Storm Chasing

Troubleshooting in the Cloud

Stan White – Siemens Medical Solutions USA, Inc.
Funnel Cloud on the Horizon!

- Brand New Cloud Application
- First Customer Live
- Day After New Years
- Functional Failure of Application
- Emergency Escalation Team Meeting
- Reference Customer At Stake
Calling The Meeting to Order...

- The Symptoms
- The Facts
- The Bottom Line
- Ownership

Network

Applications

Systems

Customer

Account Exec

Project Mgr
Why The Cloud?

• The Application Was Not Originally in the Cloud...
• Moved To The Cloud for Typical Reasons

• Cost Savings
• Reliability
• Availability
• Management Expertise

... Who better to run the application than the people who developed it, right?
Bring Me The Witch’s Broom

- Customer
  - Fix My Issue
  - Insure No Recurrence
  - Siemens – Once Face
Somewhere Over The Rainbow

- October 2010 – Wintel Architecture Team
- Design Hosted Application Architecture
- Web Client / Citrix
- Components
  - Application
  - Database
  - Web
  - Transcription
  - Faxing
  - Printing
  - Interfaces
What Stays / What Goes?

- Physical vs. Virtual
- Cloud vs. Customer
Will My Project Succeed?

- No Crystal Balls
- Am I Wasting Resources?
- Is My Design Sound?
- Financially Viable?
- How Do We Know?
Follow The Yellow Brick Road

ISO 9001 Company
Repeatable Processes
Proven Outcomes
Quality Process
Integrated Into All Aspects
Lions & Tigers & Bears? Oh My!

- A New Project is Scary
- Journey Is Fraught with Danger
- We Need to Rely on Some Allies
The Scarecrow

• Do We Have The Brains to Do This?
  – Develop A Business Case...
  – Determine Requirements?
  – Can The Requirements Be Met?
  – Is The Time Line Reasonable?
  – Do We Have The Resources?
  – Will the ROI Be Worth The Effort?

• Our Brain Says We Can Do It...
The Tin Man

- Create The Solution’s Heart
  - Tie Components to Requirements
  - Proof of Concept Model
- Reliable Infrastructure
- Security Adherence
- Proper Capacity
- Determine SLA’s

- Our Heart is Pumping...
The Heart of Our Solution
The Lion

- Now We Needed The Courage To Go Live
  - Performance Equal or Better Than Non-Cloud
  - Physically Close to Datacenter
  - Choose a BETA Customer
  - Existing Customer
  - Easy Rollback

We have the courage to go live...
The Journey to Oz

• Business Plan
• Quality Process
• Design Complete
• Proof of Concept
• Customer Chosen

Inevitable loose cobblestones along the way...
Networking / Security

• Firewall Requests
  – Conversions
  – Temporary Openings
  – Id Request Processes
Content Switch Traffic Spraying

- Non-Existent Server
- Sporadically Failing Web Requests
- Application FQDN Issues
Poor Client Application Performance

- Response Time from DBMS Reaching 7 to 9 Seconds
  - Increased DBMS Engines
  - More Memory Dedicated to DBMS
  - Procedure Cache Increased
## Before Performance Adjustments

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### After Performance Adjustments

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<tr>
<th>Transaction Name</th>
<th>Average response Time - In-house Environment - Sep 2010</th>
<th>Average response Time - iLab Environment - June 2011</th>
<th>Average response Time - Production Environment -</th>
<th>Average response Time - Index rebuild &amp; procedure caching setting -</th>
<th>Average response Time - Added 2 DBMS engine, and more memory for DBMS</th>
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A Wonderful Success!

- 24 Hours – No Major Issues
- Minor Security / Training Issues
- Live Scheduled
- Extra Staff On Hand
I’ll Get You and Your Little Dog Too!

- 48 Hours with No Issues
- One Client Reporting Issue on One Record
  - Other Users OK
  - Only This Record
  - Training Issue?
  - Corrupt Record?

Over Next Few Hours, Other Occurrences of The Error...
Time Is Running Out

- Multiple User Errors
- Sporadic Occurrence
- Holidays Approaching
- Anxiety Levels Peaking
- Fall Back Plan Initiated

Need to get our heads around this before time runs out...
Give Me The Ruby Slippers!

- **Determine Symptoms**
  - Javascript 12031, generally an error with large web VIEWSTATE
  - Only occurred on records with large number of sub-records
  - Verified with development that VIEWSTATE was indeed used
  - Determined sequence of steps to recreate the issue consistently
  - Internet Connection Reset

- **Eliminate Components**
  - Test VIEWSTATE
  - Customer Network
  - Internal Infrastructure (Test vs Prod)
  - Network Captures
Give Me The Ruby Slippers!
Captured!

- Network Traces Initiated
  - Client?
  - Web Server?
  - Firewall?
    - Difficult to Bypass
    - Logs
  - Content Switch?
    - Reset Connection
    - Client Same Subnet

At last, we have found the problem...
Captured!

Reset request sent from MAC address of network interface of content switch facing the web server.
Pay No Attention to The Man Behind The Curtain!

- Client Facing Interface
- Server Facing Interface
- Reset Coming from Content Switch
- Client on Server Subnet Works
- Bypass Content Switch & Resolve
Pay No Attention to The Man Behind The Curtain!

- Client Facing Interface
- Server Facing Interface
- Reset Coming from Content Switch
- Client on Server Subnet Works
- Bypass Content Switch & Resolve
An Unlikely Bucket of Water

- Eliminate The Impossible, Whatever Is Left...
  - Error Coming Out of Content Switch
  - Bypassing Content Switch Fails
  - What Did We Miss?
  - Engaged Networking
  - Network Egress Points
Dousing The Witch

• Intrusion Prevention System
  – Network Egress Points
    • Where Traffic Changes Networks
    • Bypassing Content Switch Changed Networks
    • Test Infrastructure Doesn’t Utilize
  – Request with too Many Parameters Denied
    • Sends Reset to Both Client and Server
  – Need to Modify IPS Rule to Allow More Params
Providing The Witch’s Broom

- Testing
  - Internal
  - One Customer Device
  - Small Subset
  - Migrate Back To Cloud
What Have You Learned Dorothy?

• Take Ownership
• Watch Out For Man Behind The Curtain
• Eliminate The Impossible
• Document Everything
• Share Your Knowledge with Others
  – Yes! It Happened to Another... Quickly Resolved!
There’s No Place Like Home
The End
Questions & Comments