StackExchange

Scaling the Windows Stack

George Beech @GABeech

PICC ‘12

Agenda

- What is Stack Exchange?
- Growth this Year
- Our Technology Stack
- How we scale
- Dealing with Windows stack scaling pain

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Stack Exchange is a fast-growing network of 87 question and answer sites on diverse topics from software programming to cooking to photography and gaming. We build libraries of high-quality questions and answers, focused on the most important topics in each area of expertise. From our core of Q&A, to community blogs and real-time chat, we provide experts with the tools they need to make The Internet a better place.

stackexchange.com

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Growth this Year

- Quantcast rank: 250 (April 2011) -> 132 (May 2012)
- Pageviews / month: 120M (April 2011) -> 271M (May 2012)
- HTTP Requests/s: 800 (April 2011) -> 900 (May 2012)
- “Visits”: 1.5M (April 2011) -> 2.9M (May 2012)
- SSL: <1%% of requests (April 2011) -> ~3% of requests (May 2012)

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Our Core Technology Stack

- ASP.NET MVC 3 (RAZOR)
- IIS 7.5
- Windows Server 2008 R2
- Microsoft SQL Server 2008 R2
- C# (.net 4)

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HAMPSTERS!

Reference: http://meta.stackoverflow.com/q/96354

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Important Infrastructure

- Load Balancing
  - Haproxy (currently 1.5dev6)
- Network Caching
  - Redis (2.4.10)
- Search
  - Lucene.NET
- Monitoring
  - SolarWinds Orion
  - Custom Status Console (uses Orion data)

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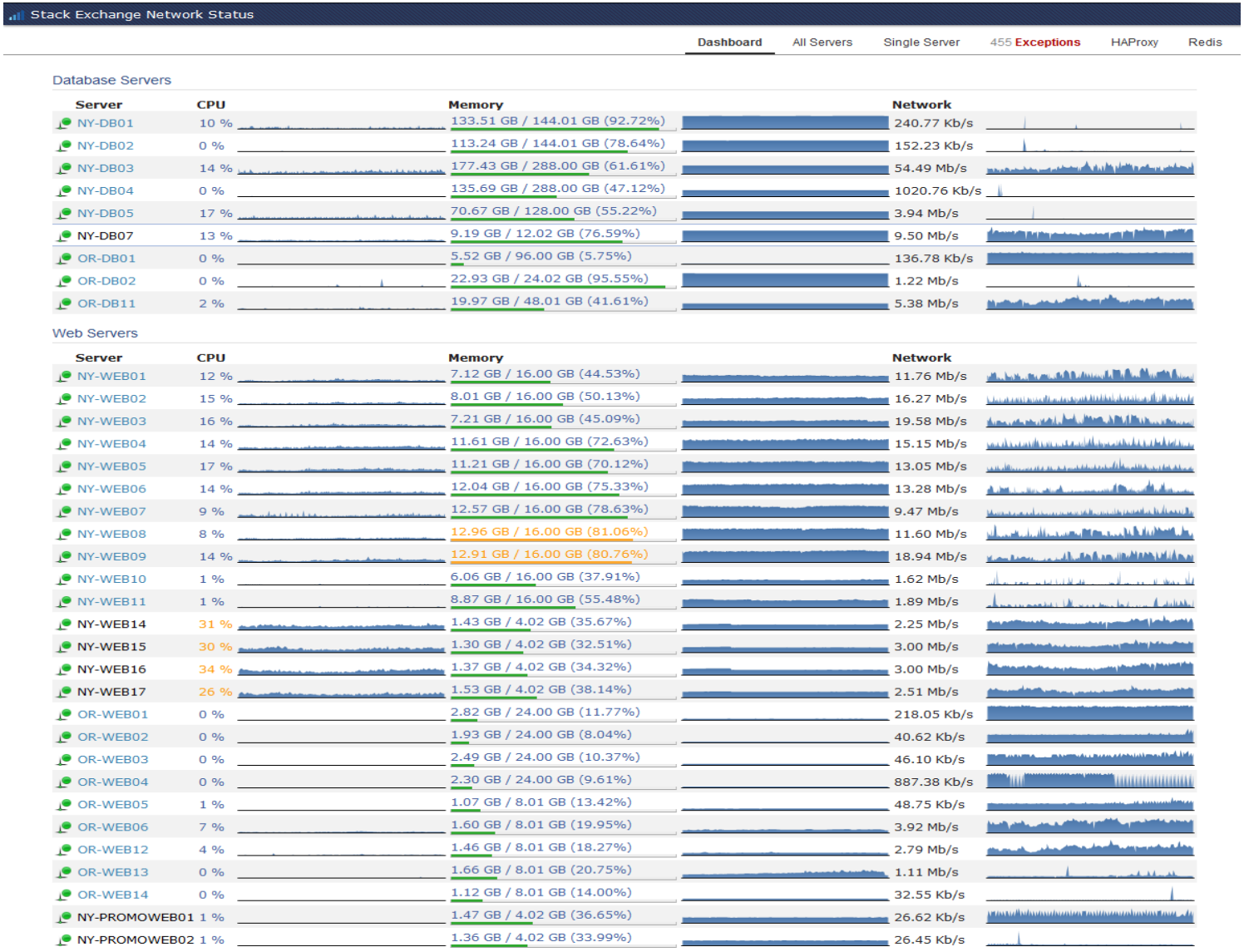

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How have we Scaled?

1. AWESOME Devs
2. CACHE ALL THE THINGS!
3. Always be planning for the future
4. Vertical vs Horizontal
5. Right Tool, Right Job

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Step Back

Last Year

9 Production, 1 Dev Web Server

2 DB (Hot/Warm Pair) - Stack Overflow Dedicated

This Year

9 Production, 2 Dev Web Server

2 DB (Hot/Warm Pair) - Stack Overflow Dedicated

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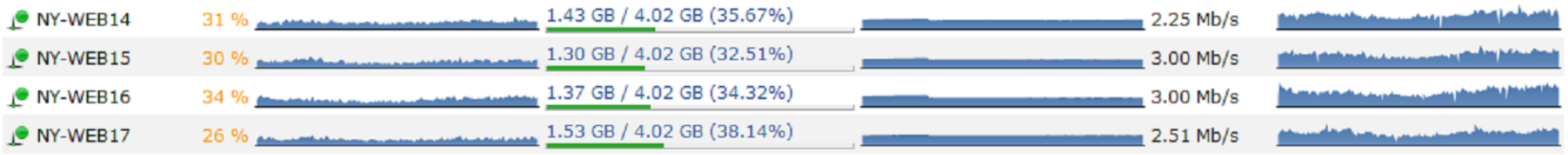
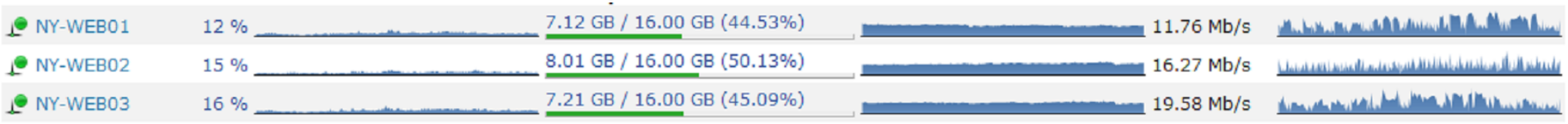
Awesome Devs

SE 1.0 – equivalent to pre-optimized SE 2.0



Optimized SE 2.0



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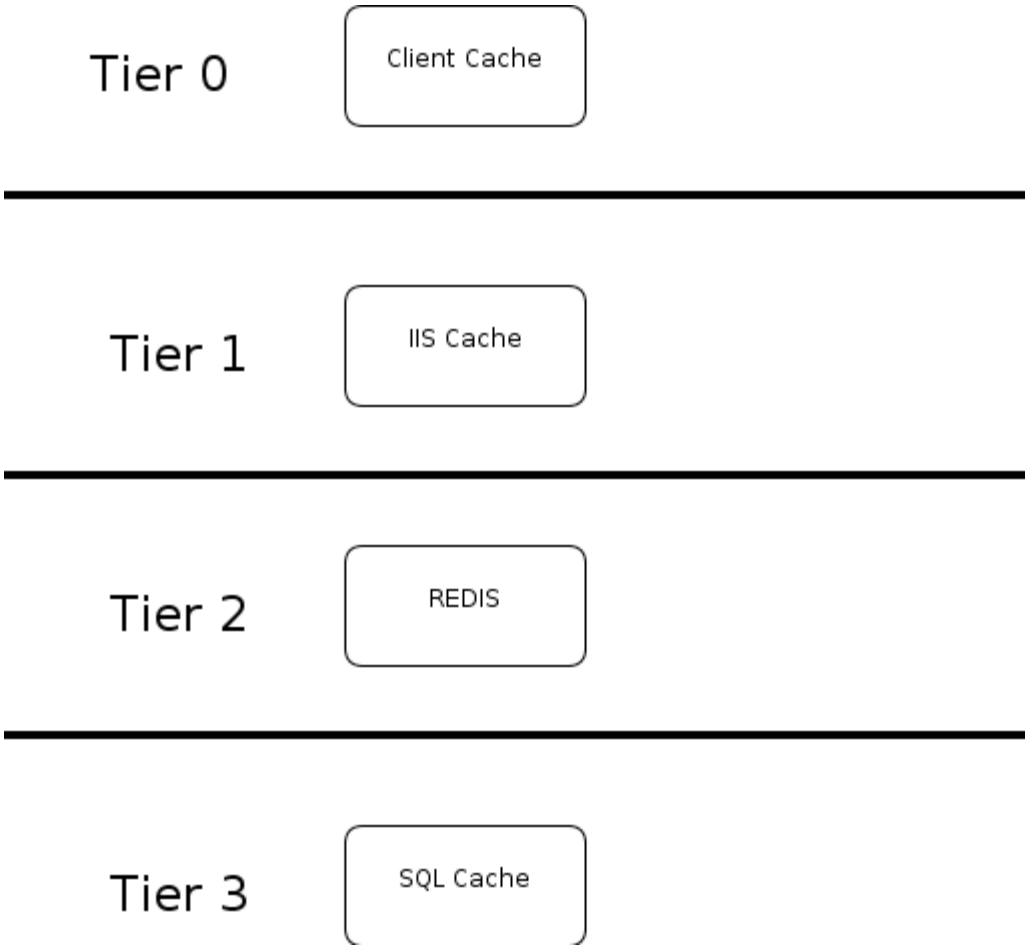
Caching, Caching, Caching



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A little more on Caching

- Not All Users are equal
- 90+% of our page views are anonymous
  - Much more aggressive Caching for anonymous users
  - Very few anonymous user requests hit the database

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Future Planning, it's IMPORTANT

- Game plan what you expect your growth to look like
  - You'll be wrong
- Design for a reasonable amount of growth – avoid over engineering AND under engineering

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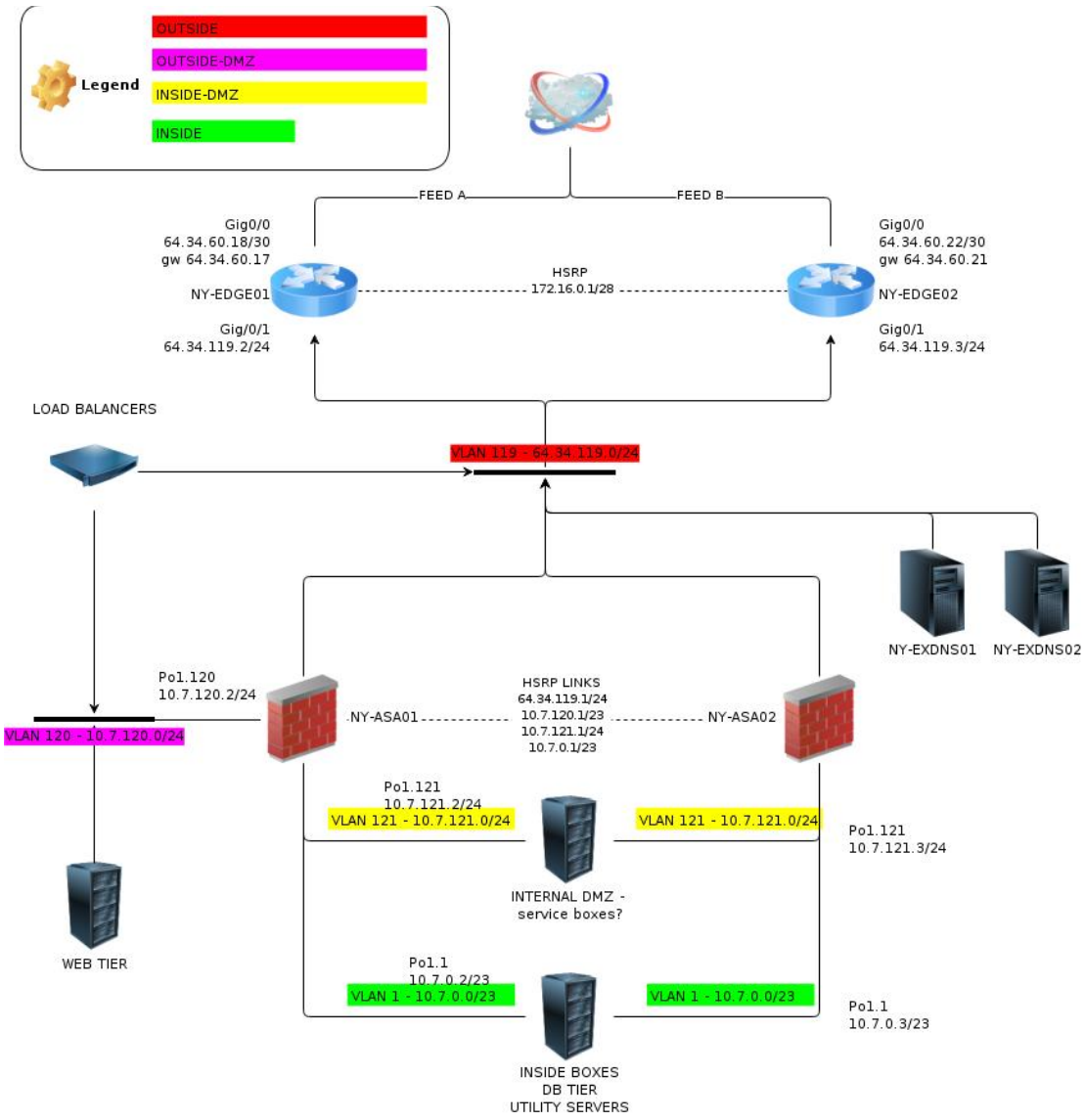

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Vertical and Horizontal

- They aren't mutually exclusive
- We grow primarily up, but also out when needed

- We have scaled our SQL servers up
  - Added RAM (Currently 144GB / 288 GB)
  - SSDs (Moved to Intel 710 200GB SSDs)
- If we needed we would scale our Web servers out

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Always Use the right tool

- Don’t Use Ports
- Don’t try and force a piece of software to be everything
- Use specific tools for specific jobs

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Scaling Windows can be painful

- 2008 Does not respect GARP out of the box (there is a hotfix)
- $$$$
- Garbage Collection Pain
- Deployment can be harder

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Wait, no GARP?!

“First, a Windows Vista or Windows Server 2008 will not update the Neighbor cache if an ARP broadcast is received unless it is part of a broadcast ARP request for the receiver. What this means is that when a gratuitous ARP is sent on a network with Windows Vista and Widows Server 2008, these systems will not update their cache with incorrect information if there is an IP address conflict.”

http://blogs.technet.com/b/networking/archive/2009/03/30/tcp-ip-networking-from-the-wire-up.aspx

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$$$

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Garbage Collection

- 3 tiers
  - Gen-0
  - Gen-1
  - Gen-2
- Under Certain situations this can kill you

For more information:

http://marcgravell.blogspot.com/2011/10/assault-by-gc.html

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Deployment

- Imaging … sucks
- Scripted installs are MUCH better now (kickstart/preseed like installs)
- Network configuration is still generally painful
- WDS + GPO will get you 95% of the way there

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Questions?

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