Projects :

E-Billing Solutions

Company profile:

E-Billing Solutions or EBS (www.ebs.in) is India's second largest payment gateway. EBS is the first Indian merchant account provider to achieve the PCI DSS Level 1 Standards of Compliance.E-Billing Solutions part of Ingenico was incorporated in 2005 by young entrepreneurs who came together to offer a comprehensive and easy solution for the e-commerce industry. After exhaustive research on the requirements for e-commerce, EBS developed a product which changed how e-businesses operate.

EBS has pioneered as an associate with multiple acquiring Banks and other entities to provide payment services via credit/debit cards, net-banking e-wallets, cash cards on a single platform.

Project goals :

E-Billing solutions serves thousands of e-commerce merchants. It is very important that the web service be available at all times and also able to scale to thousands of concurrent users. Thus, High Availability and Scalability are of paramount importance to EBS. Apart from the goals of High Availability(HA) and Scalability, Disaster Recovery (DR) was also of paramount importance. So, the service had to be available even if the primary data centre went offline for any reason.

Another important goal was that of security. Since EBS deal with credit card data and since all service that deal with credit card data need to be compliant with Payment Card Industry-Data Security Standards (PCI-DSS), all infrastructure need to be setup with this in mind.

It was also important that the project be designed with the budgets that the client had in mind. A solution had to be designed to satisfy the requirements of the client while staying within budget.

Project Solution :

Given that the main goals of the project are High Availability, Scalability, Disaster Recovery and PCI-CSS grade security, we arrived at the right solution. Amazon Web Services (AWS) was chosen as the solution of choice of the project. Since AWS Elastic Compute Cloud (EC2) service does not have a point of presence (POP) in India, the Singapore location was chosen as the EC2 region of choice.

High Availability (HA)

EBS's HA goals were realised by reducing the number of single points of failures by adding sufficient redundancy in all places where possible. This goal was achieved using the following:

- Redundant HTTPS load balancers
- Redundant Application Servers (Ahache+PHP)
- MySQL in Master + Slave configuration
- MySQL circular replication from India to Singapore and back to India
- Multiple external monitoring services were deployed (Site24x5, Wormly)

Scalability

EBS is a fast browning company that adds additional merchants everyday. This grown needs to be sustained by both vertical and horizontal scaling.

- Multiple MySQL slaves for generating reports from. Only writes and some reads are done from master database instance
- Easy to add additional Application servers
- Easy to add multiple load balancers with round robin DNS
- All static content (HTML, images, Javascript, CSS) moved to Amazon S3, front-ended by Amazon's CDN Cloud Front

Disaster Recovery

Since thousands of merchants depend on EBS for their online transactions to take place, it is very important that EBS continue to operate even if they are down from their primary data centre in India. This was the main goal of this project.

We went with creating a near replica of the existing setup of the primary DC in India. It is a standard 3-tier architecture based web service. There are load balancers, application servers and database servers in each tier. Amazon Virtual Private Cloud (VPC) was used, keeping only the load balancer, staging server and SSH gateway server in the public subnet. All other servers, mainly the application server and the database servers were designed to be in the private subnet.

The primary data centre in India is the data source for the MySQL instances in the DR site. Using standard MySQL replication over SSH tunnelling for security, MySQL replication from India master MySQL instance, data was sourced for the Singapore DR site's master instance. With a lag of 2-3 seconds, data is fairly up-to-date.

SSL certificates are already setup in the load balancers so that EBS's service can switch from India to Singapore at any point in time just by switching the DNS records.

Security

Since EBS's has to be compliant with the PCI-DSS standards, security is of paramount importance.

- Amazon's VPC was used to implement a near private cloud setup
- Critical services were running in a private subnet
- All servers had just one, well defined function
- All authentication allowed only via the SSH gateway server with SSH keys
- Password logins not allowed to the SSH gateway severs
- Strict policy on the services that each server is running
- Strict password expiration policies
- Stringent firewall rules specifically designed for each host

Cloud Technologies used

EC2, VPC, Security Groups, Elastic Block Storage, S3, Elastic IPs, Cloud Front, Route 53, Cloud Watch, SES

MerchantRMS, Inc

Company profile :

MerchantRMS (www.merchantrms.com) is a Risk Management System (RMS) for merchants who are involved in e-commerce. MerchantRMS is one of the leading companies in the world to provide Risk Management for credit card and debit card transactions in Card Not Present (CNP) transactions. With clients all over the world. MerchantRMS is a Software-as-a-Service (SaaS) model based company headquartered in Canada. Some of the world's largest airlines, luxury good sellers, electronics good sellers, travel and tourism operators depend on MerchantRMS to fight credit card fraud.

Project goals :

High Availability and Scalability were one of the main goals we were trying to achieve for this project. Reason being that MerchantRMS is a SaaS model provider and thousands of merchants depend on MerchantRMS to fight credit fraud, which is a constant threat. Disaster Recovery is also an important goal of this project, apart from the goals of High Availability(HA) and Scalability. The goal was that the service had to be running at all times no matter from which Availability Zone it was working from.

MerchantRMS is a PCI-DSS compliant service, so security was also another goal that was to be achieved. While designing the infrastructure, this had to be kept in mind.

MerchantRMS business model was charging per transaction and to scale as the company grew by adding more and more merchants. It was very important to stay within the budgets and to design a solution that would scale as and when merchants were added. It was very important for MerchantRMS to start small, budget-wise.

Project Solution :

Given that the main goals of the project are High Availability, Scalability, Disaster Recovery and PCI-CSS grade security, we arrived at the right solution. Amazon Web Services (AWS) was chosen as the solution of choice of the project. Since AWS Elastic Compute Cloud (EC2) service does not have a point of presence (POP) in India, the Singapore location was chosen as the EC2 region of choice.

High Availability (HA)

By using the following techniques, MerchantRMS's goal of HA was met. Redundancies were introduced wherever possible, while single points of failure were reduced:

- Redundant HTTPS load balancers
- Redundant Application Servers (Ahache+PHP)
- MySQL in Master + Slave configuration
- MySQL circular replication from India to Singapore and back to India
- Multiple external monitoring services were deployed (Site24x5, Wormly)

Scalability

MerchantRMS's business model was based on the transactions that it was evaluating for various merchants. Since they started out with very few merchants, they did not want to invest a lot in infrastructure. However, once they stated marketing the product they expected traffic to surge. So, the infrastructure had to be architected in such a way that it scales vertically and horizontally very easy with minimal downtime.

The following techniques were used:

- Multiple MySQL slaves for generating reports from. Only writes and some reads are done from master database instance
- Easy to add additional Application servers
- Easy to add multiple load balancers with round robin DNS
- All static content (HTML, images, Javascript, CSS) moved to Amazon S3, front-ended by Amazon's CDN Cloud Front

Disaster Recovery

For MerchantRMS, it was important to be online even if the primary data centre was lost. Since the service was fully based on Amazon's AWS service, we took full advantage of AWS's Availability zones within the same region. Availability Zones are geographically separate. If one natural or man made calamity affects one, others are far enough to be unaffected. AWS also provide local IP address access to all resource on different Availability Zones in the same region. Also, all IP bandwidth between them is free.

Amazon's RDS database as a service was utilised with its multi Availability Zone capability. Replicas of the 3-tier design infrastructure were setup at each Availability Zone.

SSL certificates are already setup in the load balancers so that MerchantRMS's service can switch from one Availability Zone to the other at any point in time just by switching the DNS records.

Security

Since EBS's has to be compliant with the PCI-DSS standards, security is of paramount importance.

- Amazon's VPC was used to implement a near private cloud setup
- Critical services were running in a private subnet
- All servers had just one, well defined function
- All authentication allowed only via the SSH gateway server with SSH keys
- Password logins not allowed to the SSH gateway severs
- Strict policy on the services that each server is running
- Strict password expiration policies
- Stringent firewall rules specifically designed for each host

Cloud Technologies used

EC2, VPC, Security Groups, Elastic Block Storage, S3, Elastic IPs, Cloud Front, Route 53, Cloud Watch, SES, RDS, Availability Zones.

Products :

K7 Tracker, (Laptop Recovery Software)

K7 Tracker is an invisible software security application that traces the location of missing laptops for recovery. K7 Tracker is a light weight application that will help you track and find your device if it ever gets stolen. It works on MAC and Linux machines. This tracking system send, over the Internet, updates regarding the current location of the device to a remotely administered repository. If the device is lost or stolen, but maintains Internet connectivity and unmodified software, the tracking system can keep tabs on the current whereabouts of the device. k7tracker.com is the device management portal, From where you can manage all your devices, configure and track them all from a single place.

StackIron (IaaS,Hypervisor Manager)

StackIron is a virtualization platform. StackIron provides a unified interface to manage all opensource hypervisors. A pure python implementation for which we developed our own development framework and billing solution. It comes integrated with third party billing solutions like WHMCS as well. All basic functionalities like backup, templatization, migration, SAN and local storage management work seamlessly across all hypervisors. StackIron provides fine grained user control and allows various levels of user configurations at runtime. StackIron has an optional VLAN and bonding functionality along with Basic Firewall and traffic controlling.

EggPlug (EggRack,EggDrive and EggAV) {NAS and Cloud Storage}

EggPlug (www.eggplug.com) is a physical device which lets you access your digital media across the Internet. Contents across various other Physical plugs and desktop installations are kept in sync. User selected files/folders are backed incrementally onto Amazon S3. Devices are authenticated using OAuth protocol. One could simply consider this product as a NAS and Dropbox solutions combined. EggPlug can automatically backup your most important folders to EggRack, the Cloud based, versioned backup service.

Cyclozzo - Platform as a Service (PaaS)

Cyclozzo is a meta cloud platform designed to support the latest PaaS APIs with minimal effort. Cyclozzo currently implements two of the most popular PaaS APIs: Google App Engine Python and Google App Engine Java. Cyclozzo continuously monitors application requests and makes sure that user applications are responsive at all times, while utilizing optimal server resources. When load goes up, Cyclozzo increases the number of application instances and also decreases them when requests come down. Cyclozzo does auto scale-out and scale-in while taking in to account the application's budget/plan.

ScaleInfra - Scalability Manager

ScaleInfra is yet another infrastructure management tool. ScaleInfra can deploy customer applications based on their requirements in a public/private infrastructure deployment. It uses FluidVM/AmazonEC2 for private/public deployments. ScaleInfra employs layer-based strategy to categories virtual machines (like external world visibility). Virtual machines in a layer is pre-configured to a Linux XenPV template. There is an additional option to associate shell scripts per template. Layers are configurable. Application scalability is done by increasing and decreasing the number of virtual machines participating in the application cluster.

Python Framework (Pyles)

Python application development was our primary goal and there were some features, which we used on a regular basis at K7 Computing. Pyles was developed to reduce application development time. The main purpose of this framework was to provide a web interface using a web server and database schema migration capability. Pyles supports few open-source databases like MySQL and SQLite. Other features include automatic validation based on pre-build values/range dictionary, task queue, simple calls for save, update and delete functionalities, Multiple dynamic user roles, cookie based authentication, pre and post start procedures etc.

MCNHRMS - Human Resource Management Portal

MCN is an HR services and placement providing organization aligned to address the objective to obtain the efficiencies and effectiveness of IT power processes. MCNHRMS is an Intranet Workflow Management portal. This Portal usage is for authorized MCN employees only. This Portal enables the authorized users to capture the market details, specific client requirements, allocate the requirements to the consultants, fulfil the requirements and complete the formalities of the closure of the requirement. The individual credits and performance monitoring and their Key Result Areas tracking will be done only through this portal. Delivery Lead allocates client's requirements to consultant. Consultant sends all clients requirement to QC person and also manages the candidate recruitment process. Associate consultant updates the candidate feedback status sent by the client. Quality Checker (QC) Understands client requirements and performs QC.

Island-worldwide - Online Travel agency

I-W provides leisure and business travellers a wide selection of low airfares, as well as deals on lodging, car rentals, cruises, vacation packages and other travel. It is to address consumers' need for an unbiased, comprehensive display of fares and rates in a single location. Its inventory includes hundreds of airlines, more than 80,000 hotels worldwide and 13 rental car brands. Search results are presented in an easy-to-use matrix that displays a vast array of travel options.

ACAPS (Automatic Credit Application Processing System) - Online financing solution product

ACAPS is an online financing solution product. ACAPS can help a customer, who finds paying off debts, difficult. The product also gives homeowners an option to borrow against their equity to pay off their debts in full. This could be accomplished, even if they have been denied a loan by other lenders. Once the customers consolidate all their monthly debt into one lower payment, they can breathe easier. Interest on their new monthly payment may even be tax-deductible. Plus, they can arrange to have cash left over to spend as they wish. And unlike other lenders, the customer can prequalify in as little as 24 hours and deliver their funds in days, not months.