AWS Best Practices for Oracle PeopleSoft

December 2017

Notices

Contents

Abstract

This whitepaper covers areas that should be considered when moving Oracle PeopleSoft applications to Amazon Web Services (AWS). It helps you understand how to leverage AWS for all PeopleSoft applications including PeopleSoft Human Capital Management (HCM), Financials and Supply Chain Management (FSCM), Interactive Hub (IAH), and Customer Relationship Management (CRM).

Benefits of Running Oracle PeopleSoft on AWS

Migrating Oracle PeopleSoft applications to AWS can be simplified by leveraging a standardized architecture footprint. It is important to understand that this is not just a conversion from physical hardware to a virtualized environment. In this section we discuss key benefits of running PeopleSoft applications on AWS compared to various on-premises and Software-as-a-Service (SaaS) environments, whether virtualized or not.

Key Benefits of AWS over On-Premises

There are several key benefits to running PeopleSoft applications on AWS compared to on-premises environments:

- **Eliminate Long Procurement Cycles**: In the traditional deployment model, responding to increases in capacity, whether it be disk, CPU, or memory, can cause delays and challenges for your infrastructure team. The following diagram provides an overview of a typical client IT procurement cycle. Each step is time-sensitive and requires large capital outlays and multiple approvals. This process must be repeated for each change/increase in infrastructure, which can compound costs and cause significant delays. With AWS, resources are available as needed within minutes of you requesting them.
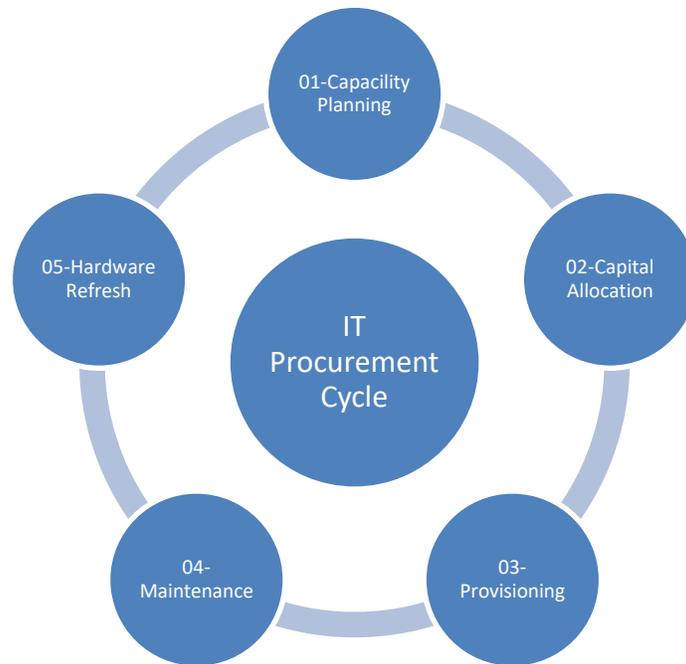
- **Moore's Law:** With an on-premises environment, you end up owning hardware that depreciates in value every year. You cannot simply add and remove computing capacity on demand. You're generally locked into the price and capacity of the hardware that you have acquired, as well as the resulting hardware support costs. With AWS, you can change the underlying infrastructure as new capabilities and configurations become available.

- **Right Size Anytime:** Often you end up oversizing your on-premises environments to anticipate potential capacity needs or to address development and quality assurance (QA) needs early on in the project cycle. With AWS, you can adjust capacity to match your current needs with ease. Since you pay only for the services you use, you save money during all phases of the software deployment cycle.

- **Resiliency:** On-premises environments require an extensive set of hardware, software, and network monitoring tools. Failures must be handled on a case-by-case basis. You must procure and replace failed equipment and correct software and configuration issues. Key components of PeopleSoft must be replicated and managed. With AWS, you can leverage Elastic Load Balancing (ELB), Auto Recovery for Amazon Elastic Compute Cloud (Amazon EC2), and Multi-[Availability

[Zone (AZ)](#) capabilities to build a highly tolerant and resilient system with the highest service level agreement (SLA) available.

- **Disaster Recovery**: Traditional disaster recovery (DR) solutions require immense upfront expenditures and are not easily scalable. AWS offers built-in disaster recovery solutions to execute your business data continuity plans at lower comparative costs, which allows you to benefit from an on-demand model while always having the optimal amount of data redundancy.

- **Incidental Data Center Costs:** With an on-premises environment you typically pay hardware support costs, virtualization licensing and support, data center operational costs, and more. All of these costs can be eliminated or reduced by leveraging AWS.

- **Testing:** Even though testing is recommended prior to any PeopleSoft application or environment change, few perform any significant testing after the initial application launch, due to the expense and the unavailability of the required environment. With AWS, you can easily and quickly create and use a test environment, thus eliminating the risk of discovering functional, performance, or security issues in production. Again, you are charged only for the hours the test environment is used.

- **Hardware:** All hardware platforms have end-of-life (EOL) dates, at which point the hardware is no longer supported, and you are forced to replace it or face enormous maintenance costs. With AWS, you can simply upgrade platform instances to new AWS instance types with a single click at no cost for the upgrade.

- **High Availability:** High availability for critical applications is a major factor in corporate decisions to choose the AWS Cloud. With AWS you can achieve a 99.95% uptime by placing your data and your applications in multiple Availability Zones (locations). Your critical data synchronously replicates to standby instances automatically and recovers automatically. This automation allows AWS to achieve better performance than the average SLA of other data centers. With additional investment and infrastructure design, uptime could approach 99.99%.

- **Unlimited Environments:** On-premises environments are rigid and take too long to provision. For example, if a performance issue is found in production, it takes time to provision a test environment with an identical configuration to the production environment. On AWS you can

create the test environment and clone your production database quickly and easily.

Key Benefits of AWS over SaaS

There are several key benefits to deploying PeopleSoft applications on AWS compared to using a SaaS solution:

- **Lower Total Cost of Ownership (TCO):** If you already use PeopleSoft you do not have to purchase new licenses or take the risks associated with re-implementing your applications—you can just move your existing implementation to AWS. If you are a new customer, the TCO may still be lower when taking monthly SaaS fees into account.

- **Security:** On AWS, PeopleSoft can be deployed in a virtual private cloud (VPC) created using the Amazon Virtual Private Cloud service. Your VPC can be connected to your on-premises data centers using [AWS Direct Connect](), bypassing the public internet. Using AWS Direct Connect, you can assign private IP addresses to your PeopleSoft instances as if they were on your internal network. By contrast, SaaS must be accessed over the public internet, making it less secure and requiring a bigger integration effort.

- **Unlimited Usage:** SaaS applications have governor/platform limits to accommodate their underlying multitenant architecture. Governor limits restrict everything from the number of API calls and transaction times to data sets and file sizes. With the AWS Cloud, you can provision and use as much capacity as needed and pay only for what you use.

- **Elastic Compute Capacity:** SaaS products typically use a multitenant architecture that ties you to a specific instance and the limits of that instance. With AWS, you can provision as much or as little compute capacity as you need.

- **Application Features and Functions:** PeopleSoft lets you manage everything from Financials to the Human Capital Management Interactive Hub within the associated application pillar. Many SaaS solutions require multiple applications that you must purchase and integrate, even if they come from the same vendor. It is easy to overlook the cost of integration in the application buying decision. Running PeopleSoft with its rich, integrated functionality on AWS avoids this cost.

Amazon Web Services Concepts

Understanding the various AWS services and how they can be leveraged will allow you to deploy secure and scalable Oracle PeopleSoft applications, no matter if your organization has 10 users or 100,000 users.

Regions and Availability Zones

An AWS Region is a physical location in the world. Each Region is a separate geographic area isolated from the other Regions. Regions provide you the ability to place resources, such as Amazon Elastic Compute Cloud (Amazon EC2) instances, and data in multiple locations. Resources aren't replicated across Regions unless you do so specifically.

An AWS account provides multiple Regions so that you can launch your application in locations that meet your requirements. For example, you might want to launch your application in Europe to be closer to your European customers or to meet legal requirements.

Each Region has multiple, isolated locations known as Availability Zones. Each Availability Zone runs on its own physically distinct, independent infrastructure, and is engineered to be highly reliable. Common points of failure, such as generators and cooling equipment, are not shared across Availability Zones. Because Availability Zones are physically separate, even extremely uncommon disasters such as fires, tornados or flooding would only affect a single Availability Zone. Each Availability Zone is isolated, but the Availability Zones in a Region are connected through low-latency links. The following diagram illustrates the relationship between Regions and Availability Zones.
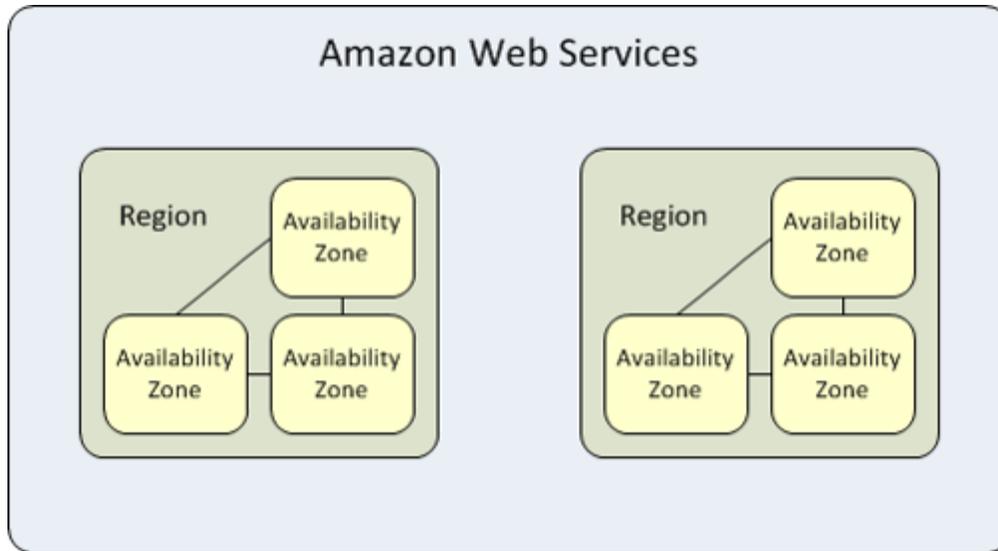
Figure 1: Relationship between AWS Regions and Availability Zones

The following figure shows the Regions and the number of Availability Zones in each Region provided by an AWS account at the time of this publication. For the most current list of Regions and Availability Zones, see https://aws.amazon.com/about-aws/global-infrastructure/.

Note that you can't describe or access additional Regions from the AWS GovCloud (US) Region or China (Beijing) Region.
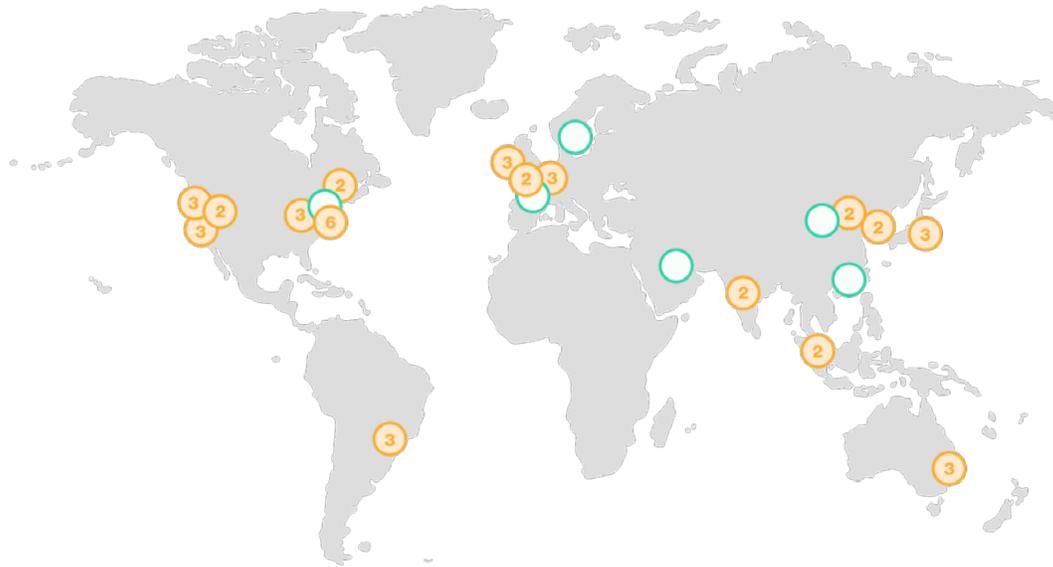
**Region & Number of Availability Zones**

US East
N. Virginia (6), Ohio (3)

US West
N. California (3), Oregon (3)

Asia Pacific
Mumbai (2), Seoul (2), Singapore (2), Sydney (3), Tokyo (3)

Canada
Central (2)

China
Beijing (2)

Europe
Frankfurt (3), Ireland (3), London (2)

South America
São Paulo (3)

AWS GovCloud (US-West) (2)

New Region (coming soon)

Bahrain

China

France

Hong Kong

Sweden

AWS GovCloud (US-East)

Figure 2: Map of AWS Regions and Availability Zones

Amazon Elastic Cloud Compute

Amazon Elastic Compute Cloud (Amazon EC2) is a web service that provides resizable compute capacity in the cloud, billed by the hour. You can run virtual machines with various compute and memory capacities. You have a choice of operating systems including different versions of Windows Server and Linux.

Amazon Relational Database Service

Amazon Relation Database Service (Amazon RDS) makes it easy to set up, operate, and scale a relational database in the cloud. It provides cost-efficient and resizable capacity while managing time-consuming database administration tasks, allowing you to focus on your applications and business. For PeopleSoft, both Microsoft SQL Server and Oracle Databases are available.

Elastic Load Balancing

Elastic Load Balancing (ELB) automatically distributes incoming application traffic across multiple EC2 instances in the cloud. It enables you to achieve greater levels of fault tolerance in your applications, seamlessly providing the required amount of load balancing capacity needed to distribute application traffic. ELB can be used for load balancing web server traffic.

Amazon Elastic Block Store
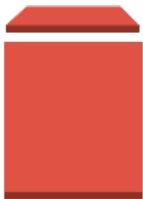
Amazon Elastic Block Store (Amazon EBS) provides persistent block level storage volumes for use with EC2 instances in the AWS Cloud. Each EBS volume is automatically replicated within its Availability Zone to protect you from component failure, offering high availability and durability. EBS volumes offer the consistent and low-latency performance needed to run your workloads.

Amazon Machine Image

An Amazon Machine Image (AMI) is simply a packaged-up environment that includes all the necessary bits to set up and boot your EC2 instance. AMIs are your unit of deployment. Amazon EC2 uses Amazon EBS and Amazon S3 to provide reliable, scalable storage of your AMIs so that we can boot them when you ask us to do so.

Amazon Simple Storage Service
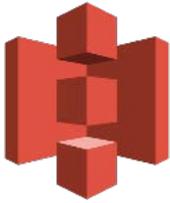
Amazon Simple Storage Service (Amazon S3) provides developers and IT teams with secure, durable, highly-scalable object storage. Amazon S3 is easy to use, with a simple web services interface to store and retrieve any amount of data from anywhere on the web. With Amazon S3, you pay only for the storage you actually use. There is no minimum fee and no setup cost.

Amazon Route 53

Amazon Route 53 is a highly available and scalable cloud Domain Name System (DNS) web service. It is designed to give developers and businesses an extremely reliable and cost-effective way to route end users to internet applications.

Amazon Virtual Private Cloud

Amazon Virtual Private Cloud (Amazon VPC) lets you provision a logically isolated section of the AWS Cloud where you can launch resources in a virtual network that you define. You have complete control over your virtual networking environment, including selection of your own private IP address range, creation of subnets, and configuration of route tables and network gateways. You can leverage multiple layers of security, including security groups and network access control lists, to help control access to EC2 instances in each subnet. Additionally, you can create a Hardware Virtual Private Network (VPN) connection between your corporate data center and your VPC and leverage the AWS Cloud as an extension of your corporate data center.

AWS Direct Connect
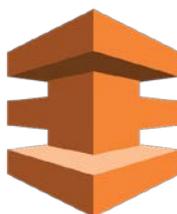
AWS Direct Connect is a network service that provides an alternative to using the internet to utilize AWS cloud services. Using AWS Direct Connect, you can establish private dedicated network connectivity between AWS and your data center, office, or colocation environment, which in many cases can reduce your

network costs, increase bandwidth throughput, and provide a more consistent network experience than internet-based connections.

AWS CloudFormation

AWS CloudFormation gives developers and systems administrators an easy way to create and manage a collection of related AWS resources, provisioning and updating them in an orderly and predictable fashion. You can leverage AWS CloudFormation to quickly provision your PeopleSoft environments, as well as to quickly create and update your infrastructure. You can create your own CloudFormation templates to describe the AWS PeopleSoft resources, and any associated dependencies or runtime parameters required to run them. You don't need to figure out the order for provisioning AWS services or the subtleties of making those dependencies work—AWS CloudFormation takes care of this for you. After your resources are deployed, you can modify and update them in a controlled and predictable way, in effect applying version control to your AWS infrastructure the same way you do with your traditional software.

You can deploy and update a template and its associated collection of resources (called a stack) by using the AWS Management Console, AWS Command Line Interface, or APIs. AWS CloudFormation is available at no additional charge, and you pay only for the AWS resources needed to run your applications.

Oracle PeopleSoft and Database Licensing on AWS

Oracle PeopleSoft and Database License Portability

Most Oracle software licenses are fully portable to AWS, including Enterprise License Agreement (ELA), Unlimited License Agreement (ULA), Business Process Outsourcing (BPO), and Oracle Partner Network (OPN). You can use your existing Oracle PeopleSoft and Oracle Database licenses on AWS just like you would use them on-premises; however, you should read your Oracle contract for specific information, and consult with a knowledgeable Oracle licensing expert when in doubt.

Amazon RDS for Oracle Licensing Models

You can run Amazon RDS for Oracle under two different licensing models: "License Included" (LI) and "Bring-Your-Own-License (BYOL)". In the LI model, you do not need to separately purchase Oracle licenses, as the Oracle Database software has been licensed by AWS.

If you already own Oracle Database licenses, you generally can use the BYOL model to run Oracle databases on Amazon RDS. The BYOL model is designed for customers who prefer to use existing Oracle Database licenses or purchase new licenses directly from Oracle.

Best Practices for Deploying Oracle PeopleSoft on AWS

The following architecture diagram illustrates how PeopleSoft Pure Internet Architecture (PIA) can be deployed on AWS. You can deploy your PeopleSoft web, application, and process scheduler servers and the PeopleSoft database across multiple Availability Zones for high availability of your application.
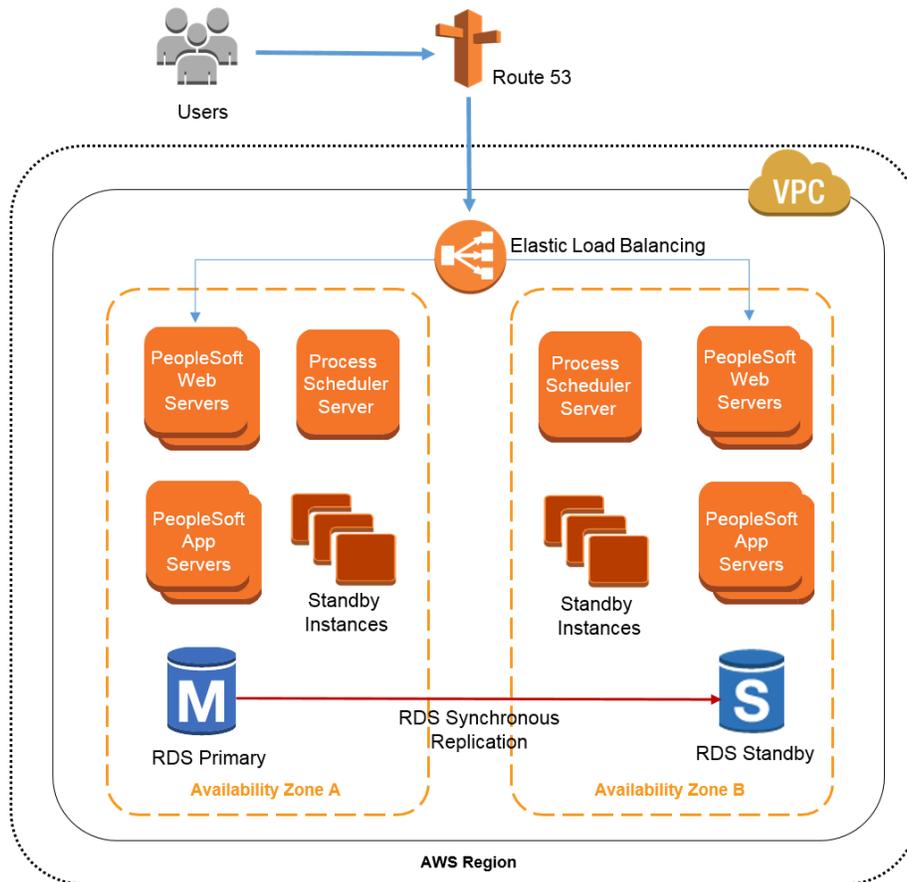
Figure 3: Sample PeopleSoft Pure Internet Architecture deployment on AWS

Traffic Distribution and Load Balancing

Use Amazon Route 53 DNS to direct users to PeopleSoft hosted on AWS. Use Elastic Load Balancing to distribute incoming traffic across your web servers deployed in multiple Availability Zones. The load balancer serves as a single point of contact for clients, which enables you to increase the availability of your application. You can add and remove PeopleSoft web server instances from your load balancer as your needs change without disrupting the overall flow of information. Elastic Load Balancing ensures that only healthy web server instances receive traffic. If a web server instance fails, Elastic Load Balancing automatically reroutes the traffic to the remaining running web server instances. If a failed web server instance is restored, Elastic Load Balancing restores the traffic to that instance.

The PeopleSoft web servers will load balance the requests among the PeopleSoft application servers; if a PeopleSoft application server fails the requests are routed to another available PeopleSoft application server. PeopleSoft application server load balancing and failover can be configured in the PeopleSoft configuration.properties file. Please refer to the [PeopleSoft Documentation](#) for more information on configuring PeopleSoft application server load balancing and failover.

Use Multiple Availability Zones for High Availability

Each Availability Zone is isolated from other Availability Zones and runs on its own physically distinct, independent infrastructure. The likelihood of two Availability Zones experiencing a failure at the same time is relatively small, and you can spread your PeopleSoft web, application, and process scheduler servers across multiple Availability Zones to ensure high availability of your application.

In the unlikely event of failure of one Availability Zone, user requests are routed by Elastic Load Balancing to the web server instances in the second Availability Zone, and the PeopleSoft web servers will failover their requests to PeopleSoft application server instances in the second Availability Zone. This ensures that your application continues to remain available in the unlikely event of an Availability Zone failure.

In addition to the PeopleSoft web and application servers, the PeopleSoft database on Amazon RDS can be deployed in a Multi-AZ configuration. Multi-AZ deployments provide enhanced availability and durability for Amazon RDS DB instances, making them a natural fit for production database workloads. When you provision a Multi-AZ DB instance, Amazon RDS automatically creates a primary DB instance and synchronously replicates the data to a "standby" instance in a different Availability Zone. In case of an infrastructure failure (for example, instance hardware failure, storage failure, or network disruption), Amazon RDS performs an automatic failover to the "standby" instance. Since the endpoint for your DB instance remains the same after a failover, your application can resume database operations as soon as the failover is complete without the need for manual administrative intervention.

See [Configuring Amazon RDS as an Oracle PeopleSoft Database](#) to learn how to set up Amazon RDS for Oracle as the database backend of your PeopleSoft application.

You can use the Amazon EC2 Auto Recovery feature to recover failed PeopleSoft web, application, and process scheduler server instances in case of failure of the underlying host. When using Amazon EC2 Auto Recovery, several system status checks monitor the instance and the other components that need to be running in order for your instance to function as expected. Among other things, the system status checks look for loss of network connectivity, loss of system power, software issues on the physical host, and hardware issues on the physical host. If a system status check of the underlying hardware fails, the instance will be rebooted (on new hardware if necessary) but will retain its instance ID, IP address, Elastic IP addresses, EBS volume attachments, and other configuration details.

Scalability

When using AWS you can scale your application easily due to the elastic nature of the cloud. You can scale up the PeopleSoft web, application, and process scheduler servers simply by changing the instance type to a larger instance type.

For example, you can start with an r4.large instance with 2 vCPUs and 15 GiB RAM and scale up all the way to an x1.32xlarge instance with 128 vCPUs and 1,952 GiB RAM. After selecting a new instance type, only a restart is required for the changes to take effect. Typically, the resizing operation is completed in a few minutes, the EBS volumes remain attached to the instances, and no data migration is required.

For your PeopleSoft database deployed on Amazon RDS, you can scale the compute and storage independently. You can scale up the compute simply by changing the DB instance class to a larger DB instance class. This modification typically takes only a few minutes and the database will be temporarily unavailable during this period. You can increase the storage capacity and IOPS provisioned for your database without any impact on database availability.

You can scale out the web and application tier by adding and configuring more instances when required. You can launch a new EC2 instance in a few minutes. However, additional work is required to configure the new web and application tier instance. Although it might be possible to automate the scaling out of the web and application tier using scripting, this requires an additional technical investment. A simpler alternative might be to use stand by instances as explained in the next section.

Standby Instances

To meet extra capacity requirements, additional instances of PeopleSoft web and application servers can be pre-installed and configured on EC2 instances. These standby instances can be shut down until extra capacity is required. Charges are not incurred when EC2 instances are shut down—only EBS storage charges are incurred. At the time of this publication, EBS General Purpose volumes are priced at $0.10 per GB per month in the US East (Ohio) Region. Therefore, for an EC2 instance with 120 GB hard disk drive (HDD) space the storage charge is only $12 per month. These pre-installed standby instances provide you the flexibility to use these instances for meeting additional capacity needs as and when required.

Amazon VPC Deployment and Connectivity Options

Amazon VPC provides you with several options for connecting your AWS virtual networks with other remote networks securely.

If your users are primarily accessing the PeopleSoft application from an office or on premises, you can use a hardware IPsec VPN connection or AWS Direct Connect to connect to the on-premises network and Amazon VPC. If they're accessing the application from outside the office (e.g., a sales rep or customer accesses it from the field or from home) you can use a Software appliance-based VPN connection over the internet. Please refer to the [Amazon Virtual Private Cloud Connectivity Options](#) whitepaper for detailed information.

Disaster Recovery and Cross Region Deployment

Even though a single Region architecture with multi Availability Zone deployment might suffice for most use cases, some customers might want to consider a multi-Region deployment for disaster recovery (DR) depending on business requirements. For example, there might be a business policy that mandates that the disaster recovery site should be located a certain distance away from the primary site.

Cross-Region deployments for DR should be designed and validated for specific use cases based on customer uptime needs and budget. The following diagram depicts a typical PeopleSoft deployment across Regions that addresses both high availability and DR requirements.
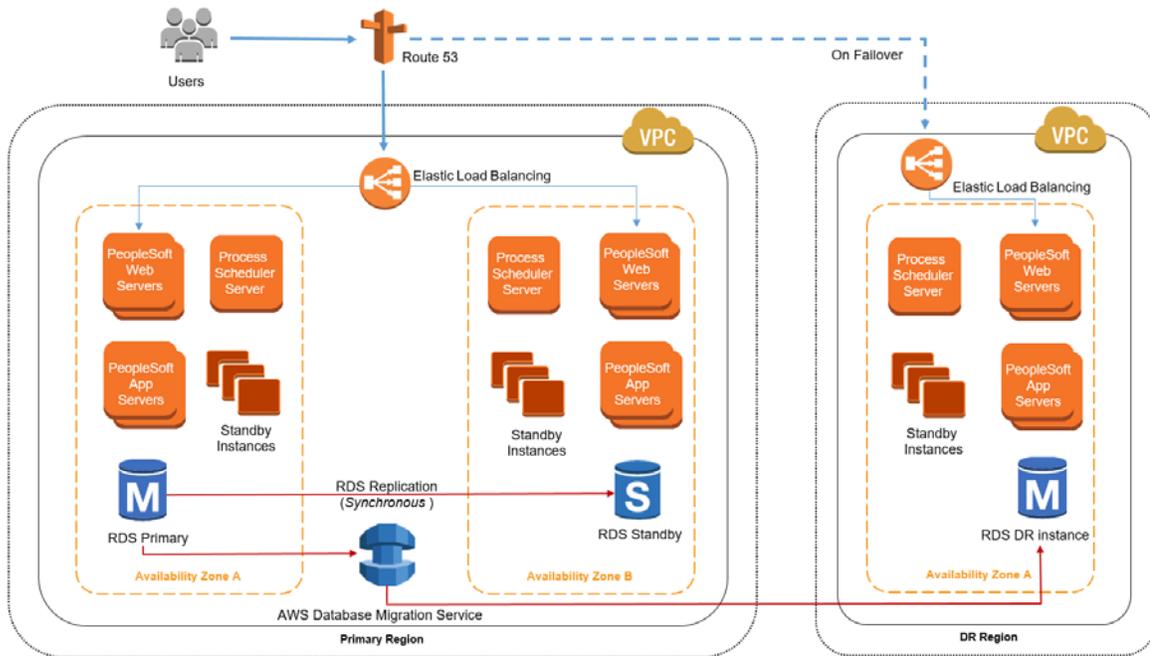

Figure 4: Sample PeopleSoft cross Region deployment on AWS

The users are directed to the PeopleSoft application in the primary Region using Amazon Route 53. In case the primary Region is unavailable due to a disaster, failover is initiated, and the users will be redirected towards the PeopleSoft application deployed in the DR Region. The primary database is deployed on Amazon RDS for Oracle in a Multi-AZ configuration. AWS Database Migration Service (AWS DMS), in continuous data replication mode, is used to replicate the data from the RDS instance in the primary Region to another RDS instance in the DR Region. Note that AWS DMS can replicate only the data, not the database schema changes. The database schema changes in the RDS DB instance in the primary Region should be applied separately to the RDS DB instance in the DR Region. This could be done while patching or updating the PeopleSoft application in the DR Region.

Deploying the Database on Amazon EC2 Instances

While Amazon RDS is the recommended option for deploying the PeopleSoft database, there could be some scenarios where Amazon RDS might not be suitable. For example, Amazon RDS might not be suitable if the database size is larger than 6 TB, which is the current limit for Amazon RDS for Oracle. In such scenarios, you can install the PeopleSoft database on Oracle on EC2 instances and configure Oracle Data Guard replication for high availability and DR as shown in the following figure.
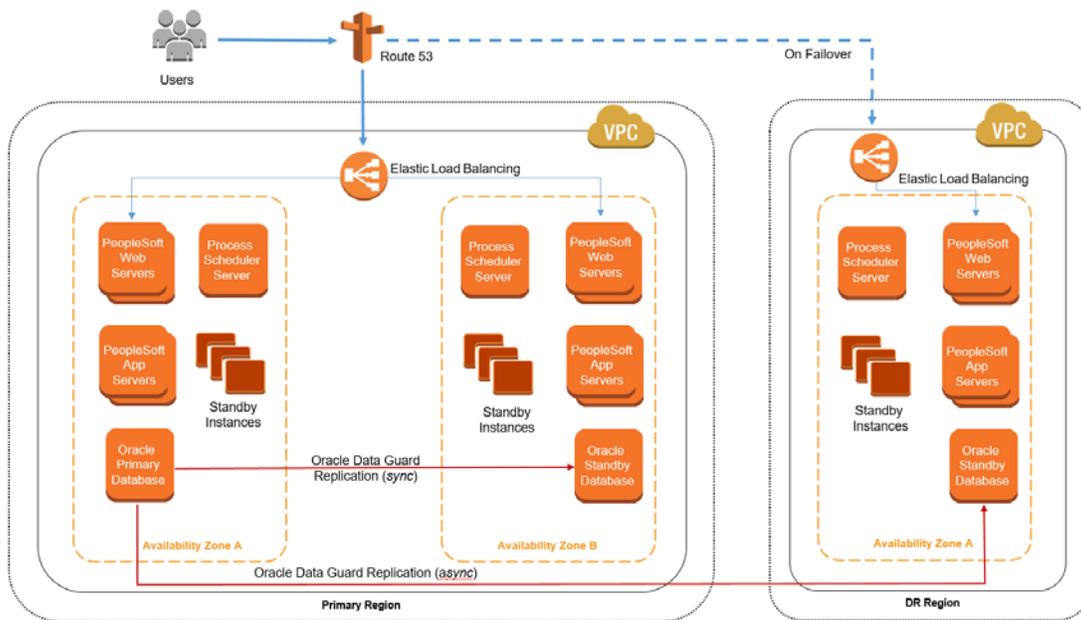
Figure 5: Sample multi-Region deployment with Oracle on Amazon EC2

In this DR scenario, the database is deployed on Oracle running on EC2 instances. Oracle Data Guard replication is configured between the primary database and two standby databases. One of the two standby databases is 'local' (for synchronous replication) in another Availability Zone in the primary Region. The other is a 'remote' standby database (for asynchronous replication) in the DR Region.

In case of failure of the primary database, the 'local' standby database is promoted as the primary database and the PeopleSoft application will connect to it. In the extremely unlikely event of a Region failure or unavailability, the 'remote' standby database is promoted as the primary database and users are redirected to PeopleSoft application in the DR Region using Route 53.

For more details on deploying Oracle Database with Data Guard replication on AWS please see the Oracle Database on AWS Quick Start.

Refer to this AWS whitepaper to learn more about using AWS for Disaster Recovery.

Disaster Recovery on AWS with Production On-Premises

You can use AWS to deploy DR environments for PeopleSoft applications running on-premises. In this scenario, the production environment remains on-premises, but the DR environment is deployed on AWS. If the production environment fails, a failover is initiated and users of your application are redirected to the PeopleSoft application deployed on AWS. The process is fairly simple and involves the following major steps:

1. Set up connectivity between the on-premises data center and AWS using VPN or AWS Direct Connect.

2. Install PeopleSoft web, application, and process scheduler servers on AWS.

3. Install the secondary database on AWS and configure Oracle Data Guard replication between the on-premises production database and the secondary database on AWS. Alternatively instead of Oracle Data Guard, you could use the AWS Database Migration Service (AWS DMS) in continuous data replication mode for replicating the on-premises production database to the secondary database on AWS. AWS DMS can replicate only the data, not the database schema changes. The database schema changes in the on-premises production database should be applied separately to the secondary database on AWS. This could be done while patching or updating the PeopleSoft application on AWS.

4. If the on-premises production environment fails, initiate a failover and redirect your users to the PeopleSoft application on AWS.

AWS Security and Compliance

The AWS Cloud security infrastructure has been architected to be one of the most flexible and secure cloud computing environments available today. Security on AWS is very similar to security in your on-premises data center—but without the costs and complexities involved in protecting facilities and hardware. AWS provides a secure global infrastructure, plus a range of features that you can use to help secure your systems and data in the cloud. To learn more about AWS Security, visit the [AWS Security Center](#).

AWS Compliance enables customers to understand the robust controls in place at AWS to maintain security and data protection in the cloud. AWS engages with external certifying bodies and independent auditors to provide customers with extensive information regarding the policies, processes, and controls established and operated by AWS. To learn more about AWS Compliance, visit the [AWS Compliance Center](#).

The AWS Security Model

The AWS infrastructure has been architected to provide an extremely scalable, highly reliable platform that enables you to deploy applications and data quickly and securely.

Security in the cloud is slightly different than security in your on-premises data centers. When you move computer systems and data to the cloud, security responsibilities become shared between you and your cloud service provider. In this case, AWS is responsible for securing the underlying infrastructure that supports the cloud, and you are responsible for securing workloads that you deploy in AWS. This shared security responsibility model can reduce your operational burden in many ways, and gives you the flexibility you need to implement the most applicable security controls for your business functions in the AWS environment.
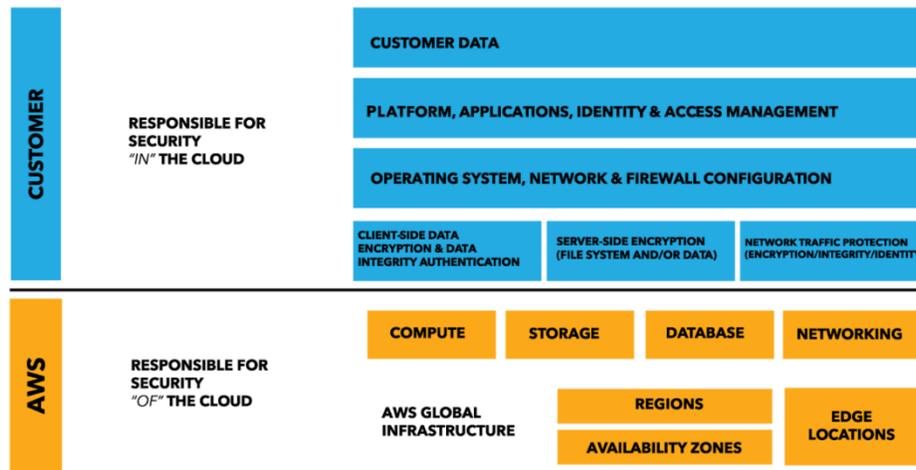
Figure 6: The AWS shared responsibility model

It's recommended that you take advantage of the various security features AWS offers when deploying PeopleSoft applications on AWS. Some of them are listed in the following discussion.

AWS Identity and Access Management

With AWS Identity and Access Management (IAM), you can centrally manage users, security credentials such as passwords, access keys, and permissions policies that control which AWS services and resources users can access. IAM supports multifactor authentication (MFA) for privileged accounts, including options for hardware-based authenticators and support for integration and federation with corporate directories to reduce administrative overhead and improve end-user experience.

Monitoring and Logging

AWS CloudTrail is a service that records AWS API calls for your account and delivers log files to you. The recorded information includes the identity of the API caller, the time of the API call, the source IP address of the API caller, the request parameters, and the response elements returned by the AWS service. This provides deep visibility into API calls, including who, what, when, and from where calls were made. The AWS API call history produced by CloudTrail enables security analysis, resource change tracking, and compliance auditing.

Network Security and Amazon Virtual Private Cloud

You create one or more subnets within each VPC. Each instance launched in your VPC is connected to one subnet. Traditional layer 2 security attacks, including MAC spoofing and ARP spoofing, are blocked. You can configure network ACLs, which are stateless traffic filters that apply to all inbound or outbound traffic, from a subnet within your VPC.

These ACLs can contain ordered rules to allow or deny traffic based on IP protocol, by service port, as well as source/destination IP address.

Security groups are a complete firewall solution enabling filtering on both ingress and egress traffic from an instance. Traffic can be restricted by any IP protocol, by service port, as well as source/destination IP address (individual IP or classless inter-domain routing (CIDR) block).

Data Encryption

AWS offers you the ability to add a layer of security to your data at rest in the cloud, by providing scalable and efficient encryption features. Data encryption capabilities are available in AWS storage and database services, such as Amazon EBS, Amazon S3, Amazon Glacier, Amazon RDS for Oracle, Amazon RDS for SQL Server, and Amazon Redshift. Flexible key management options allow you to choose whether to have AWS manage the encryption keys using the AWS Key Management Service o (AWS KMS) or to maintain complete control over your keys. Dedicated, hardware-based cryptographic key storage options (AWS CloudHSM) are available to help you satisfy compliance requirements.

For more information, see the following AWS whitepapers:

[Introduction to AWS Security](#)

[AWS Security Best Practices](#)

Migration Scenarios and Best Practices

Each customer could potentially have a different migration scenario. This section covers some of the most common scenarios.

Migrate Existing Oracle PeopleSoft Environments to AWS

This is most suitable if you are on a recent release of PeopleSoft. You should design your AWS deployment based on the best practices in this whitepaper.

Oracle PeopleSoft Upgrade

You can leverage AWS as the upgrade environment to keep the PeopleSoft upgrade costs to a minimum. In the end, you have the option to leverage this new environment for test and development only, or you can choose to migrate your entire PeopleSoft environment to AWS. Either way, it's a win for you as the overall TCO can be reduced.

Performance Testing

AWS enables you to test your PeopleSoft applications during initial deployments or upgrades with minimal cost because you are only charged for the resources you use when the tests run. This enables more consistent, repeatable testing for PeopleSoft upgrades and updates, which can be budgeted on a predictable basis depending upon your normal need cycles.

Oracle PeopleSoft Test and Development Environments on AWS

The flexibility and pay-as-you-go nature of AWS makes it compelling for setting up test and development environments, whether to try out AWS prior to a migration, or just for additional test and development environments if the migration of the production environment is not imminent.

Disaster Recovery on AWS

You may want to set up a disaster recovery (DR) environment for your existing PeopleSoft applications on AWS, even if your production environment is still on premises. This can be done at a much lower cost than setting up a traditional DR environment.

Training Environments

By leveraging the ability to replicate the production environment, you can quickly provision a training environment for short-term use and train your

employees using the most current version of production. After training has been completed, these instances can be terminated to save money.

Monitoring and Infrastructure

After migration of your PeopleSoft application to AWS, you can continue to use the monitoring tools you are familiar with for monitoring your PeopleSoft application.

You can use PeopleSoft Performance Monitor to monitor the performance of your PeopleSoft environment. You can collect real-time resource utilization metrics from your web servers, application servers, and PeopleSoft Process Scheduler servers as well as key metrics on PeopleTools runtime execution, such as SQL statements and PeopleCode events. Optionally, you can use Oracle Enterprise Manager for monitoring your PeopleSoft environment by installing the PeopleSoft Enterprise Environment Management Plug-in.

You can also use Amazon CloudWatch to monitor AWS Cloud resources and the applications you run on AWS. Amazon CloudWatch enables you to monitor your AWS resources in near real-time, including Amazon EC2 instances, Amazon EBS volumes, ELB load balancers, and Amazon RDS DB instances. Metrics such as CPU utilization, latency, and request counts are provided automatically for these AWS resources. You can also supply your own logs or custom application and system metrics, such as memory usage, transaction volumes, or error rates, and Amazon CloudWatch will monitor these as well.

You can use the Enhanced Monitoring feature of Amazon RDS to monitor your PeopleSoft database. Enhanced Monitoring gives you access to over 50 metrics, including CPU, memory, file system, and disk I/O. You can also view the processes running on the DB instance and their related metrics, including percentage of CPU usage and memory usage.

Conclusion

By deploying PeopleSoft applications on the AWS Cloud, you can reduce costs and simultaneously enable capabilities that might not be possible or cost-effective if you deployed your application in an on-premises data center. The following benefits of deploying PeopleSoft application on AWS were discussed:

- Low cost – Resources are billed by the hour and only for the duration they are used.

- Capex to Opex – Change from Capex to Opex to eliminate the need for large capital outlays.

- High availability – Achieve high availability of 99.95% or more by deploying PeopleSoft in a Multi-AZ configuration.

- Flexibility –Add compute capacity elastically to cope with demand.

- Testing – Add test environments and use them for short durations.

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