

# > GETTING STARTED WITH PROGRESS® OPENEDGE® IN THE AMAZON CLOUD

Part I: Overview of Amazon Cloud Computing

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## INTRODUCTION: THE BENEFITS OF CLOUD COMPUTING

Cloud computing offers a number of significant benefits in general and in the Amazon Cloud, in particular:

- > End users of your application can access the application over the Internet at any time from any location.
- > Data associated with your application is available to end users at any time from any location. It is not bound to a single user's machine or an internal corporate machine that may not be accessible to many users.
- > There are flexible payment models. Application users don't need to purchase perpetual licenses. Instead, customers can be charged based on their usage of the application or a periodic (e.g., monthly, yearly) subscription fee.
- > The cost of capital equipment is reduced. The cloud vendor provides the infrastructure; the user just pays a subscription fee or usage charge for access to the equipment. There is also no need to maintain space for the equipment, including the associated environmental resources such as power and cooling.
- > Users have no need to maintain the infrastructure. The cloud vendor is responsible for keeping the infrastructure running and for adding or replacing hardware when appropriate.
- > Your application can execute flexibly, on a variety of systems. For example, if the current system used is becoming overloaded, the cloud vendor probably has a larger/faster machine available and can quickly and easily switch over your application. Also, as demand for your application fluctuates over time, the cloud vendor has an essentially unlimited number of machines available, allowing you to quickly and easily run a new copy of your virtual image on new machines (and to remove them if the demand drops).
- > The equipment required by application users can cost less and be less powerful. Essentially, customers simply need enough processing

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capability to access the application in the cloud, and they do not require disk storage for the information generated by your application.

The white paper “An Introduction to Cloud Computing,” the first in a series of papers published by Progress Software to help Progress® OpenEdge® customers take advantage of cloud computing, discussed these benefits. This paper focuses on how to get started using the Amazon Elastic Compute Cloud (EC2). Many cloud infrastructures are available, not just Amazon. Progress Software doesn’t endorse any cloud provider over another. We are working with the Amazon EC2 because it is both visible and popular in the marketplace. It is reasonably easy to test with and inexpensive to use. It’s also one of the more mature cloud offerings and has the tools and features that OpenEdge requires. Progress will work with other cloud providers in the future.

For customers who’ve chosen Amazon as their cloud provider, this paper gives an overview of the features and procedures for getting established on the Amazon EC2. Subsequent papers in this series will go into greater detail, starting with “Getting Started with OpenEdge in the Amazon Cloud, Part II: Your First AMI Instance.”

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***“Amazon Web Services... allows OpenEdge application developers to quickly and inexpensively deploy an application.”***

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## OVERVIEW OF AMAZON WEB SERVICES

### ***WHAT IS AMAZON CLOUD COMPUTING?***

Amazon Web Services (AWS) is a set of cloud services that enables a large variety of capabilities, from store fronts to development tools and applications ready to be used. This document focuses on Amazon’s EC2 infrastructure and how OpenEdge applications can take advantage of it.

AWS allows OpenEdge application developers to quickly and inexpensively deploy an application. Once configured, the application can be deployed in just a few minutes. Imagine selling an application and having it deployed, running, and available to your customer in less than five minutes! Or imagine being able to scale your application to handle a temporary increase in activity and then scale down your application (to save on infrastructure expenses) when activity decreases. How about deploying and managing your application while never having to worry about hardware? Or only paying for

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the infrastructure you are using with no upfront costs? These are some of the advantages of deploying your application into AWS.

What about Software as a Service (SaaS)? AWS complements the Progress OpenEdge SaaS offering, which provides usage-based licensing of selected Progress products. A SaaS-enabled OpenEdge application can be deployed and run in the Amazon cloud, as will be shown in later papers in this series.

## ***HOW AMAZON PERFORMS CLOUD COMPUTING***

Amazon offers its services to the public through the Internet using Web services. There are a number of technologies available. Having an understanding of the terminology and its capabilities is the first step to making use of Amazon.

### ***Elastic Compute Cloud (EC2)***

Amazon calls its cloud computing service *Amazon Elastic Compute Cloud*, or *EC2* for short. EC2 provides a variety of sizes of virtual machines with many different operating systems and pre-installed software such as Web servers, video encoders, document management systems, and more. Amazon EC2 is currently available in three regions: the US East, US West, and European Union (EU). The US East Region (Northern Virginia) and US West Region (Northern California) serve North America, and the EU Region (Ireland) serves Europe. Amazon has announced it will be offering an Asia-Pacific region in 2010.

Each region consists of several Availability Zones. Each Availability Zone is a physically distinct location with hardware redundancy. This allows for fault tolerance and disaster recovery for users of the EC2.

### ***Amazon Machine Image (AMI)***

Machines in EC2 run templated, preconfigured images called *Amazon Machine Images* (AMIs) and rely on Xen hypervisor virtualization. An AMI contains an operating system and, optionally, other software, such as OpenEdge, ready to be launched on demand. A variety of operating systems are available, including many that OpenEdge supports:

- > Windows Server 2003

- > Windows Server 2008
- > RedHat Linux
- > CentOS Linux

You can also create a custom AMI and add whatever software you need.

### ***Instances and AMI Bundling***

When you decide on an operating system, it determines the initial AMI that you start with. You then launch an “instance” of the AMI. Once you have a running instance, you can log in and make changes to it. For example, you could install a new application and configuration files. Once you’ve installed and configured the software you want, you can save it as a new image that includes your changes as well as the operating system.

Saving a changed instance is called *bundling* and results in a new and private (not initially available to others) AMI. This private AMI must then be “registered” with EC2, which makes the AMI available for future retrieval and activation. This customization process, including the installation of OpenEdge, your application, and your database, are covered in subsequent papers in this series.

### ***Instance Storage***

When an AMI is running, in addition to a virtual system disk, it has one or more virtual disks available to use. These disks are much like the local physical disk drives in a computer in your own data center, but with one important difference: when you shut down the running instance, their contents disappear, making them unsuitable for permanent storage for things like databases. Amazon offers several different types of permanent storage.

### ***Simple Storage Service (S3)***

The Simple Storage Service provides permanent storage for named “buckets” containing any amount of data from 1 byte to 5 Gigabytes. When you customize an AMI and save it, it will be stored in S3, as are all AMIs. You can also store other data, such as compressed database backups or an application. S3 is not suitable for database storage because objects in S3 must be read and written in their entirety.

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### ***Elastic Block Storage (EBS)***

An important feature of Amazon EC2 is Elastic Block Storage (EBS), which provides non-volatile disk storage, for example for an application's database. An EBS volume is not tied to a specific running instance like instance storage volumes are. An instance can mount one or more EBS volumes, making them available to the software in the image. You can make as many copies of a volume as you wish. You can also make point-in-time consistent snapshot copies of an in-use EBS volume. When an instance is finished using an EBS volume or the instance is shut down, the volume's contents are preserved and can be used again later. EBS volumes are well suited for use for databases.

### ***Public and Private Domain Name Service (DNS)***

Each time an AMI instance is started, it is given a new hostname and two new IP addresses, one public and one private. When an instance starts the hostname that is generated is based on its public IP address. This address is available on the Internet and, thus, to the world. The second IP address is a private address only available within the Amazon EC2 intranet. This private IP is important for fast and more economical communication with other instances in the cloud.

You can also have static IP addresses, called Elastic IP Addresses, which are associated with your Amazon account and which can be assigned to an instance and remapped when desired.

### ***Security Groups***

Amazon provides numerous mechanisms for securing your resources. Here are a few examples:

- > You can configure firewall setting in your instances.
- > You can use industry-standard IPSec VPN's to communicate with your existing IT infrastructure.
- > Digital certificates are used to authenticate access to your AMIs.
- > SSL is used to encrypt data channels to S3.

For more information, see the "Amazon Web Services: Overview of Security Process" document on Amazon's Web site.

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## GETTING STARTED IN AMAZON'S EC2

To use Amazon EC2, you must sign up for both Amazon EC2 and for Amazon S3 (the simple storage feature).

### *GETTING AN EC2 ACCOUNT*

#### ***Amazon EC2 Signup Process***

1. Using your favorite browser, go to <http://aws.amazon.com>
2. Select Amazon Elastic Compute Cloud (Amazon EC2)
3. Select the Sign Up for Amazon EC2 button at the top right of the screen
4. Follow the on-screen instructions to register for an Amazon account. Please note that you will be required to supply valid credit card information that Amazon will use to bill you for the services you use.

### *GETTING AN S3 ACCOUNT*

In order to use Amazon EC2, you must also sign up for Amazon S3. For example, the AMIs that you will likely create will need to be stored in S3.

#### ***Amazon S3 Signup Process***

1. Using your favorite browser, go to <http://aws.amazon.com>
2. Select Amazon Simple Storage Service (Amazon S3)
3. Select the Sign Up for Amazon S3 button at the top right of the screen
4. Follow the on screen instructions. Please note that you will be required to supply valid credit card information that Amazon will use to bill you for data stored in the Amazon Cloud.

After you sign up for EC2 and S3, you can obtain your Access Key identifiers (see below), and you then get started with Amazon EC2 using tools described in a later paper in the "Getting Started with OpenEdge in the Amazon Cloud" series.



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## **YOUR ACCESS KEY IDENTIFIERS**

After you sign up for Amazon EC2, you need to get Access Key identifiers to access and use your account. You do this using command line tools or the Amazon API. You may skip this step for now, but understand you will need this information for more advanced functions in the future. (We will reference this information in a later paper when it is needed.)

These keys are very important for accessing and managing your resources in the Amazon EC2 environment. They are to be protected and backed up. In addition, an account ID can be used to share your AMIs with others. Users of your AMIs can start and stop AMI instances, but the usage will be charged to their account and not to yours.

### **Access Key Identifiers Process**

1. If you have not already, log into your Amazon user account.
2. Point to the menu labeled Your Account and select the Security Credentials link on the menu that appears.
3. Click the X.509 Certificates tab. Then, click Create a New Certificate.
4. Click Download Private Key File and Download X.509 Certificates to save the certificate and private key. You'll need these to set up the command line tools.
5. Create an .ec2 (or similar) directory in your home directory of your local computer, and save these files to it with the filenames offered by your browser. You should end up with a PEM-encoded X.509 certificate and a private key file named as shown in the following examples.

Note: For Microsoft Windows, there can be no spaces in the path. For example, C:\EC2 is acceptable, but C:\My Documents\EC2 is not.

The following is an example of a PEM encoded signed X.509 certificate.

```
cert-HKZYKTNIG2ECMXYIBH3HXV4ZBZQ55CLO.pem
```

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***“After you sign up for Amazon EC2, you need to get Access Key identifiers to access and use your account.... These keys are very important for accessing and managing your resources in the Amazon EC2 environment.”***

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The following is an example of an unencrypted, PEM encoded RSA private key that corresponds to the preceding X.509 certificate.

```
pk-HKZYKTNIG2ECMXIYIBH3HXV4ZBZQ55CLO.pem
```

This X.509 certificate is associated with your account until you generate or upload a new certificate. If you have an existing certificate that you prefer to use, you can return to the **Access Key Identifiers** and upload it later.

6. You will also need your **Access Key ID** and **Secret Access Key**. These values can be found in the **Access Keys** tab/section. **Access Key ID** in this example is AIDADH4IGTRXXKCD. The Secret Access Key must be selected and will appear in a pop-up box.
7. Finally, you'll need to look up your AWS account ID. You should use this value whenever you need to provide an Amazon EC2 user ID. From the AWS portal page, point to the menu labeled **Your Account** and select the **Security Credentials** link on the menu that appears. Then, locate your **AWS Account ID** which is a hyphenated number that looks similar to 4952-1993-3132. This number, with the hyphens removed, is your AWS account ID. In this example, it is 495219933132.

## TOOLS

Amazon comes with many tools to assist you in using AWS, and developers in the network bring you even more tools!

### ***Amazon-supplied Tools and Information***

- > ***Amazon Web Services (AWS) Console***—a browser-based console for managing your infrastructure in the Amazon cloud
- > ***CloudWatch***—a utility to gather performance information on your running instances
- > ***AMIs***—preconfigured Amazon Machine Images with applications pre-installed in order to help you get started
- > ***Technical documents***—from “Getting Started” to more in-depth topics

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- > **Amazon Web Services (AWS) Community Forum**—a searchable repository with a wealth of information

### ***Tools from non-Amazon Suppliers***

- > **Elasticfox**—a Firefox plug-in like the AWS Console
- > **S3Fox Organizer**— a Firefox plug-in to manage your S3 files
- > **PuTTY**—a free implementation of Telnet and SSH for Windows and Unix platforms, along with an xterm terminal emulator
- > **scp (or PuTTY's pscp)**—Secure copy, the best way to copy or move files

Many of these tools overlap somewhat in functionality. As an example, Elasticfox duplicates the AWS Console, but it has many extra helpful tools and is more advanced than the AWS Console. In this series of papers, we will be using the AWS console. The other tools are listed for your reference should you be interested in exploring complementary tools.

### ***SUPPORT***

Amazon has several levels of support, free and paid.

Free support is available through the AWS Community Forum. There are also premium support packages—Silver and Gold—, billed monthly. Each gives you access to support personnel, and the Gold package gives you volume discounts. Please visit the Amazon Web site for details.

### ***PRICING***

Since the Amazon EC2 prices are not static and in many cases have dropped over time, we will only discuss the pricing models here. Please visit the Amazon EC2 Web site for current pricing information.

### ***Running Instances***

- > There is a charge (pennies per hour) for each running instance.
- > Prices vary by operating system and applications installed in the AMI.
- > Prices increase by instance size, more memory, CPU, and disk.

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### **AMIs**

- > There is a charge (pennies per Gigabyte) for storage of your AMIs in the Amazon S3.
- > There is a charge for any EBS disks (more on this later in this series of papers) since they are stored in the Amazon S3.

### **Networking**

- > There is a charge to upload data to and from the Amazon Cloud.
- > There is a much lower charge for data transferred between instances within the same region.
- > There is a charge to upload and download data from the S3 from/to a location outside of the Amazon Cloud.

### **Elastic IPs**

- > Are free as long as they are associated with a running instance
- > There is a slight charge per hour to reserve an Elastic IP if it is not being used.

### **Storage**

- > There is a charge (pennies per Gigabyte) for all items stored for EC2 AMIs, both “instance storage” and the EBS.
- > Snapshots (EC2 backups—to be discussed in a later paper) also incur a charge (pennies per Gigabyte)

## **NEXT STEPS**

At this point, you have a solid understanding of the Amazon EC2 and S3 and have instructions on setting up your Amazon account if you have not done so already. You are now ready to begin to work with Amazon AMIs, and ultimately to create your own AMIs that include both OpenEdge and your application. ***Please continue to Part II of this series, “Getting Started with OpenEdge in the Amazon Cloud Part II: Your First AMI Instance.”***



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## PROGRESS SOFTWARE

Progress Software Corporation (NASDAQ: PRGS) is a global software company that enables enterprises to be operationally responsive to changing conditions and customer interactions as they occur. Our goal is to enable our customers to capitalize on new opportunities, drive greater efficiencies, and reduce risk. Progress offers a comprehensive portfolio of best-in-class infrastructure software spanning event-driven visibility and real-time response, open integration, data access and integration, and application development and management—all supporting on-premises and SaaS/cloud deployments. Progress maximizes the benefits of operational responsiveness while minimizing IT complexity and total cost of ownership.

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