Virgin America and Open Source Software
Presented at OSBC 2010

Virgin america

Virgin America – Who We Are

- Newest hybrid/low-cost airline serving the US domestic market
- Conceived in 2004, first ticket sale on 7/17/2007, first commercial flight on 8/8/2007
- San Francisco's Home Town airline
- Serve 10 markets including San Francisco, Los Angeles, New York, and Washington, D.C.
- Fleet of Airbus A319 and A320 aircraft, 28 planes
- Three classes of service – First, Main Cabin Select, Main Cabin
- Winner of major industry awards
  - Best Domestic Airline - Conde Nast Traveler
  - Best Domestic Airline - Travel + Leisure World's Best Awards
  - Number 1 in First Class 07/08 - Zagat
- Well known for product and technology innovation

Virgin America – Our Product

- Brand new Airbus A319 and A320 aircraft which are up to 25% more fuel efficient
- Mood lighting and ambiance – known as the “iPod in the Sky”
- Wi-Fi Broadband available on all aircraft
- “RED” in-flight entertainment system based on Linux
  - 9” video touch-screen
  - Movies and Music
  - Food ordering
  - Games and Chat
  - Carbon footprint offsetting
  - Live TV
- Recaro all leather seats
- 110v power, USB and RJ45 jacks available to all seats

Virgin America Information Technology Overview

- 28 FTEs
  - Strategy and Innovation
  - Program management
  - Software engineering
  - Business systems partners
  - Operations

- Responsibilities
  - Core infrastructure – data/voice networks, email, information security
  - VirginAmerica.com web site development
  - Airport Kiosk development
  - Remote infrastructure - Airport
  - Reservations system
  - Business continuity
  - Constant innovation
  - Over 85 commercial and custom applications are supported

Core Systems

- Where did we start?
  - Email – SaaS based MSExchange
  - Internal/External DNS – MSWindows
  - Sharepoint for document management
  - Not much in application delivery – waiting for DOT approval
  - HP SAN with 4.5TB of available storage, Brocade fabric
  - HP DL Series 1 and 4u servers with ILO
  - Cisco switching backbone

- Where are we now?
  - Email – MS Exchange hosted in house with Trend AV
  - External MTAs based on a Postfix cluster
  - Border AV/Spam filtering based on clamav, spamassassin
  - External DNS on UltraDNS
  - Application delivery via Citrix
  - NetApp FAS3040 heads, with about 40TB of storage in multiple sites
  - iSCSI/CIFS/NFS instead of Fibre Channel
  - Cisco VoIP with Unity – MSExchange integration

Open Source – Compelling Reasons

- Our philosophy is that software built on a foundation of quality, pride, and love of the subject is *superior*, if not equivalent, to software built on a foundation of profit.
- Mature open source software is stable, performs extremely well, and has solid support in the form of community forums, user groups, and some commercial entities.
- Stable, well adopted Open Source Software can (and in our case, DOES) *significantly* reduce costs.
- Source Code availability offers a level of *transparency* that cannot be matched, and allows for custom code injections where required.
- Open Source Software requires IT teams to be innovators, early-adopters and thinkers, unlike big brand software that mostly requires monetary and not intellectual investment from the customer.
- For cash-poor startups, Open Source Software is a real “black-box” panacea to expensive IT implementations – a number of inexpensive all-in-one hardware and VM based appliances are available.
- The 100% (yes, this is true) uptime of Virgin America’s Open Source Software systems is compelling enough that the business does not question our selection of technologies – they are interested in successful and sustained outcomes.

Open Source Adoption Requires *Special Skills* within IT Teams

- Ability to conduct unbiased R&D.
- Keeping an open mind.
- Ability to integrate a broad base of technologies to produce a single service offering.
- An incessant drive to keep costs low without compromising core needs.
- The strength to not get drawn into CYA relationships with large, commercially successful vendors i.e. don't just buy software from a vendor because you can point a finger at them when things go south. Taking responsibility for one's computing environment is very satisfying – Open Source enables this.
- Ability to recognize and eliminate BBBS (big-brand BS). Big-brand software does play a critical role in IT ecosystems, however, the role is not (and should never be) all-encompassing.
- Of course, all of the above require that IT teams spend a good deal of time conducting research, and candidly, have to be smart and agile. Hiring ninnies to maintain headcount is self-destructive. On the other hand, rocket scientists tend to fire their engines in orthogonal directions.

Factors that convinced Virgin America Executives on the benefits of Open Source

- Quality, stability and reliability were/are paramount. Open Source Software offered these attributes.
- Low maintenance and overhead in terms of work effort and headcount.
- Fire and forget solutions – Simply put, the software **JUST WORKS**, and in many cases, can be configured to self-adjust/heal. Nothing gets the attention of executives more than broken software that mucks up their day, and thereafter destroys their confidence in the IT team and their solutions.
- Reduced need for exotic and expensive hardware platforms (compute/storage etc.) to host critical infrastructural components like e-Mail and VPN - most Open Source Software packages operate very nicely on low-spec platforms.
- Cost was/is definitely a critical selection criterion, but **NOT** at the expense of quality, stability and reliability. In a nutshell, we would never adopt Open Source Software for cost containment alone.
- Not having to deal with “entrenched” vendors with complex, and mostly useless contracts was highly desirable, especially for a fledgling capital intensive startup – a plane can cost upwards of $35 Million.

Open Source in Virgin America

- Commercial web site http://www.virginamerica.com - 100% uptime
  - Apache Web Server: http://httpd.apache.org
  - Tomcat Application Server: http://tomcat.apache.org
  - MySQL Database Engine with replication: http://www.mysql.com
  - RHEL 5.4
  - Memcached for certain cacheable data services: http://www.memcached.org
  - Pentaho Kettle: ETL services

- Email Infrastructure – 100% uptime
  - Postfix MTA clusters at our borders
    - http://www.postfix.org
    - Mailbox sync with active directory users
  - Virus scanning of email using ClamAV
    - http://www.clamav.net/lang/en/
  - SPAM checks using spamassassin, SARE rulesets, MAIA Quarantine management
    - http://spamassassin.apache.org
    - http://www.rulesemporium.com/rules.htm
    - http://www.maiamailguard.com/maia/wiki

  - VPN: **OpenVPN** Community Software - 100% uptime
  - http://www.openvpn.net

Open Source in Virgin America - Continued

- Document Management System: **KnowledgeTree** DMS Community Edition - 100% uptime
  - http://www.knowledgetree.com

- Issues/Artifact management : **Scarab** – 100% uptime
  - http://scarab.tigris.org

- Internal/External Proxy Servers: **Apache** - 100% uptime
  - http://www.apache.org

- Content filtering and QOS: **DansGuardian and Squid** – in proof of concept stage
  - http://dansguardian.org
  - http://www.squid-cache.org/

- Load balancing and fail-over - HAProxy
  - http://haproxy.1wt.eu

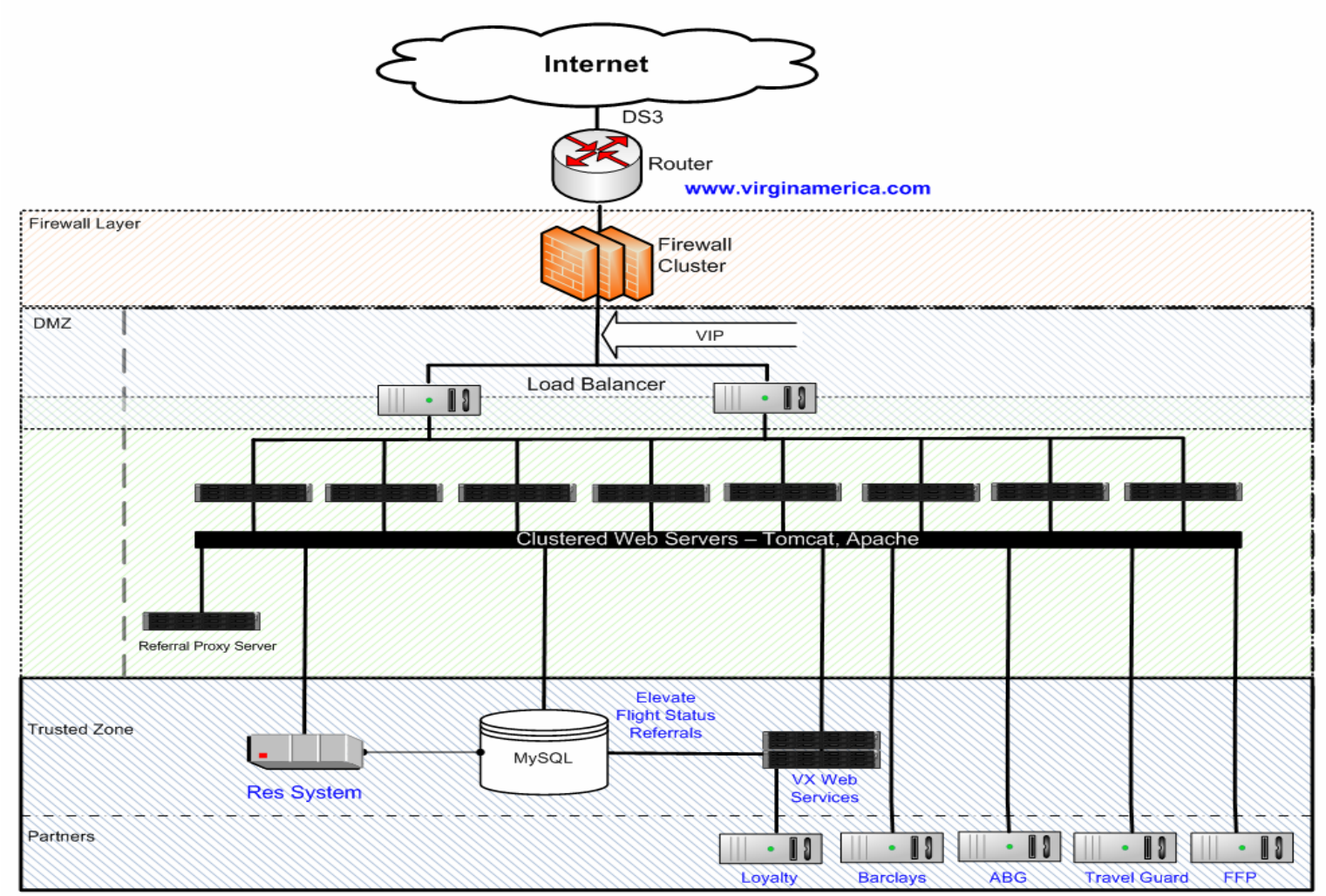
- Software release management – Capistrano
  - http://www.capify.org/index.php/Capistrano

- MySql High Availability – DRBD
  - http://www.drbd.org

Future State of Virgin America and Open Source Software

- Edge and security network appliances and applications (routers, firewalls, filters, IDS)
- HA and scalable databases
- Business Intelligence and analytics
- OpenFiler and JBOD implementations to simply storage solutions
- Improve and change application architecture to leverage new technology

VirginAmerica.Com Infrastructure

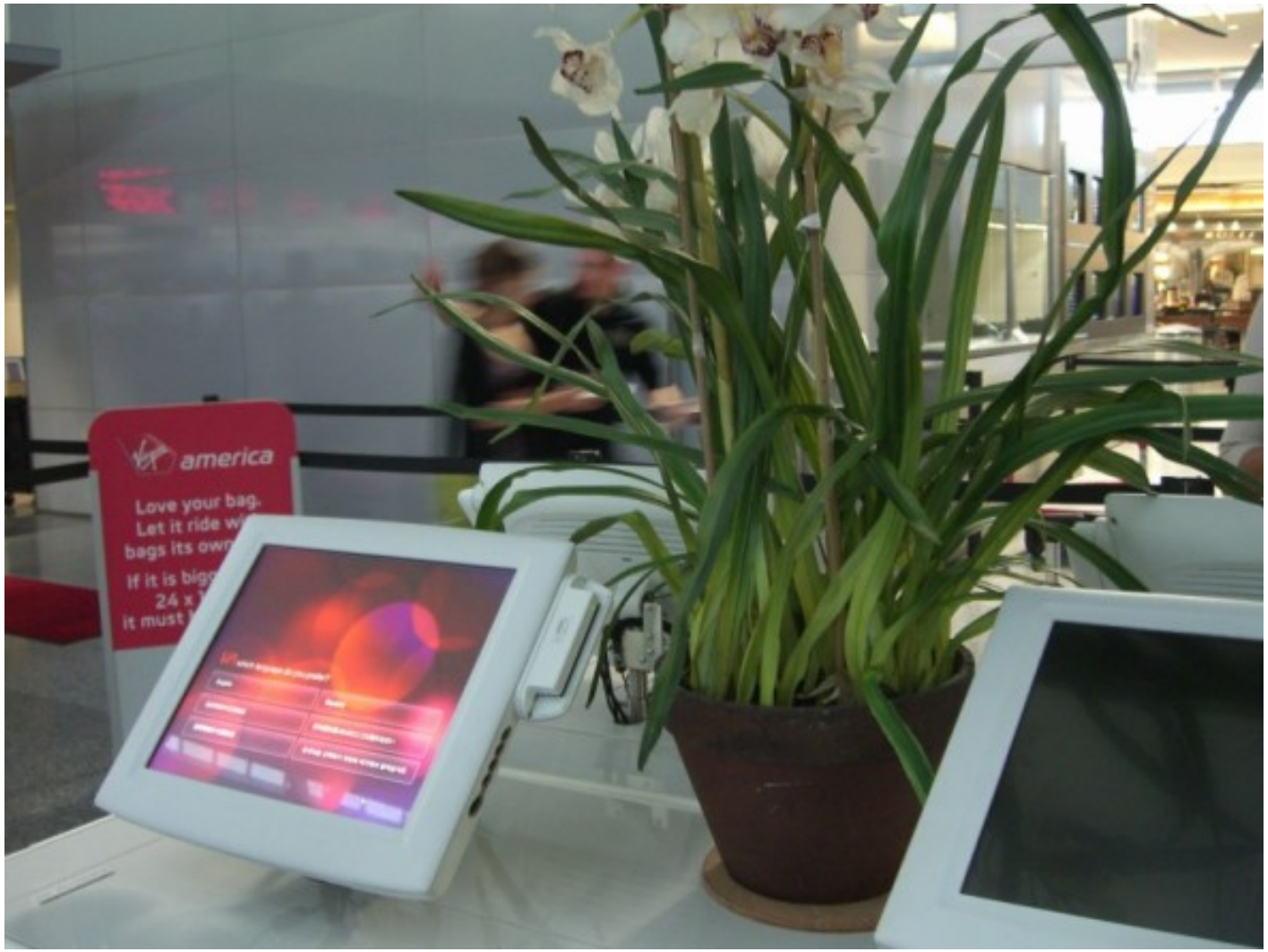


Our Product in Pictures – In Flight

Our Product in Pictures - Mood Lighting

Our Product in Pictures - First Class

Our Product in Pictures - Airport Kiosk



Come fly with us!!

http://www.virginamerica.com