 active
4 inactive (iCAP)
nPar 2
16 active
0 inactive (iCAP)
nPar 2: icapmodify –a 2

Hardware Usage Rights (Right to Use)

In the image below, with a similar HP Integrity Superdome 2 server purchase, two vPars have been created inside the first nPar. Each vPar has 2 processors (8 cores) and the remaining 4 processors (16 cores) are in a different nPar. Diagram shows movement of usage rights between vPars and nPars.

Superdome 2 Example - Moving usage rights - vPar to nPar

| HP Integrity Superdome 2 |
| nPar 1 |
| vPar 1 |
| 6 active, 2 iCAP |
| vPar 2 |
| 6 active, 2 iCAP |
| nPar2 |
| 16 active, 0 iCAP |

iCAP components are factory integrated

| HP Integrity Superdome 2 |
| nPar 1 |
| vPar 1 |
| 6 active, 2 iCAP |
| vPar 2 |
| 6 active, 2 iCAP |
| nPar2 |
| 12 active, 4 iCAP |

Deactivate
nPar2: icapmodify –d 4

| HP Integrity Superdome 2 |
| nPar 1 |
| vPar 1 |
| 8 active, 0 iCAP |
| vPar 2 |
| 8 active, 0 iCAP |
| nPar2 |
| 12 active, 4 iCAP |

Activate
vPar 1: icapmodify –a 2
vPar 2: icapmodify –a 2

NOTE: Changes in the physical vPar size require a reboot
- Example same if moving rights from a vPar to an nPar or vice versa

Hardware Usage Rights (Right to Use)

In the image below, the process of turning on iCAP memory on an iCAP blade is shown. The first picture on the left shows an active blade with active memory and unused memory slots. The second picture in the middle shows an iCAP blade with iCAP memory and unused memory slots. To turn on memory on this iCAP blade, all the memory needs to be turned on. This is done by powering on the blade using partition management commands followed by a partition reboot as shown in the third picture on the right.

Superdome 2 Example - iCAP memory
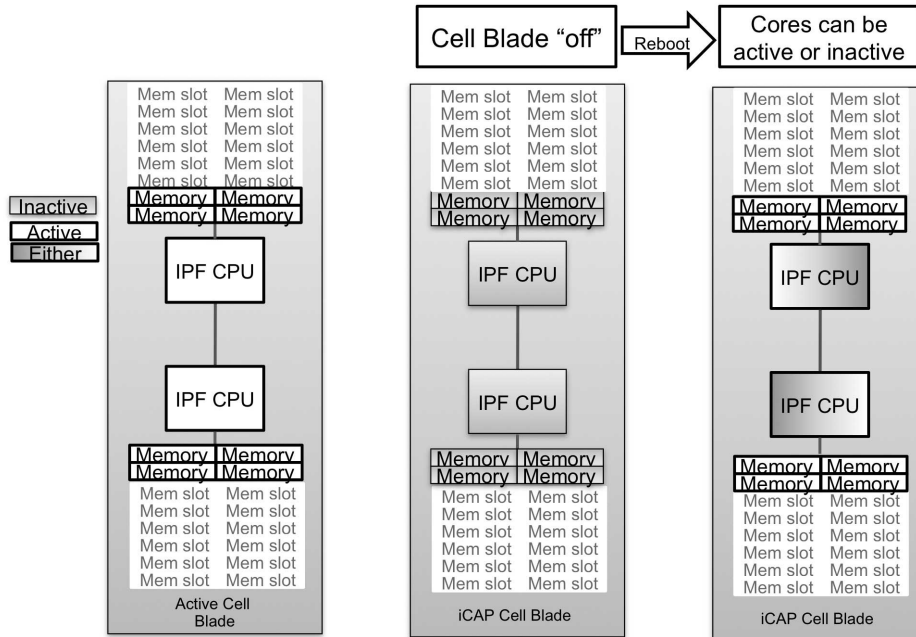
NOTE: On an iCAP blade with memory turned on the processors can be on or off. All active memory is available on a blade even with all cores turned off. The active memory on a blade does not depend on presence of active cores on that blade.

Hardware Usage Rights (Right to Use)

In the image below, a partition with 1 active and 1 iCAP blade is shown. The iCAP blade has no active cores but has active memory. This active memory can be used by the active cores on the active blade. Please note that processor cores accessing non-local memory does have an impact on the memory latency. Please refer to the Capabilities of Superdome 2 and the sx3000 chipset, Performance section of the Superdome 2 architectural whitepaper for further details on memory latency on Superdome 2 servers.

Superdome 2 Example - Active memory on iCAP blade
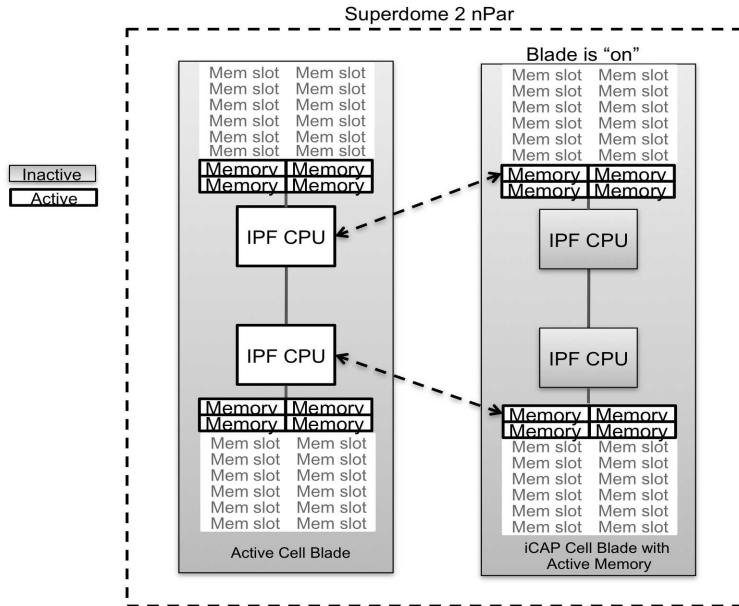
Inventory Management, Codewords and the Utility Pricing Solutions Portal

The Utility Pricing Solutions Portal is used to update server inventory and to generate codewords which provide additional capabilities.

Application of an *Instant Capacity Codeword* modifies the system inventory on an Instant Capacity system. Since Instant Capacity systems do not communicate to HP, Codewords are used to modify the inventory when certain events occur, such as the activation of a component, or an-add on of Instant Capacity hardware. Instant Capacity Codewords are used to:

- add a usage right to a system, enabling an iCAP component to be subsequently activated,
- add Temporary Instant Capacity to a system,
- add Global Instant Capacity Sharing Rights to a GiCAP Group Manager,
- adjust the system inventory after the add on of iCAP or active hardware,
- upgrade the iCAP Software, or
- upgrade system hardware (e.g., HP 9000 to HP Integrity, single core to dual core).
- upgrade the system firmware on Superdome 2 servers

Application of a Right to Use Codeword will add another usage right to the system by adjusting the data held in the system inventory, at which time the Instant Capacity Software will allow an Instant Capacity component to be activated at the Customer's discretion. In the example rx7640 from the previous section, applying a Right to Use for one processor core would increase the data stored in system inventory from four to three, meaning that at any given time, at least three cores had to be inactive in the complex. For a Superdome 2 server, applying a Right to Use for four processors cores would increase the total active usage rights information stored in the system inventory by four.

Instant Capacity Codewords are downloaded by the Customer from an external web site called the Utility Pricing Solutions Portal, accessible at: http://www.hp.com/go/icap/portal. Codewords are typically available on the Portal within 24 hours of an order being shipped. Some basic information such as the serial number of the system and the purchase order number are required in order to retrieve a Codeword. Upon retrieving the Codeword, the Customer may transfer the Codeword by any means they prefer to the Instant Capacity system, and apply the Codeword with a simple command. Application of a Codeword enables the Customer to then activate a component, use Temporary or Global Instant Capacity, and so on.

NOTE: Instant Capacity Customers are obligated to apply all Codewords to the system as requested by HP.

Supported Platforms

HP Instant Capacity processors and cell boards with memory modules are available for HP Integrity and HP 9000 Mid-range and Superdome servers. HP Instant Capacity blades and memory modules are available for HP Integrity Superdome 2 servers. The Instant Capacity Software is included with HP UX 11i version 1 or later and OpenVMS 8.3 or later.

Supported Platforms for Instant Capacity

Inventory Management, Codewords and the Utility Pricing Solutions Portal

			Instant Capacity Processors and Cell Boards with Memory*	Temporary Instant Capacity (TiCAP)	Global Instant Capacity (GiCAP)
HP-UX 11i v1,v2 and v3	HP Integrity	rx76x0/rx86x0	v	v	v
		Superdome	v	v	v
		Superdome 2	v	v	v
	HP 9000	rp74x0/rp84x0	v	v	v
		Superdome	v	v	v
OpenVMS 8.3 and later	HP Integrity	rx76x0/rx86x0	v	v	N/A
		Superdome	v	v	N/A

* For HP Integrity Superdome 2, HP Instant Capacity is available on blades and memory modules.

Non Native Windows and Linux Support

On platforms that support Windows guests in an HPVM, iCAP can now be used to flex the computing capacity available to Windows operating system instances as well as Linux (RHEL and SLES) operating system instances where those guests are supported.

In an HPVM environment the iCAP software is run in the HPVM host and is used to flex the amount of physical hardware to which the HPVM host has access. The guests then in turn take advantage of these additional resources. Thus HPVM and iCAP can be used together to flex any operating system which is supported by the HPVM software.

Instant Capacity Processors

Instant Capacity processors do not include usage rights and therefore are not used by the operating system. In the event that an active processor fails, an Instant Capacity processor will be activated to replace the failed processor immediately at no cost to the Customer.

To permanently activate a processor core, the usage right for that core must be purchased, , the Codeword downloaded from the Utility Pricing Solutions Portal and applied to the server.

NOTE: When activating a processor core, licenses for all per socket and per core licensed software installed in the partition must also be purchased, as well as the associated hardware and software support. On HP Integrity Superdome 2 servers an RTU requires one per "socket" license and allows activation of 4 cores for the Superdome 2 CB9000s i2 blades and 8 cores for the Superdome 2 CB9000s i4 blades.

NOTE: While ordering add-on iCAP blades or processors it is mandatory to order the iCAP startup and installation service (HA114A1 option 551 or HA124A1 option 5QZ as appropriate).

Instant Capacity processors can also be activated temporarily using Temporary Instant Capacity, described later.

Instant Access Capacity (IAC)
In this Chapter, the term "temporary capacity" will be used to refer to the common functionality of both Temporary Instant Capacity and Instant Access Capacity.

Since there is no communication between the Customer's system and HP, a purchase order for a Right to Use must be processed before a Codeword is made available on the Portal. In order to ensure Customers have instant access to their resources when needed, every Instant Capacity processor core purchased can be temporarily activated for up to five (5) processor core days. For HP Integrity Superdome 2 CB9000s i2 blades which contain 8 cores that mean forty (40) processor core days are provided and the corresponding number for the CB9000s i4 blades which contain 16 cores is eighty (80) processor core days.

This included temporary capacity is called "Instant Access Capacity" or "IAC," and is functionally identical to Temporary Instant Capacity (described later). Instant Access Capacity is included with Instant Capacity blades or processors ordered with new servers as well as Instant Capacity blade or processor add-ons. Any Customer running Instant Capacity Software version 6.x or later can take advantage of Instant Access Capacity, which can be used for the following purposes:

- Use an Instant Capacity processor core immediately while processing an order for processor core usage rights or Temporary Instant Capacity (TiCAP)
- Handle short term peaks in demand
- Evaluate Instant Capacity software performance
- Test and/or evaluate Instant Capacity and/or Temporary Instant Capacity functionality
- Test how applications respond to processors being activated and deactivated online
- Test interoperability of Instant Capacity with the HP Virtual Server Environment

When an order for a complex containing Instant Capacity blade or processors is processed, a Codeword for the applicable amount of Instant Access Capacity will be made available on the Utility Pricing Solutions Portal. Upon taking delivery of the hardware, the Customer can log on to the Portal to retrieve the Codeword and apply it to the complex.

Once Instant Access Capacity has been consumed, the Customer will no longer have the ability to temporarily activate the Instant Capacity processor core. HP recommends that Customers maintain some amount of Temporary Instant Capacity on Instant Capacity systems as a best practice to ensure immediate access to extra processing resources when needed.

Instant Capacity Processors

Configuring Odd Numbers of Active Cores

HP blades and processor modules typically contain an even number of cores: for example, the HP Integrity Montvale 1.6 GHz 24 MB module contains one dual core processor, and the HP Superdome blade fast 1.73GHz/24MB- contains two quad-core Intel Itanium Tukwila processor modules. Therefore, it is most common to see configurations with even numbers of active and Instant Capacity cores.

On sx2000 servers HP Instant Capacity allows partitions in new systems to be configured with odd numbers of active cores by ordering factory integrated processor core usage rights. For example, a Customer may want to order an HP Integrity Superdome with a single cell partition with three active Montvale cores and five Instant Capacity Montvale cores. The quote for such a configuration would contain:

- 1 × HP Superdome sx2000 Cell Board (A9837A)
- 1 × HP Superdome Montvale 1.6 GHz 24 MB 1P/2C module, Factory integrated (AD374A-0D1)
- 3 × HP Superdome iCAP Montvale 1.6 GHz 24 MB 1P/2C modules, Factory integrated (AD375A-0D1)
- 1 × Right to Use for one Montvale 1.6 GHz 24 MB Processor Core (AD376A)
- 1 × Right to Use for one Montvale 1.6 GHz 24 MB Processor Core, Factory integrated (AD376A-0D1)

This configuration option is supported on Mid-range and High End (sx2000 Superdome, rx7640/rx8640).

HP instant capacity allows add-on cell boards to be configured with odd number of active cores. For example, a customer may want to order an add-on sx2000 cell board with three active Montvale cores and five Instant Capacity Montvale cores. The quote for such a configuration would contain:

- 1 × HP Superdome sx2000 add-on Cell Board (A9837A)
- 1 × HP Superdome Montvale 1.6 GHz 24 MB 1P/2C module, Factory integrated (AD362A-0D1)
- 3 × HP Superdome iCAP Montvale 1.6 GHz 24 MB 1P/2C modules, Factory integrated (AD363A-0D1)
- 1 × Right to Use for one Montvale 1.6 GHz 24 MB Processor Core (AD364A)
- 1 × Right to Use for one Montvale 1.6 GHz 24 MB Processor Core, Field integrated (AD364A-02A)

HP Instant capacity also allows add-on processors (without cell board) with odd number of cores. For instance, in the above example if the customer wants to order one active Montvale and 3 iCAP Montvale cores to an existing cell board, the quote for such a configuration would look like:

- 2 × HP Superdome iCAP Montvale 1.6 GHz 24 MB 1P/2C modules (AD375A)
- 1 × Right to Use for one Montvale 1.6 GHz 24 MB Processor Core (AD376A)
- 1 × Right to Use for one Montvale 1.6 GHz 24 MB Processor Core, Field integrated (AD376A-02A)

With HP Integrity Superdome 2 blades are available with both of their two processor slots fully populated. Therefore, at the time of purchase, a blade can be fully active or fully inactive. Usage rights for iCAP processors can be purchased in units of one processor i.e. 4 processor cores for CB9000s i2 blades or 8 processor cores for CB9000s i4 blades. This is in-line with the new per-socket licensing for HP-UX. Once a processor usage rights has been purchased, the 4 or 8 processor cores can be activated all at the same time or one at a time.

Instant Capacity for Memory on HP Integrity Superdome 2 servers

Instant Capacity memory is only available on an Instant Capacity blade i.e., a blade that has only iCAP cores. A customer may purchase an Instant Capacity blade with either all active memory or all Instant Capacity Memory.

When an iCAP blade is purchased with iCAP memory the blade is considered to be turned 'off'. Customers are advised to "power off" such blades so that the memory is inaccessible to the operating system. iCAP memory is available in units of 16GB and 32GB. iCAP memory is turned 'on' in 4GB increments. All iCAP memory on a blade must be activated at the same time.

NOTE: It is not possible to have iCAP memory on a blade that has only active cores. Activating even a single core (using an RTU or TiCAP) on an iCAP blade containing iCAP memory requires all of the iCAP memory on that blade to be activated by purchasing sufficient memory RTUs.

Instant Capacity for Cell Boards with Memory on HP Integrity Mid-range and Superdome servers

Instant Capacity for Cell Boards with Memory provides a complete inactive cell board with inactive processor cores and inactive memory. When processing capacity is needed, the usage rights for the cell board and all memory on the cell board are purchased, allowing incorporation of the newly activated cell into the partition (without downtime if the conditions to use the HP-UX 11i v3 Dynamic nPar feature are met or at the next reboot).

Each active cell within a system requires at least one active core, so at minimum, the number of permanently active cores must equal the number of active cells in the server. Therefore, activation of a cell board may or may not require activation of an additional processor core.

Temporary Instant Capacity (TiCAP) for Processors

In this section, the term "temporary capacity" will be used to refer to the common functionality of both Temporary Instant Capacity and Instant Access Capacity.

Temporary capacity provides a means to temporarily activate more cores than there are usage rights in a complex, enabling Customers to meet short term peaks in demand without having to purchase a permanent usage right. This temporary activation is available in increments of processor core days and is called temporary capacity.

A "processor core day" is 24 hours (or 1,440 minutes) of activation for one processor core, and includes:

- hardware activation of the processor core,
- an HP UX DC-OE or OpenVMS MCOE license,
- an HP Virtual Server Environment license,
- a license for all standalone products included in HP-UX DC-OE, OpenVMS MCOE and the Virtual Server Environment Suite,
- hardware support for the processor core, and
- software support for the included software licenses.

A processor core day can be consumed by activating a single core for 24 hours, two cores activated for 12 hours, four cores activated for one hour a day for six days, and so on. The core can be turned on and off until the 24 hours is consumed. There are currently two ways for Customers to acquire temporary capacity:

- Instant Access Capacity or "IAC," is included with every Instant Capacity processor core and consists of five processor core days of temporary capacity.
- Temporary Instant Capacity or "TiCAP" consists of 30 processor core days of temporary capacity, and is an optional add on that can be purchased for a complex containing Instant Capacity processor cores.

Temporary capacity is very similar to a phone card-just as you need a phone to use a phone card, you must have Instant Capacity processors to use temporary capacity.

Temporary capacity is applied at the complex level and can be used to activate any Instant Capacity processor core(s) on all active cell boards within the entire system.

NOTE: On Superdome 2 server, activating even a single core (using an RTU or TiCAP) on an iCAP blade containing iCAP memory requires all of the iCAP memory on that blade to be activated by purchasing sufficient memory RTUs. You cannot apply TiCAP to a SD2 partition whose only iCAP processors are on a blade that has iCAP memory modules. If all of the iCAP processors/cores are on SD2 blades with iCAP memory, then TiCAP cannot be added to that nPar. In order to activate a core (even temporarily), the memory on the blade must be active. Memory activation/enablement will need to be purchased on any SD2 blade where they want to turn on cores using TiCAP.

Temporary Instant Capacity (TiCAP) for Processors

How Temporary Capacity is Consumed

Temporary capacity is applied to the Instant Capacity system via a Codeword. TiCAP usage is tracked locally in system inventory by the Instant Capacity Software. No connection to HP is required, and the balance is prepaid. If a complex has some temporary capacity available, the Instant Capacity Software will allow the Customer to activate cores in excess of the number of applied usage rights. Once Instant Capacity processor cores are activated, the Instant Capacity Software recognizes that there are now more active cores than there are usage rights in the complex, and will begin to decrement the available temporary capacity balance stored in system inventory.

Tracking granularity is in 30 minute increments (activating one processor core for 30 minutes will consume 30 minutes of temporary capacity on the system). How quickly temporary capacity is consumed depends on how many Instant Capacity processor cores are activated and for how long.

When Instant Capacity cores are activated temporarily, the Instant Capacity Software will calculate when the temporary capacity balance will be depleted based on the current consumption rate. The software will also notify a user defined email address once there are a certain number of days left, based on a customized setting in the software. This allows the Customer to take necessary action when the temporary capacity balance is completely consumed.

Once the temporary capacity balance is depleted, the Customer must take one of the following actions:

- deactivate the temporarily activated Instant Capacity core(s),
- apply additional Temporary Instant Capacity to the system, or
- purchase usage rights to permanently activate the core(s).

If the temporary capacity balance reaches zero and Customer continues to use the temporarily activated processor cores the temporary capacity balance will go negative and continue to accrue. At the next reboot of any partition in the complex the Instant Capacity Software will automatically deactivate as many temporarily activated processor cores as is necessary to either stop consumption of temporary capacity or to bring the partition to the minimum of one active processor core per active cell board or blade. The Customer is responsible for any negative TiCAP Balance that accrues on the server. Temporary Instant Capacity can be kept and used indefinitely (e.g., it does not expire) until it is depleted.

Calculating the Needed Amount of Temporary Capacity

To determine the total number of temporary capacity days (or minutes) required, multiply the number of Instant Capacity cores by the number of days (or minutes) of required activation. This number should then be divided by 30 days (or 43,200 minutes) and rounded up to determine the total number of Temporary Instant Capacity units required. If purchasing a new system, include the five days of Instant Access Capacity included with each iCAP core in this calculation.

It is recommended to configure a small buffer of temporary capacity and purchase more as needed, particularly if it is unclear how much temporary capacity is needed or how quickly it will be consumed.

Calculating Temporary Capacity Requirements

Temporary Instant Capacity (TiCAP) for Processors

What you need	TiCAP Calculation	Number of Units of TiCAP
Activate 1 iCAP core for 30 days	1 core × 30 days = 30 days	1
Activate 2 iCAP cores for 15 days	2 cores × 15 days = 30 days	1
Activate 4 iCAP cores for 15 days	4 cores × 15 days = 60 days	2
Activate 5 cores for 7 days once a quarter for 1 year	5 cores × 7 days * 4 quarters = 140 days	4.7 (5)
Activate 20 cores for 6 hours a day for 1 month	20 cores × 6 hours per day × 60 minutes in an hour × 30 days in a month = 216,000 minutes	5

Software and Support Included with Temporary Capacity

Temporary capacity includes hardware support for all processor cores that are activated temporarily. It also includes some software licenses and associated support for that software, specifically:

- HP UX 11i and later Data Center Operating Environment,
- OpenVMS 8.3 and later Mission Critical Operating Environment, (Not available with HP Integrity Superdome 2)
- HP Matrix Operating Environment for HP-UX, and
- All standalone products contained in the above bullets.

When an Instant Capacity processor core is temporarily activated, it is licensed for any combination of software installed in the partition which is listed in the table below.

Temporary capacity does not include software products licensed on a per server or per user basis, nor are OpenView products sold on a standalone basis are not included in this program at this time. Additionally, any HP per core or per-socket licensed software that is not included with temporary capacity must be licensed for the maximum number of cores that may be active in the partition at any given time. This includes all permanently active cores and any Instant Capacity cores that are activated even temporarily. For example, the following HP UX Operating Environments with Serviceguard Storage Management Suite are not included with Temporary capacity:

HP-UX 11i v3 new Operating environments with Serviceguard Storage Management Suite

- T8684CB/DB/EB-HAOE with Serviceguard Storage Mgmt HP-UX v3 LTU
- T8685CB-HAOE with Serviceguard CFS HP-UX v3 LTU
- T8686CB-HAOE with Serviceguard CFS for Oracle HP-UX v3 LTU
- T8687CB/DB/EB-HAOE with Serviceguard Cluster File System HP-UX v3 LTU
- T8694CB/DB/EB-DCOE with Serviceguard Storage Mgmt HP-UX v3 LTU
- T8695CB-DCOE with Serviceguard CFS HP-UX v3 LTU
- T8696CB-DCOE with Serviceguard CFS for Oracle HP-UX v3 LTU
- T8697CB/DB/EB-DCOE with Serviceguard Cluster File System HP-UX v3 LTU

HP-UX 11i v2/v3 Operating environments with Serviceguard Storage Management Suite

- T2794BA-MCOE with Serviceguard Storage Management for Oracle Premium
- T2795BA-MCOE with HP Serviceguard Cluster File System
- T2796BA-MCOE with HP Serviceguard Cluster File System for Oracle
- T2797BA-MCOE HP Serviceguard Cluster File System for RAC

Therefore, if DCOE with HP Serviceguard Cluster File System was installed in a partition with eight active and four Instant Capacity cores, and the Customer intended to use Temporary capacity to temporarily activate the iCAP cores in that partition, a total of 12 per core licenses (T8695CB) must be ordered.

Temporary Instant Capacity (TiCAP) for Processors

NOTE: Temporary Capacity does not include software licenses and support for all HP software! Permanent perpetual software licenses for any per socket or per core licensed software not listed in the table below must be licensed for the maximum number of cores that may be active in the partition at any given time. For HP Integrity Superdome 2 the maximum number of active sockets is defined as the number of active blades times two plus the number of iCAP processor RTU's plus the number of Instant Capacity cores that may be activated temporarily divided by 4. For HP Integrity Mid-range and Superdome servers the maximum number of active cores is defined as the total number of active cores plus any Instant Capacity cores that may be activated temporarily.

Software Included with Temporary Capacity

HP-UX 11i v3 New Operating Environments and Contained Standalone Products	
Base OE	
HP-UX 11i v3 Base OE License	BA927AC
HP Process Resource Manager LTU, HP-UX 11.x	B3835DA
HP Parallel Math Library License	B6061AA
HP MPI License	B6060BA
HP Auto-Port Aggregation Media	J4240AA
Virtual Server OE	
HP-UX 11i v3 Virtual Server OE License	BA929AC
HP-UX Workload Manager LTU, HP 9000	B8843CA
HP Global Workload Manager Agent PCL LTU	T8672BC
EMS HA Monitors LTU for HP-UX 11.x	B5736DA
HP Capacity Advisor for HP-UX LTU	T8670BC
HP Virtualization Manager for HP-UX LTU	T8669BC
HP UX 11i v3 Virtual Partitions E LTU	T1335DCE
HP UX 11i v2 Virtual Partitions PCL LTU	T1335BC
HP UX 11i v1 Virtual Partitions PCL LTU	T1335AC
HP-UX Integrity Virtual Machines PCL LTU	T2767CC
HP GlancePlus/UX for HP-UX 11i Software	B3693AA
HP GlancePlus/UX Pak HP-UX 11 Software	B3701AA
HP GlancePlus Pak Tier 1 Software LTU (2 socket)	B6131AA
HP GlancePlus Pak Tier 2 Software LTU (4 and 8 socket)	B6132AA
HP GlancePlus Pak Tier 3 Software LTU (16+ socket)	B6133AA
OnlineJFS 3.3 License for HP 9000 Servers	B3929CA
OnlineJFS 3.5 License for Servers	B3929DA
VERITAS VxFS (OnlineJFS) HP-UX 4.1 LTU	B3929EA
VERITAS VxFS (OnlineJFS) HP-UX 5.0 LTU	B3929FA
VERITAS VxFS (OnlineJFS) 5.0 for HP-UX 11i v3 LTU	B3929FB
VERITAS VxFS (OnlineJFS) 5.0.1 for HP-UX 11i v3 LTU	B3929GB
VERITAS VxFS (OnlineJFS) 5.1 for HP-UX 11i v3 LTU	B3929HB
HPOV Performance/Transaction agent tier 0 LTU	T2429AA
HPOV Performance/Transaction agent tier 1 LTU	T2430AA
HPOV Performance/Transaction agent tier 2 LTU	T2431AA

Temporary Instant Capacity (TiCAP) for Processors

HPOV Performance/Transaction agent tier 3 LTU	T2432AA
HPOV Performance/Transaction agent tier 4 LTU	T2433AA
MirrorDisk/UX License for Servers	B2491BA
High Availability OE	
HP-UX 11i v3 High Availability OE License	BA930AC
MC/Serviceguard SW and LTU, HP-UX	T1905CA
Serviceguard E-LTU	T1905CAE
Serviceguard NFS Toolkit License	B5140BA
EMS HA Monitors LTU for HP-UX 11.x	B5736DA
Serviceguard ECM Toolkit LTU HP-UX 11i v2	T1909BA
OnlineJFS 3.3 License for HP 9000 Servers	B3929CA
OnlineJFS 3.5 License for Servers	B3929DA
VERITAS VxFS (OnlineJFS) HP-UX 4.1 LTU	B3929EA
VERITAS VxFS (OnlineJFS) HP-UX 5.0 LTU	B3929FA
VERITAS VxFS (Online JFS) 5.0 for HP-UX 11i v3 LTU	B3929FB
VERITAS VxFS (OnlineJFS) 5.0.1 for HP-UX 11i v3 LTU	B3929GB
VERITAS VxFS (OnlineJFS) 5.1 for HP-UX 11i v3 LTU	B3929HB
HP GlancePlus/UX for HP-UX 11i Software	B3693AA
HP GlancePlus/UX Pak HP-UX 11 Software	B3701AA
HP GlancePlus Pak Tier 1 Software LTU (2 socket)	B6131AA
HP GlancePlus Pak Tier 2 Software LTU (4 and 8 socket)	B6132AA
HP GlancePlus Pak Tier 3 Software LTU (16+ socket)	B6133AA
HPOV Performance/Transaction agent tier 0 LTU	T2429AA
HPOV Performance/Transaction agent tier 1 LTU	T2430AA
HPOV Performance/Transaction agent tier 2 LTU	T2431AA
HPOV Performance/Transaction agent tier 3 LTU	T2432AA
HPOV Performance/Transaction agent tier 4 LTU	T2433AA
MirrorDisk/UX License for Servers	B2491BA
Serviceguard Extension for RAC	T1907BA
Data Center OE	
HP-UX 11i v3 Data Center OE License	BA931AC
HP UX 11i v3 Old Operating Environments and Contained Standalone Products **NOTE:** The old v3 OEs are no longer available for sale as of January 1, 2009	
Foundation OE	
For HP 9000 Servers	B9089AC
For Integrity Servers 8 processor and larger	B9429AC/T2365AC
Enterprise OE and Contained Standalone Products	
For Integrity Servers 8 processor and larger	B8484AC/T2366AC
For HP 9000 Servers	B9090AC/B9091AC
Mirrordisk UX (MDUX)	B2491BA

Temporary Instant Capacity (TiCAP) for Processors

OV GlancePlus Pak	B3701AA
Process Resource Manager (PRM)	B3835DA
OnlineJFS (OJFS) version 3.5, 4.1 and 5.0	B3929BA
EMS HA Monitors	B5736DA
Mission Critical OE and Contained Standalone Products	
For HP 9000 Servers	B9092AC/B9093AC
For Integrity Servers 8 processor and larger	B8485AC/T2367AC
Serviceguard	T1905CA
Serviceguard NFS	B5140BA
Cluster Object Manager	B8324BA
Workload Manager (WLM)	B8843CA
Enterprise Cluster Master (ECM) Toolkits	T1909BA
Technical OE and Contained Standalone Products	
For HP 9000 Servers	B6822AC/B6823AC
For Integrity Servers 8 processor and larger	T1900AC/T2368AC
CIFS Client	B8724AA
CIFS Server	B8725AA
MLIB	B6061AA
MPI	B6060BA
Java JPI 1.4	T1458AA
Java 3D 1.4	T1869AA
OpenVMS 8.3 and Later Operating Environments and Contained Standalone Products	
BOE	BA991AC
HAOE	BA992AC
Foundation OE	
For Integrity Servers Unlimited processor cores	BA329AC/BA326AC
Enterprise OE and Contained Standalone Products	
For Integrity Servers Unlimited processor cores	BA327AC/BA330AC
RMS Journaling	BA409AC
Volume Shadowing	BA413AC
DECram	BA407AC
DECnet Plus	BA406AC
OpenVMS Management Station	BA425AC
OpenView Performance Agent	T4001AA
Availability Manager	BA418AC
Mission Critical OE and Contained Standalone Products	
For Integrity Servers 8 processor and larger	BA328AC/BA331AC
OpenVMS Clusters	BA411AC/BA412AC
Reliable Transaction Router (RTR)	BA408AC
HP Matrix OE Contained Standalone Products	

Temporary Instant Capacity (TiCAP) for Processors

HP Matrix OE for HP UX 11i	T8671BC
Integrity Virtual Machines (Integrity VM)	T2767CC
Virtual Partitions (vPars) for HP UX 11i v1 on HP 9000 Servers	T1335AC
Virtual Partitions (vPars) for HP UX 11i v2 on HP Integrity Servers	T1335DC
Virtual Partitions (vPars)for HP-UX 11i v3 on HP Integrity Servers	T1335DC
Workload Manager (WLM)	B8843CA
Global Workload Manager (gWLM) for HP UX 11i	T8671BC
Global Workload Manager (gWLM) for OpenVMS 8.3	BA447AC
HP Integrity Essentials Virtualization Manager	T8669BC
HP Integrity Essentials Capacity Advisor	T8670BC

NOTE 1: All HP Matrix OE for HP-UX and other HP-UX middleware licenses have two options; #2AH option SKU's are per-core licenses for HP Integrity Mid-range and Superdome servers and #404 option SKU's are per-socket licenses for HP Integrity Superdome 2 servers
NOTE 2: HP-UX 11iv3 OE SW licenses and most layered product licenses are also available with an electronic license (e-LTU). The product number is same as for the physical license but with an added "E" appended at the end.
NOTE 3: This is a consolidated list of SW in HP Integrity Mid-range, Superdome as well as Superdome 2 servers. The SW licenses that come with TiCAP will depend on the server on which it has been purchased.

Global Instant Capacity (GiCAP)

Global Instant Capacity, or GiCAP (pronounced "jee iCAP"), is a feature included with HP Instant Capacity Software version 8.x or later. GiCAP is an extension of Instant Capacity-all previous versions of Instant Capacity have allowed Customers to move usage rights within a server, and Global Instant Capacity now allows Customers to move usage rights *between* servers.

Benefits and Applications

The top value propositions of Global Instant Capacity include:

- Cost-effective High Availability and Disaster Recovery-In case of planned or unplanned downtime, transfer core usage rights from a failed partition on one server to one or more other servers in the group that are providing backup availability. Without GiCAP, the only way to provide this failover scenario is to provision each server with an adequate amount of temporary capacity in case of potential failures, or configure fully active hardware to sit idle. GiCAP also provides the capability to extract core usage rights from a completely unavailable server and deploy these usage rights to activate iCAP cores on a failover partition in another server. Note that cell board and memory usage rights cannot be extracted using this feature.
- Load Balancing-To provide adaptability and accommodation of changing demands, usage rights can be transferred between servers in a group. For example, a server with extra unused capacity can release usage rights to be used to activate additional components on an overloaded server that needs extra capacity.
- Pooled temporary capacity-Temporary capacity usage rights can be shared across servers for better efficiency and ease of use. By pooling temporary capacity, there is no need to provision temporary capacity for each server.

How Servers Loan and Borrow Resources with GiCAP

On HP Integrity Mid-range and Superdome servers GiCAP allows usage rights for cores, cell boards and memory modules to be loaned and borrowed between servers. On HP Integrity Superdome 2 server GiCAP allows usage rights for only cores to be loanded and borrowed between servers. In disaster recovery mode, only core usage rights can be seized from an unavailable server. Instant Capacity cell boards and memory are not compatible with GiCAP disaster recovery or high availability.

GiCAP on HP Integrity Mid-range, Superdome and Superdome 2 servers

Usage rights are loaned and borrowed with GiCAP in three steps:

1. One member of the Group (the loaning member) deactivates resources (cores, cells or memory).
2. The released usage rights are then moved to another member of the Group (the borrowing member) by the Group Manager.
3. The borrowing member uses the borrowed usage rights to activate identical iCAP resources (cores, cells or memory).

Temporary capacity from all members of the Group is available for use by any Group member. GiCAP consolidates all of the temporary capacity owned by individual servers into one common pool, which means there is only one single temporary capacity balance to manage, and all servers have access to temporary capacity when needed. To use GiCAP, all systems in a GiCAP group should be running iCAP version 9 or later.

Global Instant Capacity (GiCAP)

The Group Manager

Instant Capacity Software can move usage rights within a server because the usage rights are tracked locally in system inventory. In order to track usage rights across a group of servers with Global Instant Capacity, a separate software called the GiCAP Group Manager is required.

The Group Manager requires no connection to HP, and is used by the Customer to manage their GiCAP environment. The GiCAP Group Manager creates groups, maintains information about the resources that members can exchange, and facilitates the movement of usage rights between group members. The Group Manager does not have to be a dedicated server-the Customer can use an existing server on site as long as it meets the Group Manager requirements:

- must be an HP UX 11i or later nPar or vPar
- must be running Instant Capacity Software version 9.x or later
- must be able to communicate over the network to all group members

The Group Manager may be run on either a partitionable or non partitionable system, but changing the configuration of the partitions may result in the Group Manager becoming inoperative, so it is therefore recommended that the Group Manager be on a non partitionable server for optimal availability. It is also recommended that the Group Manager not run on a group member-both for recoverability and ease of use. That is, the system should be independent of the group, but it does not need to be dedicated only to the Group Manager software. However, the ability to run Group Manager on a partitionable group member server is supported by the iCAP program. The Group Manager system must have a machine readable serial number, as displayed by the shell command "getconf CS_MACHINE_SERIAL" and must run HP UX 11i v1 or later. A management server fitting these requirements could be used, such as the Superdome Support Management Station (SMS). The separate server used to provide quorum service for the Serviceguard cluster could also potentially be used to host the Group Manager, or an HP Systems Insight Manager CMS.

iCAP version 9.x onwards supports the capability to have a standby group manager. It is recommended that customers use the latest version of the iCAP software for optimal functionality. If the primary group manager fails, GiCAP operations can continue by activating the standby group manager.

NOTE 1: On Superdome 2 servers at initial release, there was no GiCAP Group Manager offering. This has been introduced as part of the latest iCAP firmware release. The new version of the GiCAP Group Manager will continue to manage HP Integrity Mid-range and Superdome server groups also.

NOTE 2: The Group Manager cannot run in an Integrity Virtual Machine (also known as a "guest"). This is because the GiCAP Group Manager requires programmatic access to information to identify the serial number and partition information of where it is running. This information is not available in a HPVM and thus the Group Manager cannot be run in that environment.

The GiCAP Group Manager can manage any number of groups, as the number of groups on a Group Manager has no impact on performance.

Global Instant Capacity (GiCAP)

Sharing Rights

GiCAP is enabled via the purchase of GiCAP Sharing Rights. GiCAP Sharing Rights can be thought of as tokens which are consumed by every iCAP processor core brought into a GiCAP Group. In order to bring a server into a GiCAP Group, there must be at least as many tokens as there are iCAP processor cores within the server.

One GiCAP Sharing Right must be ordered for every Instant Capacity processor core in the entire complex, across all partitions. A server without any Instant Capacity hardware will not consume any Sharing Rights and can enter a GiCAP Group without consuming any Sharing Rights to deactivate resources and lend usage rights to other Group members.

GiCAP Sharing Rights are downloaded from the Utility Pricing Solutions Portal as Codewords using the same process as used for all other Instant Capacity Codewords. The Codeword is applied to the GiCAP Group Manager system (not the individual Group Members). Sharing Rights are owned by the server for which they are purchased, and expire when the server leaves the GiCAP Group. GiCAP Sharing Rights can be purchased for new servers as well as an add on to existing environments.

Groups and Grouping Rules

Global Instant Capacity is built on the concept of a server group, or GiCAP Group. This is a collection of servers that are allowed to loan and borrow usage rights.

GiCAP Grouping Rules are defined by HP and specify what servers can be grouped. Grouping Rules are downloaded from the Utility Pricing Solutions Portal as an encrypted file and applied to the GiCAP Group Manager. A readable version of the Grouping Rules is shown below and is also available on the Portal. To create a group, the GiCAP Group Manager will check that 1) there are enough Sharing Rights available, and 2) that the proposed group is supported by the current Grouping Rules.

GiCAP Grouping Rules for Superdome Servers

					HP INTEGRITY						HP 9000			
					sx2000			sx1000			sx2000		sx1000	
					Montvale/Montecito		Mad9M	Mad9M	mx2	Itanium2	PA8900	PA8800	PA8800	PA8700+
				GHz	1.6	1.6	1.6	1.6	1.1	1.5	1.068	1.1	1.0	0.875
			GHz	MB	24	18	9	9	4	6	3	3	3	2.25
HP INTEGRITY	sx2000	Montvale/Montecito	1.6	24	YES	YES					YES	YES		
			1.6	18	YES	YES					YES	YES		
		Mad9M	1.6	9			YES	YES						
	sx1000	Mad9M	1.6	9			YES	YES						
		mx2	1.1	4					YES					
		Itanium2	1.5	6						YES				
HP 9000	sx2000	PA8900	1.068	3	YES	YES					YES	YES		
		PA8800	1.1	3	YES	YES					YES	YES		
	sx1000	PA8800	1.0	3									YES	
		PA8700+	0.875	2.23										YES

GiCAP Grouping Rules for Midrange Servers

Global Instant Capacity (GiCAP)

			HP INTEGRITY	HP 9000	
			rx7640/rx8640	rx7/8440	rp7/8420
			Montvale/ Montecito	PA8900	
HP INTEGRITY	rx7640/rx8640	Montvale/ Montecito	YES	YES	YES
HP 9000	rp7440/	PA8900	YES	YES	YES
	rp7420/rp8420		YES	YES	YES
			YES	YES	YES

GiCAP Grouping Rules for Superdome 2 Servers

			HP Integrity Superdome 2 (borrower)		
			Tukwila Quad-Core Intel Itanium 9300 Series and Poulson Eight-Core Intel Itanium 9500 Series		
			8s	16s	32s
HP Integrity Superdome 2 (loaner)	8s	Tukwila Quad-Core Intel Itanium 9300 Series and Poulson Eight-Core Intel Itanium 9500 Series	YES	YES*	YES*
	16s		YES	YES	YES*
	32s		YES	YES	YES

YES - Grouping and loaning are allowed

YES* - Grouping is allowed but loaning is not allowed

Only the same class of servers can be grouped together in a GiCAP group, i.e. Superdome 2 with Superdome 2, Superdome with Superdome and Mid Range servers with other Mid Range servers. Any server with Montvale and Montecito processors can be grouped with any other server with Montvale and Montecito processors irrespective of the clock speed or the cache size as long as they are of the same class. Also any HP 9000 server with PA8900 processors (on both HP Integrity Mid-range and Superdome servers) can be grouped with an HP Integrity server with Montvale or Montecito processors, provided that the servers are of the same class. For e.g. an rp8440 with PA8900 1.068 GHz, 3MB can be grouped with an rx7640 with Montvale 1.6GHz, 24MB. For all other processor types, only servers with identical processors (e.g. same processor product number) can be grouped together. HP Integrity Superdome 2 servers can be grouped only with other HP Integrity Superdome 2 servers. However, within HP Integrity Superdome 2 servers, core usage rights can be loaned from SD2-16s to SD2-8s but not vice versa.

NOTE: On HP Integrity Mid-range and Superdome severs GiCAP moves usage rights for cell boards with memory as well as usage rights for processors. When deactivating a cell, you also deactivate the memory on that cell. An Instant Capacity cell with the same amount (or less) of Instant Capacity memory can then be activated in another server. This capability is available only when both servers have at least one partition accessible by the GiCAP Group Manager and, therefore, is not recommended for high availability or disaster recovery scenarios.

There is no restriction on location of group members, but Customers are responsible for adhering to all applicable import/export laws and customs regulations.

NOTE: If a single GM manages only SD2 systems, GM group size should be limited up to 10 complexes. If a single GM manages only legacy systems, GM group size should be limited up to 20 hard partitions.

Global Instant Capacity (GiCAP)

Software Licenses that can Move Between Servers with Global Instant Capacity

In the case of processors, GiCAP moves both the hardware usage right (Right to Use, or "RTU") and some per core licensed software (License to Use, or "LTU"). When describing movement of processor resources with GiCAP, we refer to the movement of both the RTU and the LTU(s).

Not all HP Software can be moved between servers using GiCAP. Only the per core licensed software listed in the Table can be moved. For example, HP software that is licensed per partition, per server or per cluster cannot be moved with GiCAP. Note that GiCAP is not supported on OpenVMS. Additionally, for brevity, only the "with system" software license product numbers are listed here. Please note that the corresponding add on software Product Numbers also apply.

Software that Can be Moved Between Servers with Global Instant Capacity

HP-UX 11i v3 New Operating Environments and Contained Standalone Products	
Base OE	
HP-UX 11i v3 Base OE License	BA927AC
HP Process Resource Manager LTU, HP-UX 11.x	B3835DA
HP Parallel Math Library License	B6061AA
HP MPI License	B6060BA
HP Auto-Port Aggregation Media	J4240AA
Virtual Server OE	
HP-UX 11i v3 Virtual Server OE License	BA929AC
HP-UX Workload Manager LTU, HP 9000	B8843CA
HP Global Workload Manager Agent PCL LTU	T8672BC
EMS HA Monitors LTU for HP-UX 11.x	B5736DA
HP Capacity Advisor for HP-UX LTU	T8670BC
HP Virtualization Manager for HP-UX LTU	T8669BC
HP UX 11i v3 Virtual Partitions E LTU	T1335DCE
HP UX 11i v2 Virtual Partitions PCL LTU	T1335BC
HP UX 11i v1 Virtual Partitions PCL LTU	T1335AC
HP-UX Integrity Virtual Machines PCL LTU	T2767CC
HP GlancePlus/UX for HP-UX 11i Software	B3693AA
HP GlancePlus/UX Pak HP-UX 11 Software	B3701AA
HP GlancePlus Pak Tier 1 Software LTU (2 socket)	B6131AA
HP GlancePlus Pak Tier 2 Software LTU (4 and 8 socket)	B6132AA
HP GlancePlus Pak Tier 3 Software LTU (16+ socket)	B6133AA
OnlineJFS 3.3 License for HP 9000 Servers	B3929CA
OnlineJFS 3.5 License for Servers	B3929DA
VERITAS VxFS (OnlineJFS) HP-UX 4.1 LTU	B3929EA
VERITAS VxFS (OnlineJFS) HP-UX 5.0 LTU	B3929FA
VERITAS VxFS (OnlineJFS) 5.0 for HP-UX 11i v3 LTU	B3929FB
VERITAS VxFS (OnlineJFS) 5.0.1 for HP-UX 11i v3 LTU	B3929GB
VERITAS VxFS (OnlineJFS) 5.1 for HP-UX 11i v3 LTU	B3929HB
HPOV Performance/Transaction agent tier 0 LTU	T2429AA

Global Instant Capacity (GiCAP)

HPOV Performance/Transaction agent tier 1 LTU	T2430AA
HPOV Performance/Transaction agent tier 2 LTU	T2431AA
HPOV Performance/Transaction agent tier 3 LTU	T2432AA
HPOV Performance/Transaction agent tier 4 LTU	T2433AA
MirrorDisk/UX License for Servers	B2491BA
High Availability OE	
HP-UX 11i v3 High Availability OE License	BA930AC
MC/Serviceguard Software and LTU, HP-UX	T1905CA
Serviceguard E-LTU	T1905CAE
Serviceguard NFS Toolkit License	B5140BA
EMS HA Monitors LTU for HP-UX 11.x	B5736DA
Serviceguard ECM Toolkit LTU HP-UX 11i v2	T1909BA
OnlineJFS 3.3 License for HP 9000 Servers	B3929CA
OnlineJFS 3.5 License for Servers	B3929DA
VERITAS VxFS (OnlineJFS) HP-UX 4.1 LTU	B3929EA
VERITAS VxFS (OnlineJFS) HP-UX 5.0 LTU	B3929FA
VERITAS VxFS (Online JFS) 5.0 for HP-UX 11i v3 LTU	B3929FB
VERITAS VxFS (OnlineJFS) 5.0.1 for HP-UX 11i v3 LTU	B3929GB
VERITAS VxFS (OnlineJFS) 5.1 for HP-UX 11i v3 LTU	B3929HB
HP GlancePlus/UX for HP-UX 11i Software	B3693AA
HP GlancePlus/UX Pak HP-UX 11 Software	B3701AA
HP GlancePlus Pak Tier 1 Software LTU (2 socket)	B6131AA
HP GlancePlus Pak Tier 2 Software LTU (4 and 8 socket)	B6132AA
HP GlancePlus Pak Tier 3 Software LTU (16+ socket)	B6133AA
HPOV Performance/Transaction agent tier 0 LTU	T2429AA
HPOV Performance/Transaction agent tier 1 LTU	T2430AA
HPOV Performance/Transaction agent tier 2 LTU	T2431AA
HPOV Performance/Transaction agent tier 3 LTU	T2432AA
HPOV Performance/Transaction agent tier 4 LTU	T2433AA
MirrorDisk/UX License for Servers	B2491BA
Serviceguard Extension for RAC	T1907BA
Serviceguard Storage mgmt HP-UX v3 LTU	T8684CB/DB/EB
Serviceguard CFS HP-UX v3 LTU	T8685CB/DB
Serviceguard CFS for Oracle HP-UX v3 LTU	T8686CB/DB
Serviceguard Cluster File System HP-UX v3 LTU	T8687CB/DB/EB
Data Center OE	
HP-UX 11i v3 Data Center OE License	BA931AC
Serviceguard Storage Mgmt HP-UX v3 LTU	T8694CB/DB/EB
Serviceguard CFS HP-UX v3 LTU	T8695CB/DB
Serviceguard CFS for Oracle HP-UX v3 LTU	T8696CB/DB
Serviceguard Cluster File System HP-UX v3 LTU	T8697CB/DB/EB

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HP UX 11i v3 old Operating Environments and Contained Standalone Products **NOTE:** The old v3 OEs are no longer available for sale as of January 1, 2009	
BOE	BA991AC
HAOE	BA992AC
Foundation OE	
For HP 9000 Servers	B9088AC
For Integrity Servers 8 processor and larger	B9429AC
Enterprise OE and Contained Standalone Products	
For Integrity Servers 8 processor and larger	B8484AC
For HP 9000 Servers	B9090AC
Mirrordisk UX (MDUX)	B2491BA
OV Glance Plus Pak	B3701AA
Process Resource Manager (PRM)	B3835DA
OnlineJFS (OJFS) version 3.5, 4.1 and 5.0	B3929BA
EMS HA Monitors	B5736DA
Mission Critical OE and Contained Standalone Products	
For HP 9000 Servers	B9092AC
For Integrity Servers 8 processor and larger	B8485AC
Serviceguard	T1905CA
Serviceguard NFS	B5140BA
Cluster Object Manager	B8324BA
Workload Manager (WLM)	B8843CA
Enterprise Cluster Master (ECM) Toolkits	T1909BA
Technical OE and Contained Standalone Products	
For HP 9000 Servers	B6822AC
For Integrity Servers 8 processor and larger	T1900AC
CIFS Client	B8724AA
CIFS Server	B8725AA
MLIB	B6061AA
MPI	B6060BA
Java JPI 1.4	T1458AA
Java 3D 1.4	T1869AA
HP Matrix OE for HP-UX for Contained Standalone Products	
HP Matrix OE for HP UX 11i	T8671BC
Integrity Virtual Machines (Integrity VM)	T2767CC
Virtual Partitions (vPars) for HP UX 11i v1 on HP 9000 Servers	T1335AC
Virtual Partitions (vPars) for HP UX 11i v2 on HP Integrity Servers	T1335BC
Virtual Partitions (vPars)for HP-UX 11i v3 on HP Integrity Servers	T1335DC
Workload Manager (WLM)	B8843CA

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Global Workload Manager (gWLM) for HP UX 11i	T8671BC
HP Integrity Essentials Virtualization Manager	T8669BC
HP Integrity Essentials Capacity Advisor	T8670BC

NOTE 1: All HP Matrix OE for HP-UX licenses have two options; #2AH option SKU's are per-core licenses

NOTE 1: For HP Integrity Mid-range and Superdome servers and #404 option SKU's are per-socket licenses for HP Integrity Superdome 2 servers.

NOTE 2: HP-UX 11iv3 OE SW licenses and most layered product licenses are also available with an electronic license (e-LTU). The product number is same as for the physical license but with an added "E" appended at the end.

NOTE 3: This is a consolidated list of SW in HP Integrity Mid-range, Superdome and Superdome 2 servers. The SW licenses that move with GiCAP will depend on the server on which it has been purchased.

NOTE 4: Global Instant Capacity does not include software licenses and support for all HP software! Permanent perpetual software licenses for any per socket or per core licensed software not listed above must be licensed for the maximum number of sockets or cores that may be active in the partition at any given time. For HP Integrity Superdome 2 the maximum number of active sockets is defined as the number of active blades times two plus the number of iCAP processor RTU's plus the number of core usage right borrowed temporarily from other servers divided by 4. For HP Integrity Mid-range & Superdome servers the maximum number of active cores is defined as the total number of active cores plus any Instant Capacity cores that may be activated temporarily via usage rights borrowed from another GiCAP Group Member.

Avoiding Software License Violation

While GiCAP allows some software licenses to move with the processor core usage right, not all software licenses are interchangeable and care must be taken to ensure that GiCAP transfers do not incur software licensing violation.

NOTE: Two partitions can loan and borrow processor resources to each other if they have equal software configurations.

In the context of GiCAP, two software licenses are considered equal if the two licenses are for the same software product.

For example:

- DC-OE = DC-OE
- standalone MirrorDisk/UX = standalone MirrorDisk/UX

NOTE: A partition can loan processor resources to another partition only if the software configuration of the loaning partition is equal to or greater than the software configuration of the borrowing partition.

In the context of GiCAP, software license "A" is considered greater than software license "B" if software license "A" is a bundle or standalone product that contains software license "B." Put another way, software license "A" is a superset of software license "B." For example, Data Center OE is greater than Virtual Server OE, which is in turn, greater than Base OE (see for more details on what standalone products are contained in specific bundles and suites). HP-UX 11i v2 old operating environments (MCOE, EOE and FOE) and new HP-UX 11i v3 operating environments (DC-OE, HA-OE, VSE-OE and BOE) can co-exist in the same GiCAP group The following illustrates the relationship between HP-UX 11i v3 new and HP-UX 11i v2 old operating environments for the purpose of GiCAP LTU sharing.

Relationship between HP-UX 11i v2 and v3 OEs (for GiCAP LTU Sharing purposes):

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Purchased HP-UX v3 OE	HP-UX v3 OE License To Use	HP-UX v1/v2 OE License To Use
Base OE	• Base OE	• Foundation OE • Technical Computing OE
Virtual Server OE	• Base OE • Virtual Server OE	• Enterprise OE • Foundation OE
High Availability OE	• Base OE • High Availability OE	• Enterprise OE • Foundation OE
Data Center OE	• Base OE • Virtual Server OE • High Availability OE • Data Center OE	• Mission Critical OE • Enterprise OE • Foundation OE

In general, a partition can lend processor resources to another partition only if the software configuration of the loaning partition is equal to or greater than the software configuration of the borrowing partition. It is the responsibility of the Customer to ensure that they remain in compliance with their software licensing agreements when using GiCAP to move processor resources between partitions.

Note as well that when loaning processor resources to another GiCAP Group Member, a per-socket or per-core license must be loaned for every software product installed on the borrowing partition. For example, if the borrowing partition is running HP-UX 11i v3 BOE plus Mirrordisk plus Online JFS, the loaning partition must loan either BOE plus Mirrordisk plus Online JFS or VSE-OE or HA-OE or DC-OE. The loading partition must have the same or more per-socket or per-core licenses than the borrowing partition in order to have enough licenses to loan.

Due to the potential for complications due to software licensing, it is highly recommended that Customers plan GiCAP solutions in advance, similar to designing the layout of high availability clusters. By diagramming a solution and detailing the software configuration of all partitions, allowable paths for GiCAP transfers can be identified. Alternatively, to keep things simple, GiCAP transfers can be planned between partitions of identical software configurations only.

Software that Cannot be Moved with GiCAP

GiCAP does not move all per core licensed HP Software. The following HP UX Operating Environments with Serviceguard Storage Management Suite are examples of per core licensed HP software that cannot be moved between servers with Global Instant Capacity:

Serviceguard Extension for Oracle E-Business Suite

- T2260AA - Serviceguard Extension for Oracle E-Business Suite (#2AH - per core, #404 - per socket)
- T2260AAE - Serviceguard Ext for Oracle E-Business Suite E-LTU (#2AH - per core, #404 - per socket)

Serviceguard Clustering Solutions

- B6264CA - Metrocluster with EMC SRDF LTU (#2AH - per core, #404 - per socket)
- B6264CAE - HP Metrocluster for EMC SRDF E-LTU (#2AH - per core, #404 - per socket)
- B8109CA - MetroCluster w/Continuous Access XP License (#2AH - per core, #404 - per socket)
- B8109CAE - HP Metrocluster for Cont Accss XP E-LTU (#2AH - per core, #404 - per socket)
- T2403CA - Metrocluster w/Continuous Access EVA LTU (#2AH - per core, #404 - per socket)
- T2403CAE - HP Metrocluster for Cont Accss EVA E-LTU (#2AH - per core, #404 - per socket)
- T2346BAE - HP Continentalclusters E-LTU (#2AH - per core, #404 - per socket)

Therefore, if DC-OE with HP Serviceguard Extension for Oracle E-Business Suite was installed in a partition with eight active and four Instant Capacity cores, the Customer could use Global Instant Capacity to temporarily activate the iCAP cores in that partition by borrowing four usage rights from another GiCAP Group Member. However, the Customer would be responsible for purchasing

Global Instant Capacity (GiCAP)

permanent software licenses for all 12 cores in the partition since GiCAP does not move DC-OE with Serviceguard Extension for Oracle E-Business Suite (T2260AA).

NOTE: Global Instant Capacity does not include software licenses and support for all HP software! Permanent perpetual software licenses for any per socket or per core licensed software not listed above must be licensed for the maximum number of sockets or cores that may be active in the partition at any given time. For HP Integrity Superdome 2 the maximum number of active sockets is defined as the number of active blades times two plus the number of iCAP processor RTU's plus the number of core usage right borrowed temporarily from other servers divided by 4. For HP Integrity Mid-range & Superdome servers the maximum number of active cores is defined as the total number of active cores plus any Instant Capacity cores that may be activated temporarily via usage rights borrowed from another GiCAP Group Member.

Customers are responsible for determining the policy of their applicable ISVs for moving third party software licenses between servers using GiCAP.

Pooling Temporary Capacity

GiCAP also pools temporary capacity automatically. The user can not manually transfer Temporary Capacity to a specific system- temporary capacity is first consumed on the local system and then, if required, it is consumed from other systems in the group.

When a complex is consuming temporary capacity, the iCAP daemon will periodically contact the Group Manager to determine if there are available core usage rights on other group members. If no such usage rights are available, temporary capacity will continue to be consumed. If usage rights are available anywhere in the group, they will be transferred to the complex using temporary capacity in order to stop temporary capacity consumption on that complex.

Using GiCAP for High Availability

GiCAP can be used in several ways to provide cost effective high availability and disaster recovery solutions.

In the simplest variation, a GiCAP Group can be created that includes two types of members: servers to run primary processing tasks and servers that provide failover processing. Both types of servers can contain Instant Capacity components for the most economical solution. When a failure occurs or planned downtime is required on a partition in one of the active servers, GiCAP can be used to extract processor core usage rights from that partition and transfer those usage rights to one or more of the adoptive failover servers. Those transferred usage rights can then be used to activate additional processor cores on the failover servers in order to increase capacity during a failover situation. GiCAP also enables moving capacity from one server partition to another server.

GiCAP can also be used to move capacity from one or more non production servers, such as test servers, during a failover situation. A set of standby servers which are part of a GiCAP Group can pool their resources to provide failover capability.

GiCAP in combination with TiCAP can be used in a similar scenario involving a set of non production servers. Some of those servers may be provisioned with TiCAP (perhaps for use during peak production times) and can contribute this TiCAP to the rest of the group for use during a failover situation.

Systems with full usage rights can also be part of a GiCAP group and can be used as "donor" systems, contributing usage rights to the group and allowing additional activations on member systems with iCAP components.

Some important notes to consider when using GiCAP to design an HA or DR solution:

- The Version 8 GiCAP command that extracts usage rights from a downed partition (icapmanage), with the release of GiCAP DR, v8.02.01, supports failover scenarios in which an entire server as well as a single partition becomes unavailable.
- On HP Integrity Mid-range and Superdome servers while GiCAP enables migration of all types of usage rights between member servers (cores, cells, and memory), extraction from a failed server is only for core usage rights. Instant Capacity cellboards and memory should not be used for high availability or disaster recovery scenarios.

Global Instant Capacity (GiCAP)

- On HP Integrity Superdome 2 servers GiCAP enables migration of only core usage rights between member servers. Extraction from a failed server is also only for core usage rights. Instant Capacity memory should not be used for high availability or disaster recovery scenarios.
- Usage rights are always extracted from the hard partition. If there are multiple virtual partitions or VM guests for the hard partition, they will all be affected by the reduction of usage rights.

In order to accomplish usage rights extraction network connectivity must exist between the Group Manager and the intended failover partition. If the Group Manager system is unavailable, it is not possible to transfer usage rights to a standby server. However, iCAP version 9.x onwards supports the capability to have a standby group manager. If the primary group manager fails, GiCAP operations can continue by activating the standby group manager.

Application startup time will be longer as compared to using a typical Serviceguard package control script that does not invoke GiCAP commands. When using GiCAP, the time required to perform core activation in a GiCAP group can range from seconds to minutes, depending on the size of the group and the hardware involved. The time to perform a core usage rights extraction is less but has the same range generally.

Support

GiCAP can transfer usage rights between servers with different support levels. When a support call is placed on hardware or software component that has been borrowed from another server, the level of support delivered to the Customer will be the level of support purchased for the borrowing complex, not the complex loaning the resources. For example, if a server covered under same day support loans usage rights to a server covered under 24×7 support, and the component fails, 24×7 support will be delivered.

Support pricing for GiCAP consists of an ongoing monthly support charge. The ongoing support charge covers support for the GiCAP software as well as to compensate for potential support level differences between servers within the grouping. The appropriate support band, 6B0, to apply the support associated with each GiCAP Sharing Right must be included with the GiCAP order.

Third party Software and Instant Capacity

Customers are responsible for maintaining license compliance, and should work with their ISV to determine their specific licensing requirements for an Instant Capacity environment. All Customers should consult their ISVs to determine the policy for moving software licenses between processor cores both within a server and between servers, and perform testing in order to assess how applications respond to iCAP activations.

Instant Capacity Product Lifecycles

Instant Capacity hardware has the same product lifecycle as the equivalent active component. Both versions of the component will become available, go obsolete, and no longer be covered by standard HP support at the same point in time.

The Right to Use for an Instant Capacity component will remain on HP's Corporate Price List as long as the hardware component is supported. The Right to Use will not be orderable after the End of Support date for the hardware.

Temporary Instant Capacity will remain available as long as there is at least one Instant Capacity processor for the server still covered under standard HP support.

A Summary of HP Instant Capacity Configuration Rules

Instant Capacity Program

- All Instant Capacity Customers must sign and abide by the Terms and Conditions of the Instant Capacity Contract, which is an addendum to the Customer's standard purchase agreement.
- Customers must apply all Codewords as requested by HP.
- No Instant Capacity component can be removed from the system/complex in which it was originally installed.

Instant Capacity Hardware on HP Integrity Superdome 2 servers

- Instant Capacity hardware is only supported on partitions running HP-UX 11iv3 and later
- At ordering time, an nPar must be configured with at least either one active blade or one active processor (one processor RTU)
- While deploying a server, however, a live partition (not parspec) must be adjusted to contain at least one active core.
- A processor Right to Use can activate up to 4 processor cores which can be activated all at once or one at a time
- The four core activations that are available through the purchase of a processor Right to Use should be applied on the same server
- An iCAP blade with iCAP memory should be powered off
- You cannot have iCAP memory on a blade containing active cores. Activating even a single core (through an RTU or TiCAP) on an iCAP blade containing iCAP memory requires all of the iCAP memory to be activated
- When activating iCAP memory, all the memory on the blade must be activated together. This activation requires a reboot
- Every purchase of a single processor Right to Use requires the corresponding purchase of license for the applicable HP-UX Operating Environment. Hardware and software support must also be purchased and be identical to the support and OE on the server in which the processors are installed.
- Each of the four Instant Capacity processor cores activated via the purchase of a single processor Right to Use requires the corresponding purchase of any other per-core licensed software installed in the partition.
- It is strongly recommended that all blades in a partition, both active and inactive, be configured identically and symmetrically.
- It is strongly recommended that Configuration Guidelines for HP Integrity Superdome 2 be followed when designing partition layout in order to place iCAP blades in the optimal location on the backplane for performance and availability. Consult HP Integrity Superdome 2 subchapter of this guide for more details.

Instant Capacity Hardware on HP Integrity Mid-range and Superdome servers

- Instant Capacity hardware is supported on partitions running HP UX 11i and later or OpenVMS 8.3 and later only.
- A partition must contain at least one active (non Instant Capacity) cell board.
- Instant Capacity cell boards must be assigned to a partition.
- Every active cell board must contain at least one active core and exclusively active memory (i.e. Instant Capacity memory is not supported on active cell boards).
- Instant Capacity cell boards contain exclusively Instant Capacity processors and Instant Capacity memory modules.
- When activating an Instant Capacity cell board, all memory on the cell must also be activated.
- Each active cell within a system requires at least one active core, so at minimum, the number of permanently active cores must equal the number of active cells in the server. Therefore, activation of a cell may or may not require the purchase of permanent usage rights for an additional processor core.
- Each Instant Capacity processor core activated permanently via the purchase of a Right to Use requires the corresponding purchase of licenses for the applicable HP UX or OpenVMS Operating Environment and any other per core licensed software installed in the partition. Hardware and software support must also be purchased and be identical to the support and OE on the server in which the processors are installed.
- When creating a new partition in the field, all components must be active (i.e., no Instant Capacity components can be included when creating a new partition). New partition creation fails if any of the cell boards contain Instant Capacity components. See the User's Guide for more details.
- It is strongly recommended that all cells in a partition, both active and inactive, be configured identically and symmetrically.
- It is strongly recommended that Configuration Guidelines for Superdome be followed when designing partition layout in order to place iCAP cells in the optimal location on the backplane for performance and availability. Consult the Superdome subchapter of

A Summary of HP Instant Capacity Configuration Rules

this guide for more details.

Temporary Instant Capacity

All configuration rules listed in this section apply both to Temporary Instant Capacity and Instant Access Capacity.

- Temporary Instant Capacity for processors is supported on partitions running HP UX 11i and later or OpenVMS 8.3 and later only.
- Temporary capacity does not expire. It can be held indefinitely and used as often as needed until the capacity balance is depleted.
- Temporary capacity is tracked at the complex level
- Temporary capacity can only be used on the server for which it was purchased unless that server is a member of a Global Instant Capacity Group.
- Temporary Instant Capacity can be applied to Instant Capacity processor cores on active cell boards. It cannot be applied to processors on iCAP blades with iCAP memory or iCAP cell boards.
- Temporary Instant Capacity (TiCAP) is purchased in increments of 30 processing days. Any quantity of TiCAP can be purchased at a time.
- TiCAP can be purchased for existing systems as long as those systems have iCAP processors.
- TiCAP includes temporary software licenses solely for the software products listed in this guide. Any additional software running in a partition with Instant Capacity processors that are intended to be activated temporarily using TiCAP must be licensed for the maximum number of sockets or cores that may be active at any given point in time.
- TiCAP includes temporary hardware and software support for all iCAP processors activated temporarily.

Global Instant Capacity

- GiCAP is supported on HP UX systems only.
- GiCAP grouping rules determine which servers can be put in a group (hardware related rules). The latest grouping rules are available on the *Utility Pricing Solutions Portal*, accessible at: http://www.hp.com/go/icap/portal.
- A GiCAP Sharing Right must be purchased for every iCAP core within the server you want to group.
- All partitions on all servers in the group and the Group Manager must be running HP UX 11i and later and Instant Capacity Software version 9.x or later.
- GiCAP group sizes should be limited to fewer than 9 complexes, or fewer than 20 nPars, for optimal performance.
- On HP Integrity Superdome 2 server at initial release there is no iCAP Group Manager. On HP Integrity Mid-range and Superdome servers the Group Manager can run on any HP UX instance except a virtual machine. It is recommended that the Group Manager be a non partitionable server which is not a Group Member for optimal availability.
- On Superdome 2 servers at initial release icapmodify is used to move core usage rights. On HP Integrity Mid-range and Superdome servers usage rights extraction using icapmanage works only on partitioned servers. In order to seize usage rights from a failed partition, the Group Manager must be able to communicate with another HP UX partition on the server. GiCAP also supports the capability to extract core usage rights from a completely unavailable server (where the GiCAP Group Manager is not able to communicate with the failed server) and deploy these usage rights in failover partitions in other servers. Note that cell board and memory usage rights cannot be extracted using this feature.
- For HP Integrity Mid-range and Superdome servers iCAP version 9,x and later supports the capability to have a standby GiCAP Group Manager which can take over GiCAP operations in the event of a primary Group Manager failure.. For Superdome 2 servers the icapmodify command allows movement of core usage in disaster recovery scenarios.