



# Teaching IT New Tricks



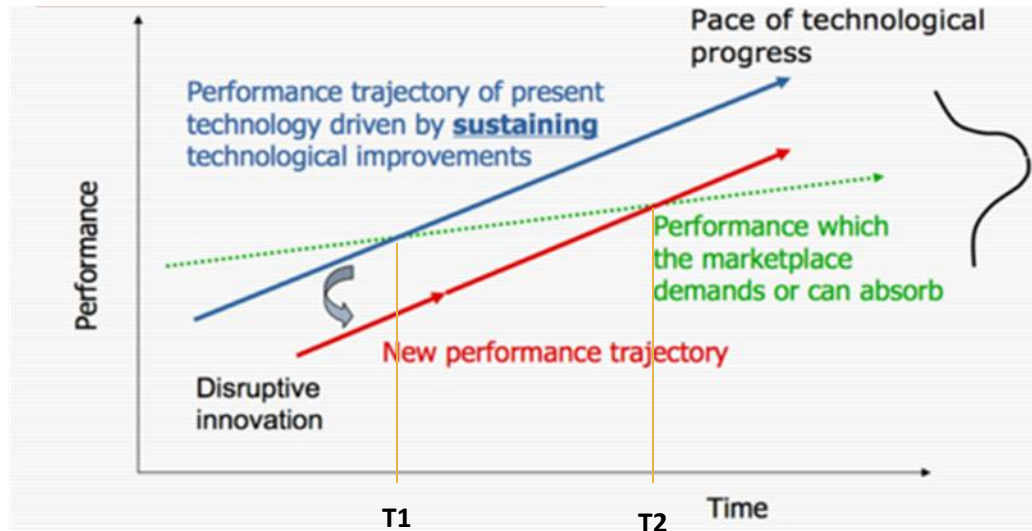
Pini Cohen  
VP and Senior Analyst

*Tell me and I'll forget  
Show me and I may remember  
Involve me and I'll understand*



# Prof. Clayton Christensen: Disruptive Innovation Model

Remember Digital Equipment Corporation (DEC). “Underdogs become mainstream faster than we think”. Change towards what looks as “non-mature” areas is crucial



# New tricks - agenda

- Web architecture and “philosophy” examples
- Devops: Culture\Processes
- Technology listing



Source: <http://www.b2binbound.com/blog/?tag=paradigm%20shift>



# Pinterest

Pinterest

Pinboards You Follow | Most Discussed | Everything | Gifts

Search  Emma - Add - Boards - People - About -

re-pin the pins, or to post another person's pins to your own board

AI - Gifts - Food + Drink - Travel - Art + Architecture - Design - Photography - Apparel - Home + Furniture - Private - Products - Ideas - Film + Music + Books - DIY - Science + Nature - Tech - Wedding + Events - People

**A FUN, INTERACTIVE WORLD WHERE KIDS CREATE THEIR OWN BOOKS**  
Create a Book  
James & Noble has a part of their website where your child can create their own book!  
Pinned by Alexandra George onto Crafty Mommy

**"The prettiest dresses are worn to be taken off."**  
Pinned by Tam Clasen onto Love

**Anna Hathaway**  
Pinned by Catherine Strand onto Beautiful Homes

**UNTITLED BY Aunelin Dumort**  
Pinned by Anna Claffman onto Photography

**I don't know what it is about this tiny kitchen, but I like it.**  
Pinned by Louise Inland onto Colour Scheme No.1

**Silver of yellow**  
Pinned by Susan Kemp onto Home Decor

**chicken with artichokes and angel hair**  
Pinned by Audrey Fry onto Love of my life

**Smoked Paprika Potatoes. Oh my!**  
Pinned by Laura Vannice onto Food

**red**  
Pinned by Michelle West onto The Look

**Tag**  
Pinned by Jan Walters onto professional-artist

**Seal**  
Pinned by Jundispaal onto Food styling

**doggie-memo**  
Pinned by Brock Haselbacher onto objects

**Reusing room**  
Pinned by Claire J onto Inspiration

**Color de la Renaissance 1979**  
Pinned by Laura Vannice onto Inspiration

**blue hanging lamp**  
Pinned by Susanna Iliou onto Interiors

**stars: chandelier**  
Pinned by Evelyn Greenbaum onto Lights and Lighting

**swim suit**  
Pinned by Brittany Klein onto My Style Pinboard

**scrap lights**  
Pinned by Yvonne Sando onto Lighting I Love

**charming**  
Pinned by Cherie Jordan onto pretty pretty outfits

**fall never fail art: \$22**  
Pinned by Catherine Antkowiak onto Jewelry

**scrap lights**  
Pinned by Yvonne Sando onto Lighting I Love

**rose garland**  
Pinned by Claire J onto Ideas

**BECAUSE SOMEONE DOESN'T LOVE YOU THE WAY YOU WANT THEM TO DOESN'T MEAN THEY DON'T LOVE YOU WITH ALL THEY HAVE.**  
Pinned by Emma Greeny onto Quotes and Advertisings

**just be happy :)**  
Pinned by Pasquale Puri onto Love, Hate, Inspiration

**Love this**  
Pinned by Victoria Brewer onto Ideas

**un simple cards**  
Pinned by Louisa Wilson onto Home sweet home

**IS SAID HIPHOP THE HIBBYTO THE HIBBYTO HEHT HIPHOP AND HOUGHTS TO PROCKET TO THE BANG BANG BOOTE SAUP**

# Pinterest Architecture Update - 18 Million Visitors, 10x Growth, 12 Employees, 410 TB of Data

- 80 million objects stored in S3 with 410 terabytes of user data, 10x what they had in August. EC2 instances have grown by 3x. Around \$39K for S3 and \$30K for EC2 a month.
- Pay for what you use saves money. Most traffic happens in the afternoons and evenings, so they reduce the number of instances at night by 40%.
- 12 employees as of last December. Using the cloud a site can grow dramatically while maintaining a very small team. Looks like 31 employees as of now.

Source: <http://highscalability.com/blog/2012/5/21/pinterest-architecture-update-18-million-visitors-10x-growth.html>

- Different type of technology:
  - Written in Python and Django
  - Sharding is used, a database is split when it reaches 50% of capacity, allows easy growth and gives sufficient IO capacity
  - ELB (Elastic Load Balancing) is used to load balance across instances. The ELB API makes it easy to move instances in and out of production.
  - Hadoop-based Elastic Map Reduce is used for data analysis and costs only a few hundred dollars a month.

Source: <http://highscalability.com/blog/2012/5/21/pinterest-architecture-update-18-million-visitors-10x-growth.html>

# Instagram

- The Instagram philosophy:
  - Simplicity
  - Optimized for minimal operational burden
  - Instrument everything



# Scaling Instagram

- Instagram went to 30+ million users in less than two years and then rocketed to 40 million users 10 days after the launch of its Android application.
- After the release of the Android they had 1 million new users in 12 hours.
- 2 engineers in 2010.
- 3 engineers in 2011
- 5 engineers 2012, 2.5 on the backend. This includes iPhone and Android development.

Source: <http://highscalability.com/blog/2012/4/16/instagram-architecture-update-whats-new-with-instagram.html>

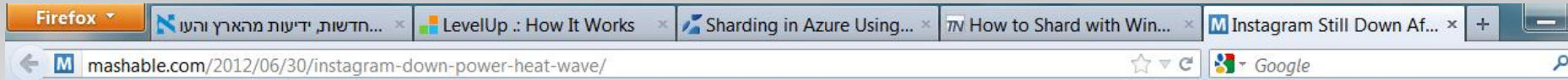


# Instagram technology philosophy

- Engineer solutions you are not constantly returning to because they are broke. STKI: operations operations operations!
- Try not to have two tools doing the same job.
- Focus on making what you have better: fast, beautiful, photo sharing. Make the fast part faster. Can we all of our requests take 50% of the time?
- Only add software to your stack that is optimized for operational simplicity
- Ideas are disposable: if one doesn't work, you quickly move on to another.
- Have fun

Source:<http://highscalability.com/blog/2012/4/16/instagram-architecture-update-whats-new-with-instagram.html> stki modifications

# Instagram is down!



## Instagram Still Down After Storm Cuts Power During Brutal Heat Wave

June 30, 2012 by Alex Hazlett  
21

- 5.8k Like
- 5.5k Tweet
- 115 +1
- 118 Share
- 9 Pin It
- 15 Share

Ads by Google

**Facebook Share Is Rising?** - Buy Facebook Stock Online, No Fees! Limited Offer- Free Welcome Bonus.  
www.plus500.co.il/Facebook

**Instagram Support** @InstagramHelp

We're currently experiencing technical difficulties and we're working to correct the issues. Thanks for your patience

27,956 RETWEETS 1,581 FAVORITES

11:16 PM - 29 Jun 12 via Twitter for Mac · Embed this Tweet

Popular mobile photo-sharing service Instagram is still down this morning after violent storms in Virginia knocked out the cloud computing services that run it.

Amazon's Elastic Compute Cloud, which powers sites like Netflix and Pinterest, and SocialFlow, as well as

Mashable on Google+ Follow

Like Sharon Malik, Nirit Icekson and 941,406 others like this.

+1 63k Recommend on Google

Follow @mashable 2.9M followers

LinkedIn YouTube Stumble RSS

More subscription options >

EFIX FOREX GROUP נתן

אדם: עשיתי \$600 בשעתיים.  
נתן: איך עשית את זה?  
אדם: למדתי איך לסחור בנפט.  
נתן: כמה השקעת?  
אדם: זה מה שמצחיק השקעתי בקושי...

**לחץ להמשך השיחה <**

MASHABLE NEWS IN YOUR INBOX

Enter your email

# Tumblr – Microblogging \ social networking platform



- 500 million page views a day
- 15B+ page views month
- Peak rate of ~40k requests per second
- 1+ TB/day into Hadoop cluster
- Many TB/day into MySQL/HBase/Redis/Memcache
- Growing at 30% a month
- ~1000 hardware nodes in production (not cloud)
- ~20 engineers (total 106 employees)

# New tricks - agenda

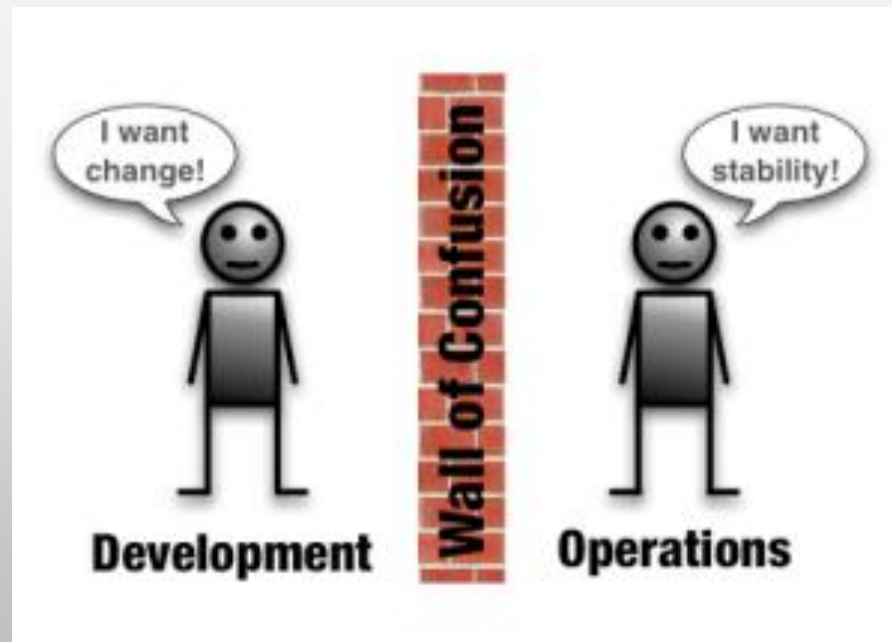
- Web architecture examples
- Devops: Culture\Processes
- Technology listing



Source: <http://www.b2binbound.com/blog/?tag=paradigm%20shift>

# Devops – Development and Operations

- Addresses the conflict between Development and Operations:
  - Development – are paid for change
  - Operations – change is the enemy!
- “Wall of Confusion” - combination of conflicting motivations, processes, and tooling

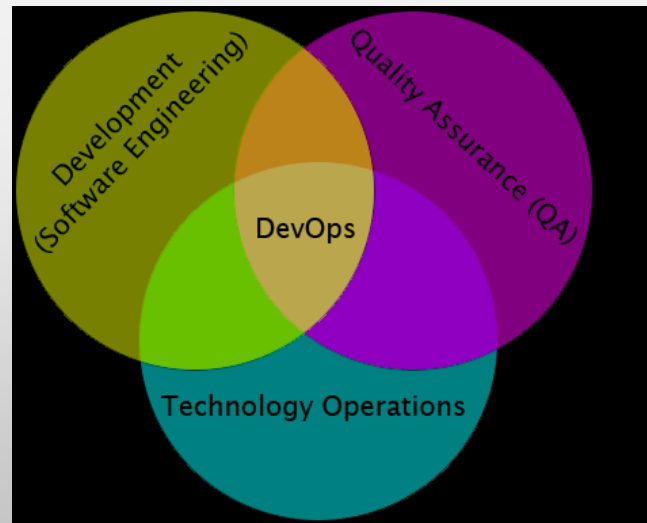


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# Devops aims at:

- DevOps enables the benefits of Agile development to be felt at the organizational level. DevOps does this by allowing for fast and responsive, yet stable, operations that can be kept in sync with the pace of innovation coming out of the development process.

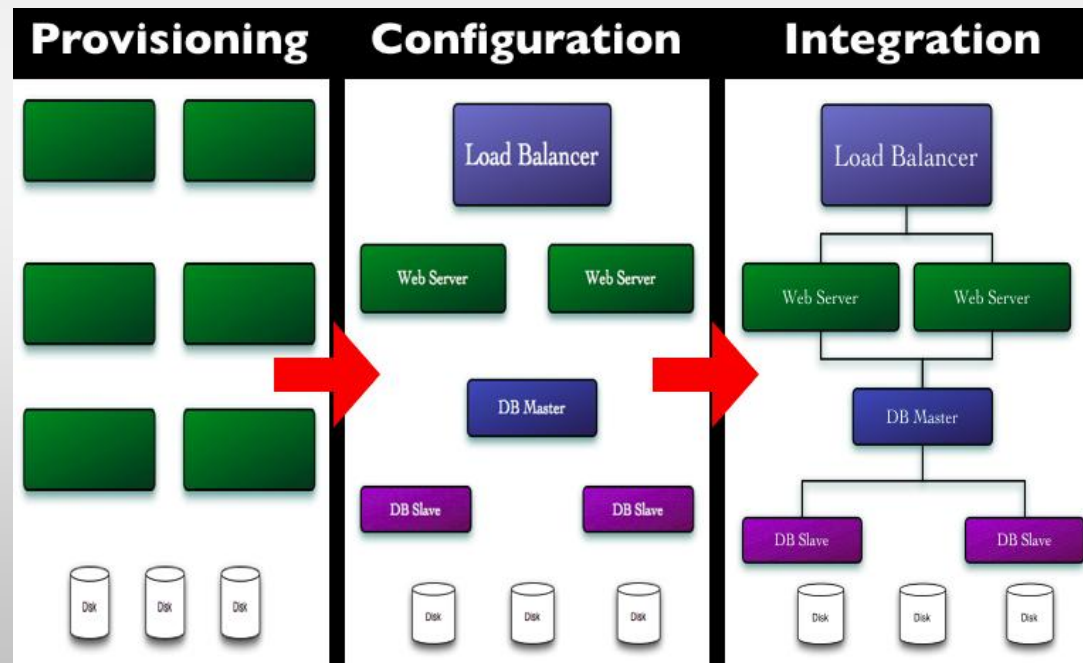


# Striving towards Devops state of mind:

- Measurement and incentives to change culture - metrics based on joint performance
- Unified processes
- Unified tooling
- Rolling back should be easy

# Devops needs automation. Example: Opscode - Chef

- With Chef, you write abstract definitions as source code to describe how you want each part of your infrastructure to be built, and then apply those descriptions to individual servers.
- The result is a fully automated infrastructure: when a new server comes on line, the only thing you have to do is tell Chef what role it should play in your architecture.



Source: opscode

# Continuous deployment: The Lean Startup Philosophy

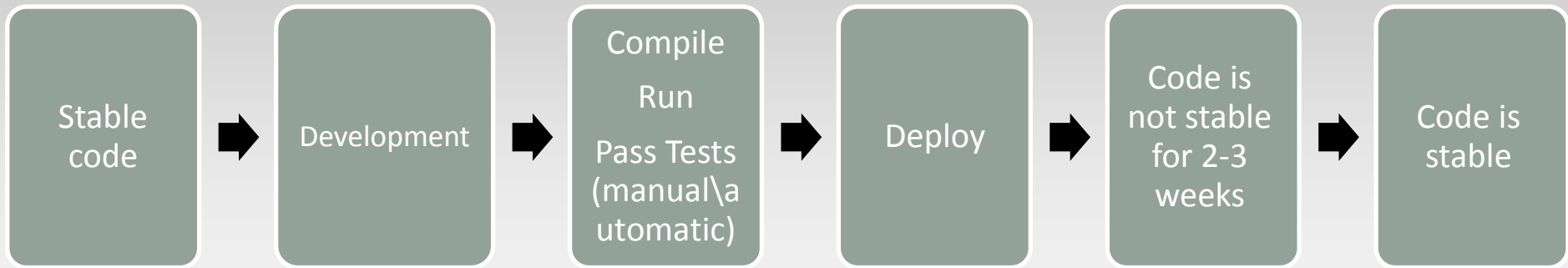
- The Lean Startup relies on validated learning, scientific experimentation, and iterative product releases to shorten product development cycles, measure progress, and gain valuable customer feedback. (from wikipedia STKI modifications)
- The basic insight : “I wrote **small** feature but the customer thinks it is **BIG**” (and vice versa).

Continuous Deployment: taking Devops to the extreme!

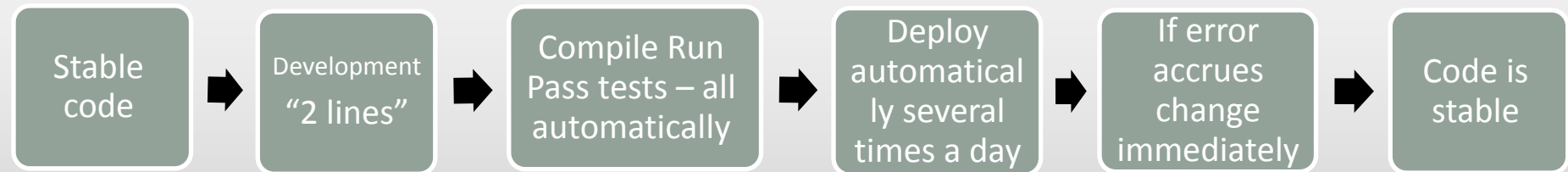
Delivery of new functionality is core value for new companies

# Continues deployment: your code is always stable!

- Old school deployment



- Continues deployment



- What about the “buffer overflow” after 5 days?!
- Answer: you will have it anyway!



# Continues integration\deployment perquisites

- Tools needed
  - Version control server (SCM)
  - Build server
  - Deployment Server
  - Automation tools
  - Continouse integration tools
- Work Process
  - Commit/Update often (each change)
  - Run often
  - Tests
  - Run test often
  - Common code ownership

Source:

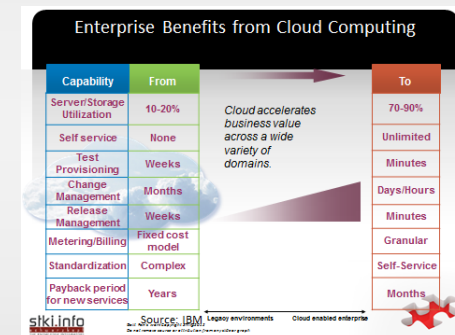
<http://www.google.co.il/url?sa=t&rc=tj&q=Continuous+Integration+%28CI%29+with+Hudson++filetype%3Appt&source=web&cd=1&ved=0CEoQFJAA&url=http%3A%2F%2Fpretoria.uoc.es%2Fwpmu%2FblogaTE%2Ffiles%2F2010%2F06%2Fcontinuous-integration-with-hudson1.ppt&ei=UHH5T7aaJ-jQ4QTVhcWNBw&usg=AFQjCNHpiw711JvY9crKXXnJ0hwnw95E1g> STKI modifications

# Devops vs. Private Cloud?

- In many aspects the objectives of Devops and Private Cloud are overlapping
- Automation is at the core of both Private Cloud and Devops
- Standardization is a must for automation



Source: <http://www.pistoncloud.com/2012/01/devops-and-private-cloud-sitting-in-a-tree/>



# Old vs. New

Old Datacenter	New Cloud\Datacenter
Licensed and Installed Applications	SaaS (Workday, Pagerduty )
Central SQL Database	Distributed Key/Value NoSQL
Sticky In-Memory Session	Shared Memory Cache Session
Tangled Service Interfaces	Layered Service Interfaces
Instrumented Code	Instrumented Service Patterns
Fat Complex Objects	Lightweight Serialized Objects
Chatty Protocols	Latency Tolerant Protocols
Manual and Static Tools	Automated and Scalable Tools
Monolithic Software Development	Teams Organized around Services
Monolithic Applications	Building Your Own PaaS
Static and Slow Growing Capacity	Incremental and Fast Growing Capacity
Heavy Process/Meetings/Tickets/Waiting	Better Business Agility
Single Location	Massive Geographical Distribution
Focus on How Much it Costs	Focus on How Much Value it Brings
Ownership/CapEx	Leasing/OpEx/Spot/Reserved/On Demand

Source: <http://the scalability.com/blog/2012/5/27/startups-are-creating-a-new-system-of-the-world-for-it-its-it-modifications>

# Technology listing

- Hadoop \ Mapreduce
- NoSQL dbms (Cassandra, Mongo, HBASE)
- Sharding
- In Memory DBMS
- DBMS\DW appliances
- Memcached
- MemSQL
- Solr
- Redis
- DJANGO
- ELB - Elastic load balancing amazon

# Summary

- Open your mind – things are happening out there!
- “Underdogs become mainstream faster than we think”.
- Change towards what looks as “non-mature” areas is crucial
- Standardization and Automation is a must
- Categorization of Infra-Ops activities:
  - Faults
  - Specific work (on “Neptun” for APP X)
  - General work (all Web Servers)



Source: <http://toktobis.deviantart.com/art/Open-Your-Mind-109225982>



Thanks for your patience and hope you enjoyed

