## **USDL** Examples

Amazon EC2 use case



SYSTEMATIC THOUGHT LEADERSHIP FOR INNOVATIVE BUSINESS

SAP Research November 2009



## Core Service Description



## Amazon Elastic Compute Cloud (Amazon EC2)

Service Name (Core)

Amazon Elastic Compute Cloud (Amazon EC2) is a web service that provides resizable compute capacity in the cloud. It is designed to make web-scale computing easier for developers. Sign Up For Amazon EC2

Amazon EC2's simple web service interface allows you to obtain and configure capacity with minimal friction. It provides you with complete control of your computing resources and lets you run on Amazon's proven computing environment. Amazon EC2 reduces the time required to obtain and boot new server instances to minutes, allowing you to quickly scale capacity, both up and down, as your computing requirements change. Amazon EC2 changes the economics of computing by allowing you to pay only for capacity that you actually use. Amazon EC2 provides developers the tools to build failure resilient applications and isolate themselves from common failure scenarios.

Long Description (Core/Foundation)

## Core Service Description



Service Description		(
Service		
Short Description:	Amazon Elastic Compute Cloud	
Long Description:	A web service that provides resizable compute capacity in the cloud. It is designed to make web-scale computing	
Guid:		
Namespace:		
Name:	Amazon EC2	
Synonyms:		×
Version:		
Publication Time:		select
Keywords:		×
Languages:		×
Туре:	Other ▼	
Release Stage:	Proposed <b>▼</b>	
Granularity:	Other ▼	
Provider:	_	
Business Owner:	_	

# Core Service Description Dependencies



### **Detailed Description**

### Using Amazon EC2 to Run Instances

Amazon EC2 allows you to set up and configure everything about your instances from your operating system up to your applications. An Amazon Machine Image (AMI) is simply a packaged-up environment that includes all the necessary bits to set up and boot your instance. Your AMIs are your unit of deployment. You might have just one AMI or you might compose your system out of several building block AMIs (e.g., webservers, appservers, and databases). Amazon EC2 provides a number of command line tools to make creating an AMI easy. Once you create a custom AMI, you will need to upload it to Amazon S3. Amazon EC2 uses Amazon S3 to provide reliable, scalable storage of your AMIs so that we can boot them when you ask us to do so.

You can also choose from a library of globally available AMIs that provide useful instances. For example, if you just want a simple Linux server, you can choose one of the standard Linux distribution AMIs. Once you have set up your account and uploaded your AMIs, you are ready to boot your instance. You can start your AMI on any number and any type of instance by calling the *RunInstances* API.

If you wish to run more than 20 instances, create more than 20 EBS volumes, need more than 5 Elastic IP addresses, or need to send large quantities of email from your EC2 account, please complete the <u>Amazon EC2 instance request form</u>, <u>Amazon EBS volume request form</u>, <u>Elastic IP request form</u>, or the <u>Email request form</u> respectively and your request will be considered.

Dependency to Amazon S3 (Core)

# Core Service Description Dependencies



Dependency			G
Dependency			Ф <b>   Ж</b>
Name:			
Synonyms:			×
Short Description:			
	Provide reliable, scalable storage	*	
Long Description:	of your AMIs so that we can boot them when you ask us to do so.	-	
Dependency Type:	Requires	-	
Target:	Amazon S3	-	

## Core Service Description Options 1

#### Software

Amazon EC2 enables our partners and customers to build and customize Amazon Machine Images (AMIs) with software based on your needs. We have hundreds of free and paid AMIs available for you to use. A small sampling of the software available for use today within Amazon EC2 includes:

<u>Databases</u>	Batch Processing	Web Hosting
IBM DB2	Hadoop	Apache HTTP
IBM Informix Dynamic Server	Condor	IIS/Asp.Net
Microsoft SQL Server Standard 2005	Open MPI	IBM Lotus Web Content Management
MySQL Enterprise		IBM WebSphere Portal Server
Oracle Database 11q		

Options (Core, experimental)

## Core Service Description Options 1



tions		0
Option		G
Option		•   <b>x</b>
Name:	IBM DB2	
Synonyms:		×
Short Description:	Database Option	
and the second second	*	
Long Description:	-	
Option		•   <b>x</b>
Name:	IBM Informix Dynamic Server	
Synonyms:		×
Short Description:	Database Option	
Long Description:	*	
Option		•   <b>x</b>
Name:	Microsoft SQL Server Standard 2005	
Synonyms:		×
Short Description:	Database Option	
	*	
Long Description:	L.	

# Core Service Description Options 2



#### **Instance Types**

#### Standard Instances

Instances of this family are well suited for most applications.

- Small Instance (Default) 1.7 GB of memory, 1 EC2 Compute Unit (1 virtual core with 1 EC2 Compute Unit),
   160 GB of instance storage, 32-bit platform
- Large Instance 7.5 GB of memory, 4 EC2 Compute Units (2 virtual cores with 2 EC2 Compute Units each),
   850 GB of instance storage, 64-bit platform
- Extra Large Instance 15 GB of memory, 8 EC2 Compute Units (4 virtual cores with 2 EC2 Compute Units each), 1690 GB of instance storage, 64-bit platform

#### **High-Memory Instances**

Instances of this family offer large memory sizes for high throughput applications, including database and memory caching applications.

- High-Memory Double Extra Large Instance 34.2 GB of memory, 13 EC2 Compute Units (4 virtual cores with 3.25 EC2 Compute Units each), 850 GB of instance storage, 64-bit platform
- High-Memory Quadruple Extra Large Instance 68.4 GB of memory, 26 EC2 Compute Units (8 virtual cores with 3.25 EC2 Compute Units each), 1690 GB of instance storage, 64-bit platform

#### High-CPU Instances

Instances of this family have proportionally more CPU resources than memory (RAM) and are well suited for compute-intensive applications.

- High-CPU Medium Instance 1.7 GB of memory, 5 EC2 Compute Units (2 virtual cores with 2.5 EC2 Compute Units each), 350 GB of instance storage, 32-bit platform
- High-CPU Extra Large Instance 7 GB of memory, 20 EC2 Compute Units (8 virtual cores with 2.5 EC2 Compute Units each), 1690 GB of instance storage, 64-bit platform

Options (Core, experimental)

### SAP

## Core Service Description Options 2

Option		⊕∥ 🗶
Name:	Standard Instances	
Synonyms:		ж
Short Description:	Instance Option	
Long Description:	* Small Instance (Default) 1.7 GB of memory, 1	
Option		•   <b>x</b>
Name:	High-Memory Instances	
Synonyms:		ж
Short Description:	Instance Option	
Long Description:	Instances of this family offer large memory sizes  * High-Memory Double Extra Large Instance 3	
Option		
Name:	High-CPU Instances	
Synonyms:		ж
Short Description:	Instance Option	
Long Description:	* High-CPU Medium Instance 1.7 GB of mema	

## Functional Perspective Actions



### Amazon EC2 Functionality

Amazon EC2 presents a true virtual computing environment, allowing you to use web service interfaces to launch instances with a variety of operating systems, load them with your custom application environment, manage your network's access permissions, and run your image using as many or few systems as you desire.

To use Amazon EC2, you simply:

- Create an Amazon Machine Image (AMI) containing your applications, libraries, data and associated configuration settings. Or use pre-configured, templated images to get up and running immediately.
- Upload the AMI into Amazon S3. Amazon EC2 provides tools that make storing the AMI simple. Amazon S3
  provides a safe, reliable and fast repository to store your images.
- Use Amazon EC2 web service to configure security and network access.
- Choose which instance type(s) and operating system you want, then start, terminate, and monitor as many
  instances of your AMI as needed, using the web service APIs or the variety of management tools provided.
- Determine whether you want to run in multiple locations, utilize static IP endpoints, or attach persistent block storage to your instances.
- Pay only for the resources that you actually consume, like instance-hours or data transfer.

Actions (Functional)

# Functional Perspective Actions



tions		(
Action		6
Action		•   <b>x</b>
Name:	Create an Amazon Machi	
Synonyms:		×
Short Description:		
Long Description:	Create an Amazon M Acontaining your appl data and associated c	
Action		Ф <b>   Ж</b>
Name:	Upload the AMI into Ama	
Synonyms:		×
Short Description:		
	Upload the AMI into / 🔺	

```
-<portType name="AmazonEC2PortType">
 -<operation name="RegisterImage">
     <input message="tns:RegisterImageRequestMsg"/>
     <output message="tns:RegisterImageResponseMsg"/>
   -<operation name="DeregisterImage">
     <input message="tns:DeregisterImageRequestMsg"/>
     <output message="tns:DeregisterImageResponseMsg"/>
   <operation name="RunInstances">
     <input message="tns:RunInstancesRequestMsg"/>
     <output message="tns:RunInstancesResponseMsg"/>
   Operation
                                    (Functional)
```

Technical Interface (Functional)

## Technical Interface



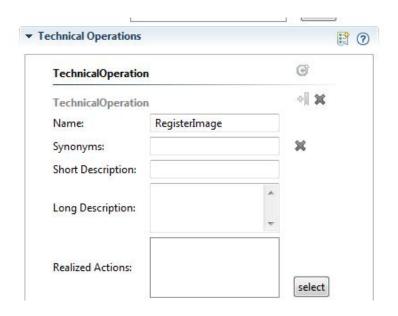
		C. anni			
Technical Interface		G			
TechnicalInterface		•   <b>X</b>			
Name:	AmazonEC2PortType		<b>▼</b> Implementation Artif	act	
Synonyms:		×	14 142 1		G
Short Description:			Artifact		
	*		Artifact		<b></b> ⊕ <b>×</b>
Long Description:	_		Name:	WSDL file	
T	WSDL PortyType		Synonyms:		×
Туре:	W3DL PORTYTYPE		Short Description:		
Realized Capabilities:			I D:	A reference to the WSI 🔺	
reduzed capabilities.		select	Long Description:	•	
			Туре:	TechnicalMetadata ▼	
			Mime Type:		
			Source:		
			Uri:	C:\Users\d053224\worksp	Browse
			Copyright:		\$ TA

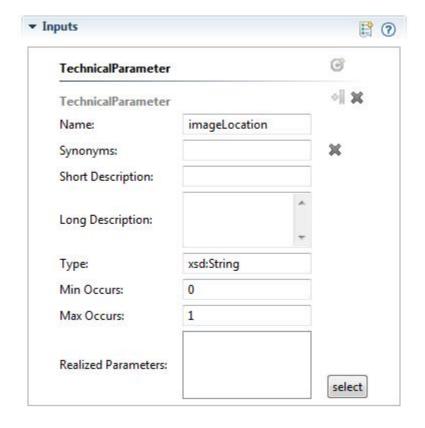
```
-<types>
  -<xs:schema targetNamespace="http://ec2.amazonaws.com/doc/2009-04-04/" elementFormDefault="qualified">
    -<xs:annotation>
        <xs:documentation xml:lang="en"> </xs:documentation>
      </xs:annotation>
      <!-- RegisterImage request definitions -->
      <xs:element name="RegisterImage" type="tns:RegisterImageType"/>
    -<xs:complexType name="RegisterImageType">
      -<xs:sequence>
          <xs:element name="imageLocation" type="xs:string"/>
        </xs:sequence>
      </xs:complexType>
      <!-- RegisterImage response definitions -->
      <xs:element name="RegisterImageResponse" type="tns:RegisterImageResponseType"/>
    -<xs:complexType name="RegisterImageResponseType">
      -<xs:sequence>
          <xs:element name="requestId" type="xs:string"/>
          <xs:element name="imageId" type="xs:string"/>
        </r></xs:sequence>
      </xs:complexType>
```

```
<!-- DescribeKeyPairs Request definitions -->
 <xs:element name="DescribeKeyPairs" type="tns:DescribeKeyPairsType"/>
-<xs:complexType name="DescribeKeyPairsType">
  -<xs:sequence>
      <xs:element name="keySet" type="tns:DescribeKeyPairsInfoType"/>
   </r></xs:sequence>
 </xs:complexType>
-<xs:complexType name="DescribeKeyPairsInfoType">
  -<xs:sequence>
      <xs:element name="item" type="tns:DescribeKeyPairsItemType" minOccurs="0" maxOccurs="unbounded"/>
   </r></xs:sequence>
 </xs:complexType>
                                                                       Occurrence
-<xs:complexType name="DescribeKeyPairsItemType">
                                                                       (Functional)
  -<xs:sequence>
      <xs:element name="keyName" type="xs:string"/>
   </r></xs:sequence>
 </xs:complexType>
```

## Operation and Inputs/Outputs

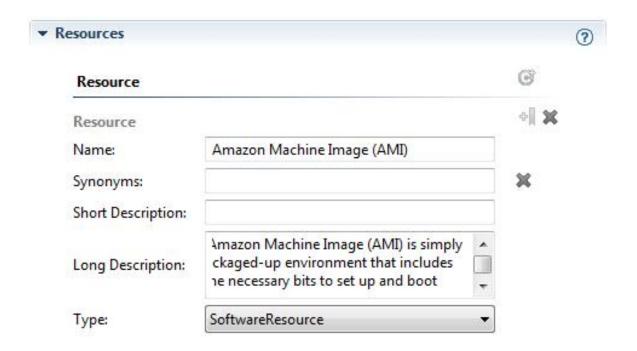






### Resources







### **Detailed Description**

### Using Amazon EC2 to Run Instances

Amazon EC2 allows you to set up and configure everything about your instances from your operating system up to your applications. An Amazon Machine Image (AMI) is simply a packaged-up environment that includes all the necessary bits to set up and boot your instance. Your AMIs are your unit of deployment. You might have just one AMI or you might compose your system out of several building block AMIs (e.g., webservers, appservers, and databases). Amazon EC2 provides a number of command line tools to make creating an AMI easy. Once you create a custom AMI, you will need to upload it to Amazon S3. Amazon EC2 uses a mazon S3 to provide reliable, scalable storage of your AMIs so that we can boot them when you ask us to do so.

You can also choose from a library of globally available AMIs that provide useful instances. For example, if you just want a simple Linux server, you can choose one of the standard Linux distribution AMIs. Once you have set up your account and uploaded your AMIs, you are ready to boot your instance. You can start your AMI on any number and any type of instance by calling the *RunInstances* API.

Resource (Foundation)

## Pricing Price Plans



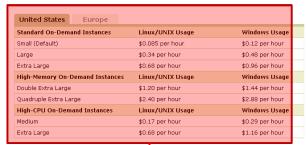
#### Pricing

Pay only for what you use. There is no minimum fee. Estimate your monthly bill using <u>AWS Simple Monthly Calculator</u>. The prices listed are based on the Region in which your instance is running.

#### On-Demand Instances

On-Demand Instances let you pay for compute capacity by the hour with no long-term commitments. This frees you from the costs and complexities of planning, purchasing, and maintaining hardware and transforms what are commonly large fixed costs into much smaller variable costs.

The pricing below includes the cost to run private and public AMIs on the specified operating system. Amazon also provides you with additional instances with other option for <a href="Manazon EC2"><u>Amazon EC2 running Microsoft</u></a> and <a href="Manazon EC2"><u>Amazon EC2 running Microsoft</u></a> and <a href="Manazon EC2"><u>Amazon EC2 running Microsoft</u></a>



Pricing is per instance-hour consumed for each instance type, from the time an instance is launched until it is terminated. Each partial instance-hour consumed will be billed as a full hour.

## Alternative Price Plans (Pricing)

ou want to reserve e one-time payment choose to run that

instance for the associated associated for the quintion of your complete when you do not use the instance, you will not pay usage charges on it.

United States Europe			
Linux/UNIX	One-tim	e Fee	
Standard Reserved Instances	1 yr Term	3 yr Term	Usage
Small (Default)	\$227.50	\$350	\$0.03 per hour
Large	\$910	\$1400	\$0.12 per hour
Extra Large	\$1820	\$2800	\$0.24 per hour
High-Memory Reserved Instances	1 yr Term	3 yr Term	Usage
Double Extra Large	\$3185	\$4900	\$0.42 per hour
Quadruple Extra Large	\$6370	\$9800	\$0.84 per hour
High-CPU Reserved Instances	1 yr Term	3 yr Term	Usage
Medium	\$455	\$700	\$0.06 per hour
Extra Large	\$1820	\$2800	\$0.24 per hour

Reserved Instances can be purchased for 1 or 3 year terms, and the one-time fee per instance is non-refundable. Usage pricing is per instance-hour consumed. Instance-hours are billed for the time that instances are in a running state; if you do not run the instance in an hour, there is zero usage charge. Partial instance-hours consumed are billed as full hours.

Reserved Instances are currently available for Linux/UNIX operating systems. <u>Click here</u> to learn more about Reserved Instances.



Price Plan		0
PricePlan		o∥ <b>×</b>
Name:	On-Demand Instances plan	
Synonyms:		×
Short Description:		
Long Description:	<u> </u>	
Currency:	USD 🔻	
Plan Cap:	0.0	
Plan Floor:	0.0	
Effective From:	2009-11-01T02:17:22.000+0100	select
Effective To:		select
▶ Plan Comprises		
▶ Plan Penalties		
▶ Fence Expression		
7 Telice Expression		
Plan Fences:		select
		select
Plan Fences:		select
Plan Fences: Default Payment Terms:	Reserved Instances plan	
Plan Fences: Default Payment Terms: PricePlan		
Plan Fences:  Default Payment Terms:  PricePlan  Name:		•   <b>x</b>
Plan Fences:  Default Payment Terms:  PricePlan  Name:  Synonyms:		•   <b>x</b>
Plan Fences:  Default Payment Terms:  PricePlan  Name:  Synonyms:  Short Description:		•   <b>x</b>
Plan Fences:  Default Payment Terms:  PricePlan  Name:  Synonyms:  Short Description:  Long Description:	Reserved Instances plan	•   <b>x</b>
Plan Fences:  Default Payment Terms:  PricePlan  Name: Synonyms: Short Description: Long Description:  Currency:	Reserved Instances plan	•   ×
Plan Fences:  Default Payment Terms:  PricePlan  Name: Synonyms: Short Description: Long Description:  Currency: Plan Cap:	Reserved Instances plan  USD  0.0	•   <b>x</b>

## Price Plans Cap & Floor



## Price Floor (null | 0)

Pay only for what you use There is no minimum fee. Estimate your monthly bill using AWS Simple Monthly Calculator. The prices listed are based on the Region in which your instance is running.

Price Plan		G
PricePlan		•   <b>X</b>
Name:	On-Demand Instances plan	
Synonyms:		ж
Short Description:		
Long Description:		~
Currency:	USD	
Plan Cap:		
Plan Floor:		
Effective From:	2009-11-01702:17:22.000+0100	select
Effective To:		select

## Price Plans Effectiveness Date



### Effective From / Effective To

### Upcoming Price Changes

Effective November 1, 2009, we will be lowering prices for all On-Demand instances. The tables below show the existing and future On-Demand prices.

Price Plan		G
PricePlan		*   X
Name:	On-Demand Instances plan	
Synonyms:		×
Short Description:		
Long Description:		
Currency:	USD	
Plan Cap:		
Plan Floor:		
Effective From:	2009-11-01T02:17:22.000+0100	select
Effective To:		select



#### **On-Demand Instances**

#### **Price Fences**

On-Demand Instances let you pay for compute capacity by the hour with no long-term commitments. This frees you from the costs and complexities of planning furchasing, and maintaining hardware and transforms what are commonly large fixed costs into much smaller variable costs.

The pricing below includes the cost to run private and public AMIs on the specified operating system. Amazon also provides you with additional instances with other option for Amazon EC2 running Microsoft and Amazon EC2 running IBM that are priced differently.

United States Europe			
Standard On-Demand I	nstances	Linux/UNIX Usage	Windows Usage
Small (Default)		\$0.085 per hour	\$0.12 per hour
Large		\$0.34 per hour	\$0.48 per hour
Extra Large		\$0.68 per hour	\$0.96 per hour
High-Memory On-Dem	nd Instances	Linux/UNIX Usage	Windows Usage
Double Extra Large		\$1.20 per hour	\$1.44 per hour
Quadruple Extra Large		\$2.40 per hour	\$2.88 per hour
High-CPU On-Demand I	Instances	Linux/UNIX Usage	Windows Usage
Medium		\$0.17 per hour	\$0.29 per hour
Extra Large		\$0.68 per hour	\$1.16 per hour

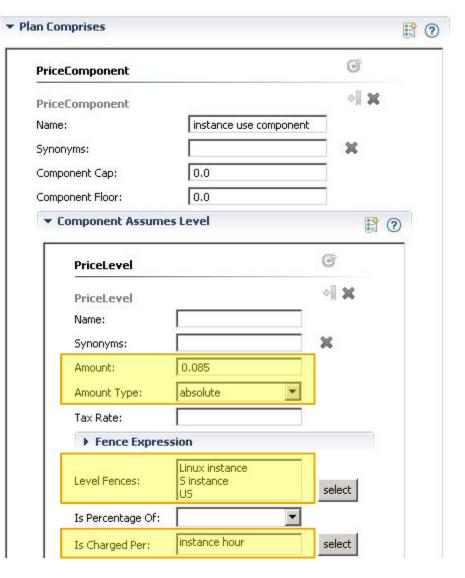
Price Levels

pay-per-use component

## Pricing Price Level







## Price Fence definition Instance Type example

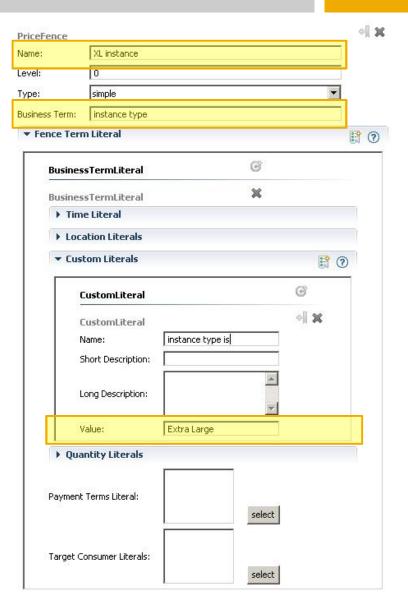


#### On-Demand Instances

On-Demand Instances let you pay for compute capacit you from the costs and complexities of planning, purch commonly large fixed costs into much smaller variable.

The pricing below includes the cost to run private and provides you with additional instances with other optiunning IBM that are priced differently.

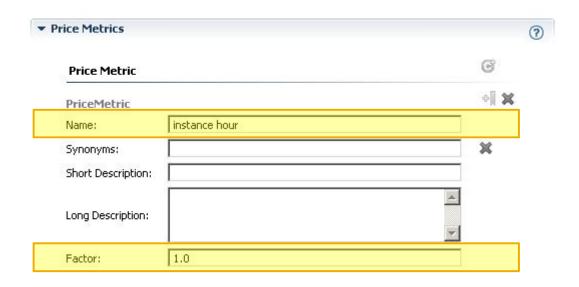
United States	Europe	
Standard On-Dema	and Instances	Linux/U/
Small (Default)		\$0.085 pe
Large		\$0.34 per
Extra Large		\$0.68 per
High-Memory On-L	Demand Instance	s Linux/UN
Double Extra Large		\$1.20 per
Quadruple Extra La	rge	\$2,40 per
High-CPU On-Dem	and Instances	Linux/UN
Medium		\$0.17 per
Extra Large		\$0.68 per



## Pricing Price Metric









#### **Price Fences**

#### Reserved Instances

Reserved Instances give you the oftion to make a low, one-time payment for each instance you want to reserve and in turn receive a significant discount on the hourly usage charge for that instance. After the one-time payment for an instance, that instance is reserved for you, and you have no further obligation; you may choose to run that instance for the discounted usage rate for the duration of your term, or when you do not use the instance, you will not pay usage charges on it.

United States   Europe			
Linux/UNIX	One-t	me Fee	
Standard Reserved Instances	1 yr Term	3 yr Term	Usage
Small (Default)	\$227.50	\$350	\$0.03 per hour
Large	\$910	\$1400	\$0.12 per hour
Extra Large	\$1820	\$2800	\$0.24 per hour
High-Memory Reserved Instance	s 1 yr Term	3 yr Term	Usage
Double Extra Large	\$3185	\$4900	\$0.42 per hour
Quadruple Extra Large	\$6370	\$9800	\$0.84 per hour
High-CPU Reserved Instances	1 yr Term	3 yr Term	Usage
Medium	\$455	\$700	\$0.06 per hour
Extra Large	\$1820	\$2800	\$0.24 per hour

Price Component (per-use fee)

Reserved Instances can be purchased for 1 or 3 year terms, and the one-time fee per instance is non-refundable. Usage pricing is per instance-hour consumed. Instance hours are billed for the time that instances are in a running state; if you do not run the instance in an hour, there is zero usage charge. Partial instance-hours consumed are billed as full Price Component (fixed fee)

Reserved Instances are currently available for Linux/UNIX operating systems. <u>Click here</u> to learn more about Reserved Instances.

Two-part

tariff

## Pricing Two-part Tariff



PriceComponent		6
PriceComponent		•   <b>x</b>
Name:	One-time Fee	
Component Cap:	0.0	
Component Floor:	0.0	
▶ Component Assume	s Level	
▶ Fence Expression		7
Component Fences:		select
Component Payment Terms		
		select
		TOTAL WAR
PriceComponent		•  X
	Usage Fee	- N X
PriceComponent Name: Component Cap:	Usage Fee	

# Participants Service Provider



**15.2. To Us.** For notices made by you to us under this Agreement and for questions regarding this Agreement or the Services, you may contact Amazon as follows:

aws@amazon.com

and/or

Amazon Web Services LLC 1200 12th Avenue South Seattle, WA 98144-2734

# © Copyright 2009 SAP AG All Rights Reserved



No part of this publication may be reproduced or transmitted in any form or for any purpose without the express permission of SAP AG. The information contained herein may be changed without prior notice.

Some software products marketed by SAP AG and its distributors contain proprietary software components of other software vendors.

Microsoft, Windows, Excel, Outlook, and PowerPoint are registered trademarks of Microsoft Corporation.

IBM, DB2, DB2 Universal Database, System i, System p, System p5, System x, System z10, System z10, z9, iSeries, pSeries, xSeries, zSeries, eServer, z/VM, z/OS, i5/OS, S/390, OS/390, OS/400, AS/400, S/390 Parallel Enterprise Server, PowerVM, Power Architecture, POWER6+, POWER6+, POWER5+, POWER5, POWER5, POWER, OpenPower, PowerPC, BatchPipes, BladeCenter, System Storage, GPFS, HACMP, RETAIN, DB2 Connect, RACF, Redbooks, OS/2, Parallel Sysplex, MVS/ESA, AIX, Intelligent Miner, WebSphere, Netfinity, Tivoli and Informix are trademarks or registered trademarks of IBM Corporation.

Linux is the registered trademark of Linus Torvalds in the U.S. and other countries.

Adobe, the Adobe logo, Acrobat, PostScript, and Reader are either trademarks or registered trademarks of Adobe Systems Incorporated in the United States and/or other countries.

Oracle is a registered trademark of Oracle Corporation.

UNIX, X/Open, OSF/1, and Motif are registered trademarks of the Open Group.

Citrix, ICA, Program Neighborhood, MetaFrame, WinFrame, VideoFrame, and MultiWin are trademarks or registered trademarks of Citrix Systems, Inc.

HTML, XML, XHTML and W3C are trademarks or registered trademarks of W3C®, World Wide Web Consortium, Massachusetts Institute of Technology.

Java is a registered trademark of Sun Microsystems, Inc.

JavaScript is a registered trademark of Sun Microsystems, Inc., used under license for technology invented and implemented by Netscape.

SAP, R/3, SAP NetWeaver, Duet, PartnerEdge, ByDesign, SAP Business ByDesign, and other SAP products and services mentioned herein as well as their respective logos are trademarks or registered trademarks of SAP AG in Germany and other countries.

Business Objects and the Business Objects logo, BusinessObjects, Crystal Reports, Crystal Decisions, Web Intelligence, Xcelsius, and other Business Objects products and services mentioned herein as well as their respective logos are trademarks or registered trademarks of Business Objects S.A. in the United States and in other countries. Business Objects is an SAP company.

All other product and service names mentioned are the trademarks of their respective companies. Data contained in this document serves informational purposes only. National product specifications may vary.

These materials are subject to change without notice. These materials are provided by SAP AG and its affiliated companies ("SAP Group") for informational purposes only, without representation or warranty of any kind, and SAP Group shall not be liable for errors or omissions with respect to the materials. The only warranties for SAP Group products and services are those that are set forth in the express warranty statements accompanying such products and services, if any. Nothing herein should be construed as constituting an additional warrant.

