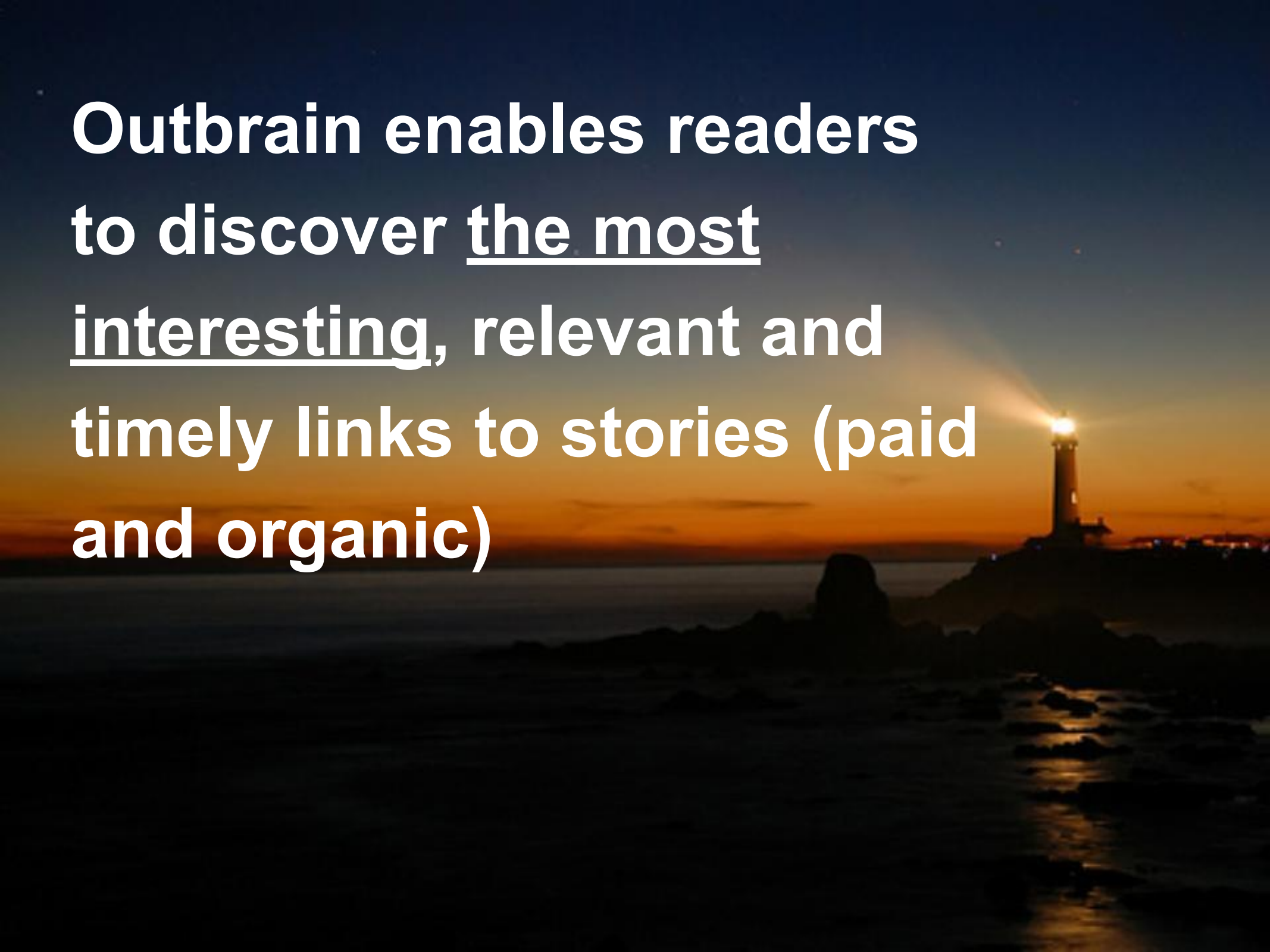# Continuous Deployment

@rantav
@orilahav
@outbrain

Outbrain enables readers to discover <u>the most interesting</u>, relevant and timely links to stories (paid and organic)

CNN Politics

SEARCH
powered by Google

The Ladder
THE MOST $100K+ J

White House defe recovery chief

By Ed Henry, CNN Senior White House Corres
June 18, 2010 7:07 p.m. EDT

Navy Secretary Ray Mabus has been appointed by
Obama to create a plan to help Gulf restoration effo

STORY HIGHLIGHTS

- Environmental group official says Ray Mabus should focus on Gulf full-time
- But another calls his appointment great, says "Gulf is in good hands"
- President picked Navy Secretary to create long-term Gulf Coast restoration plan

RELATED TOPICS

Gulf Coast Oil Spill
Ray Mabus

former gove
two jobs.

"The preside
agreed that

But Cat Laz
said it will b

"I think our
Lazaroff sai
the person i

Another top
Lazaroff and
part-time be

We recommend

- Clinton gives Father's Day shout-out to dads, including Bill
- Obama chooses Navy secretary to lead Gulf recovery efforts
- Day 57: Oil disaster latest developments
- Obama meets with relatives of oil rig blast victims

From around the web

- The Hidden Health Danger of Hand Sanitizers
  MainStreet.com
- 27 Bedford County Citizens Inducted Into PA Voter Hall Of Fame TheStreet
- 8 Things Your Pet Shouldn't Eat Real Simple
- Windows XP SP2 retirement looms, puts users in tough spot - Computerworld Computerworld

[what's this]

FOLLOW THIS TOPIC

delta.com

NewsPulse »
Most popular stories right now

Chavez asks Interpol to arrest critic

Inmate executed before firing squad

Anadarko blasts BP for 'reckless actions'

Diapered baby dances samba
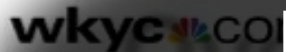
Multi Billion Page Views per month
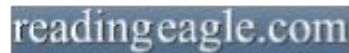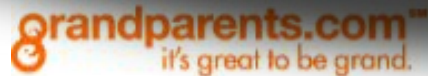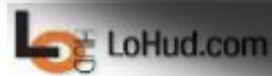
Note: Outbrain is typically installed on *every* article/blog post on each of these sites, immediately under the

```
~ $ svn ci -m"Implementing
the super-sharp images algo
#deploy:ImageServer #to:ny
"
```

Who's in?

WordPress.com

Outbrain

wiredreach

wealthfront

facebook

Etsy

imvu

Eric Ries

digg

flickr from YAHOO!

WHY

WHY

For the Business

For Fun

WHY

What was so bad before ?

WHY

Mmmm... a lot was/is wrong...

- Feedback loop speed is important (see REPL in programming)
- Inefficient Waits (wait for QA, wait for other features etc)
- Inefficient Context Switch
- Feature Delayed - b/c of other features
- Big Changes – Big Problems.
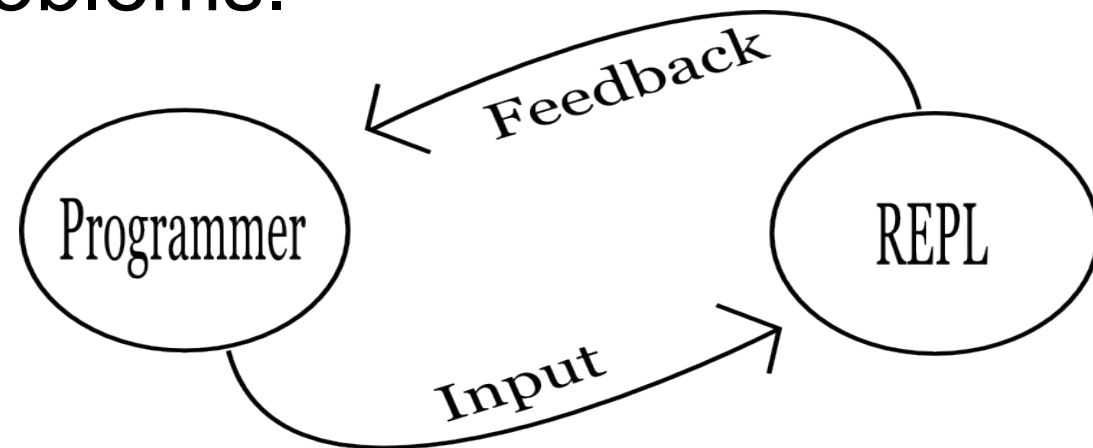
HOW

HOW

HOW

Continuous Deployment Themes

- Release is a marketing decision.

- Deployment is an engineering decision!

HOW
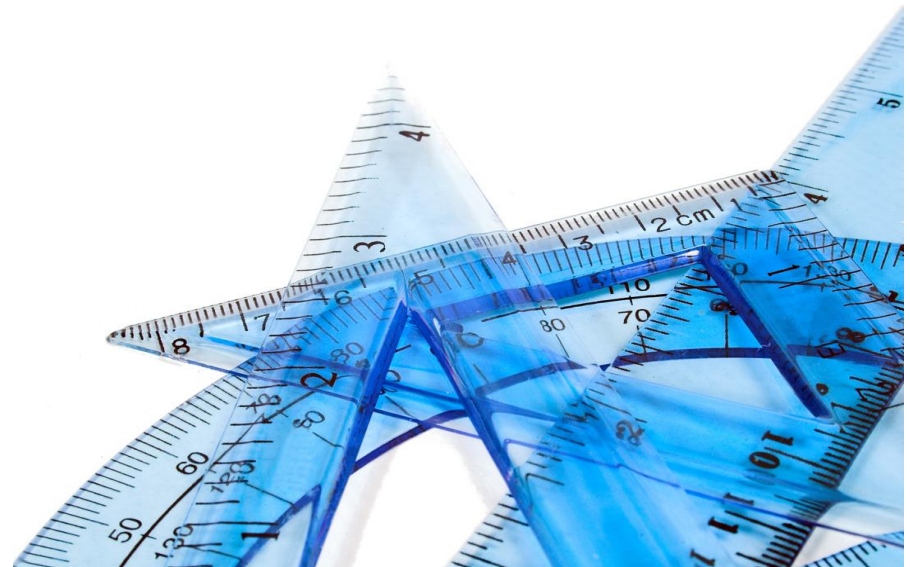
Continuous Deployment Themes

- Small Changes – Reduce Risks

- Kent Beck: You can spill a bucket but you can't spill a Hose.

HOW
Culture

- **Everyone** need to care about **everything**!
  - build
  - tests
  - quality
  - production
  - monitoring
  - business

HOW
Culture

- No Broken Windows!

Broken Windows Theory

HOW

Culture

"What's the worse that could happen?"
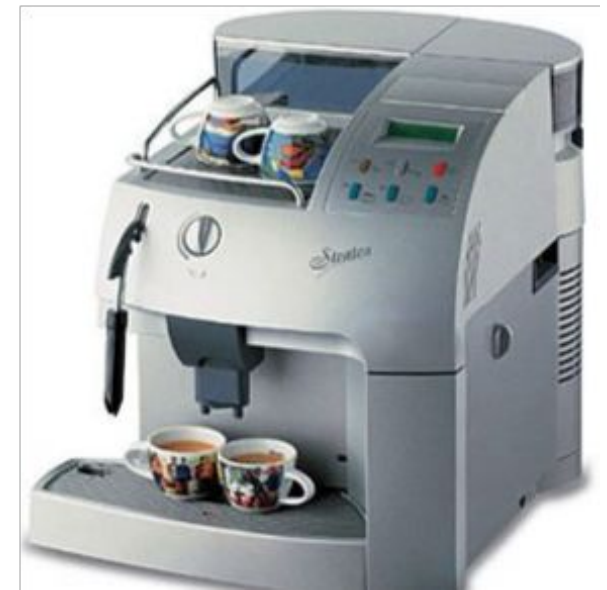
WORKFLOW

WORKFLOW
Dev

Traditional Release Organization

Timeline
1-4 Weeks

Development
- Software organized as a tree
- Engineers work on feature branches

Release Cut
- aka code freeze
- Features get integrated into trunk
- Trunk goes on production
- Trunk is the truth

Stage
Release train on regular cyclic period

QA
QA Ensures correctness of each train

Fix P1 Bugs

Integrate Patches
P1 Bugs get patched back into the train

Release !
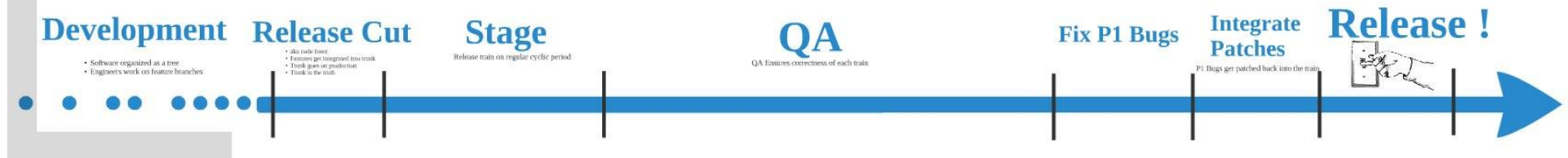
WORKFLOW
Dev

Continuous Deployment

Timeline
5-10 Minutes

Development
Using Experiments to hide
half baked features

~~Cut a Release~~

~~Stage~~

Automated QA Testing and Staging

~~Fix Bugs~~

~~Integrate Patches~~

Deploy Release !

... Monitor...

WORKFLOW
PM - Dev

- Tasks **queue** continuously prioritized
- Developer handles **one** task from inception to production
- **Fast**, automated **tests**
- **Fast**, automated **deployments**
- (**feature flags**, internal versions, if needed)

The

INGREDIENTS

INGREDIENTS
Trunk Stable

- Everyone run tests before commit
- No branches, really
- Trunk may get released any moment. If you commit now, users will see it really soon.
  => Test your code, **really good**
- Use feature flags, but only if you must
- Forward and backward compatibility

INGREDIENTS
Automated Tests

- We have about 2000 test cases
- They run in < 4 minutes
- We use TeamCity
- We regularly test production

Desired state: No manual QA whatsoever.

INGREDIENTS
Infrastructure Automation

"Infrastructure as code"

- Using kickstart script to install OS and Chef agent.
- All infrastructure is deployed by **Chef**.
- All apps are deployed by **Glu**
- All scripts, and chef cookbooks, glu configs are SVNed.
- Very easy to deploy large number of machines.

INGREDIENTS
Deployer

```
~ $ svn ci -m"Implementing
the super-sharp images algo
#deploy:ImageServer #to:ny
"
```

Services:	ImageServer,WebStemmer
Tags:	test,stg
Version:	latest
Who are you?	ran
Message: Will be used for yammer	Testing the new image stemming algorithm

Submit To TeamCity

remove SUCCESS_IN_GLU_HANDS_NOW	Categorization	all	34440	59a6ed46ebaa8dd7a7e29d76f4dc5a2514c962af 334	02:37:16 10-02	02:37:43 10-02
remove SUCCESS_IN_GLU_HANDS_NOW	Categorization	se7	34440	4b60f3f6e356df578384804ad4f330996e968e5a 333	02:22:14 10-02	02:22:42 10-02
remove SUCCESS_IN_GLU_HANDS_NOW	testBlogs	of16	34429	edfd5d2a22bf5fbfef2e546339d2d5bdc793e4a4 332	11:32:19 10-02	11:32:44 10-02
remove SUCCESS_IN_GLU_HANDS_NOW	www	web2	34349	1ac66055fee6de88079bb30103f6d5cbccefef62 331	10:42:30 10-02	10:42:58 10-02
remove SUCCESS_IN_GLU_HANDS_NOW	ImageServer	imagefetcher	34415	8aed83eff774c1db4952e86954e58c071f3b3784 330	09:11:49 10-02	09:12:15 10-02
remove SUCCESS_IN_GLU_HANDS_NOW	CacheWarmer,VotesOnlineDB	stg	34401	1731d0d41d272836e02fe25bf9746864312f4725 329	07:42:22 10-02	07:42:52 10-02

Dashboard System

Group By: mountPoint:25   agent:100 ☑   container:0 ☑   version:34 ☑   product:25 ☑   cluster:7 ☑   skeleton:0 ☐   script:2 ☐   st

Show/Hide: Summary: ☑   Errors: ☐   Last Modified: ☐

mountPoint:25	I:303	E:15	agent:80	container:0	version:34	product:25	cluster:7	status:4
/AdminSite/i001	3	1	3		33728	AdminSite	3	2
/AdsEngine/i001	8	2	8		3	AdsEngine	5	3
/BackendUtils/i001	7	0	7		34200	BackendUtils	2	running
/BloggerUtils/i001	38	1	38		2	BloggerUtils	4	2
/CacheWarmer/i001	13	1	13		2	CacheWarmer	4	2
/Categorization/i001	7	1	7		2	Categorization	3	2
/CrawlerSpawn/i001	4	1	4		2	CrawlerSpawn	2	2
/DocumentEngine/i001	7	0	7		2	DocumentEngine	3	running
/DocumentServices/i001	3	1	3		2	DocumentServices	2	2
/ImageServer/i001	41	1	41		5	ImageServer	4	2
/Impressions/i001	1	0	ofl7.nydc1.outbrain.com		33442	Impressions	ny	running
/Indexer/i001	2	1	2		2	Indexer	2	2
/MonitoringService/i001	1	0	ofl4.nydc1.outbrain.com		33808	MonitoringService	ny	running
/OBFlightManager/i001	3	0	3		2	OBFlightManager	3	running
/Owch/i001	1	0	ofl4.nydc1.outbrain.com		33777	Owch	ny	running
/PCEngine/i001	3	0	3		34238	PCEngine	2	running
/RedirectSrv/i001	38	1	38		2	RedirectSrv	4	2
/SourceServices/i001	1	0	webstem1.nydc1.outbrain.com		33345	SourceServices	ny	running
/VotesOnlineDB/i001	39	2	39		3	VotesOnlineDB	5	3
/VotesPreProcessor/i001	37	1	37		33257	VotesPreProcessor	2	2
/VotesServer/i001	38	1	38		2	VotesServer	4	2
/WebStemmer/i001	2	0	2		33325	WebStemmer	ny	running
/Widgets/i001	1	0	api7.nydc1.outbrain.com		34259	Widgets	ny	running
/testBlogs/i001	1	0	ofl6.nydc1.outbrain.com		34429	testBlogs	ny	running
/www/i001	4	0	4		2	www	3	running

384/384 - 100%

origin=rest - action=deploy - filter=metadata.version=34461 - SEQUENTIAL

origin=rest - action=deploy - filter=metadata.version=34461 - 59m53s

api16.nydc1.outbrain.com - /VotesOnlineDB/i001 - 56s

    Stop api16.nydc1.outbrain.com:/VotesOnlineDB/i001 on api16.nydc1.outbrain.com - 13s

    Unconfigure api16.nydc1.outbrain.com:/VotesOnlineDB/i001 on api16.nydc1.outbrain.com - 41

    Uninstall api16.nydc1.outbrain.com:/VotesOnlineDB/i001 from api16.nydc1.outbrain.com - 1s

    Uninstall script for installation api16.nydc1.outbrain.com:/VotesOnlineDB/i001 on api16.nydc1.

    Install script for installation api16.nydc1.outbrain.com:/VotesOnlineDB/i001 on api16.nydc1.out

    Install api16.nydc1.outbrain.com:/VotesOnlineDB/i001 on api16.nydc1.outbrain.com - 5s

    Configure api16.nydc1.outbrain.com:/VotesOnlineDB/i001 on api16.nydc1.outbrain.com - 418m

    Start api16.nydc1.outbrain.com:/VotesOnlineDB/i001 on api16.nydc1.outbrain.com - 34s

api17.nydc1.outbrain.com - /VotesOnlineDB/i001 - 1m5s

    Stop api17.nydc1.outbrain.com:/VotesOnlineDB/i001 on api17.nydc1.outbrain.com - 13s

    Unconfigure api17.nydc1.outbrain.com:/VotesOnlineDB/i001 on api17.nydc1.outbrain.com - 42

    Uninstall api17.nydc1.outbrain.com:/VotesOnlineDB/i001 from api17.nydc1.outbrain.com - 1s

    Uninstall script for installation api17.nydc1.outbrain.com:/VotesOnlineDB/i001 on api17.nydc1.

    Install script for installation api17.nydc1.outbrain.com:/VotesOnlineDB/i001 on api17.nydc1.out

    Install api17.nydc1.outbrain.com:/VotesOnlineDB/i001 on api17.nydc1.outbrain.com - 6s

    Configure api17.nydc1.outbrain.com:/VotesOnlineDB/i001 on api17.nydc1.outbrain.com - 425m

    Start api17.nydc1.outbrain.com:/VotesOnlineDB/i001 on api17.nydc1.outbrain.com - 41s

api18.nydc1.outbrain.com - /VotesOnlineDB/i001 - 1m9s

    Stop api18.nydc1.outbrain.com:/VotesOnlineDB/i001 on api18.nydc1.outbrain.com - 13s

    Unconfigure api18.nydc1.outbrain.com:/VotesOnlineDB/i001 on api18.nydc1.outbrain.com - 43

    Uninstall api18.nydc1.outbrain.com:/VotesOnlineDB/i001 from api18.nydc1.outbrain.com - 2s

    Uninstall script for installation api18.nydc1.outbrain.com:/VotesOnlineDB/i001 on api18.nydc1.

    Install script for installation api18.nydc1.outbrain.com:/VotesOnlineDB/i001 on api18.nydc1.out

    Install api18.nydc1.outbrain.com:/VotesOnlineDB/i001 on api18.nydc1.outbrain.com - 6s

INGREDIENTS
Servicization

- At outbrain we have ~ 25 services
- Each service is deployed at > 1 server
- If there's damage, it's contained
- It's easy to make small changes
- If there's an error it's easy to find it
- If rollback is needed it's easier
- Everything is either proxies (HAProxy) or queued (AMQ)
- Challenge: It's sometimes hard to find the right balance:
  - number of services that need maintanance
  - complexity
  - performance
  - api conformance

INGREDIENTS
The Immune System

- Coding
  - Review
  - Testing
- Monitoring
  - We use Nagios for the vitals
  - Regularly check servers via instrumentation
  - KeyNote
  - Test Production (selenium,APT)
- Instrumentation
  - Self-Test
  - Performance
- Monitoring KPIs
  - PVs,
  - 3 different CTRs,
  - clicks, revenue, RPM
  - etc...
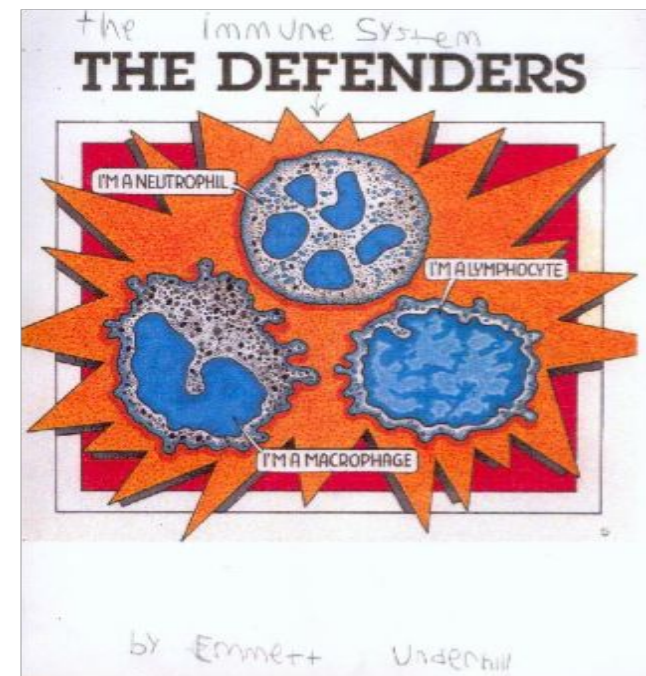
INGREDIENTS
The Immune System

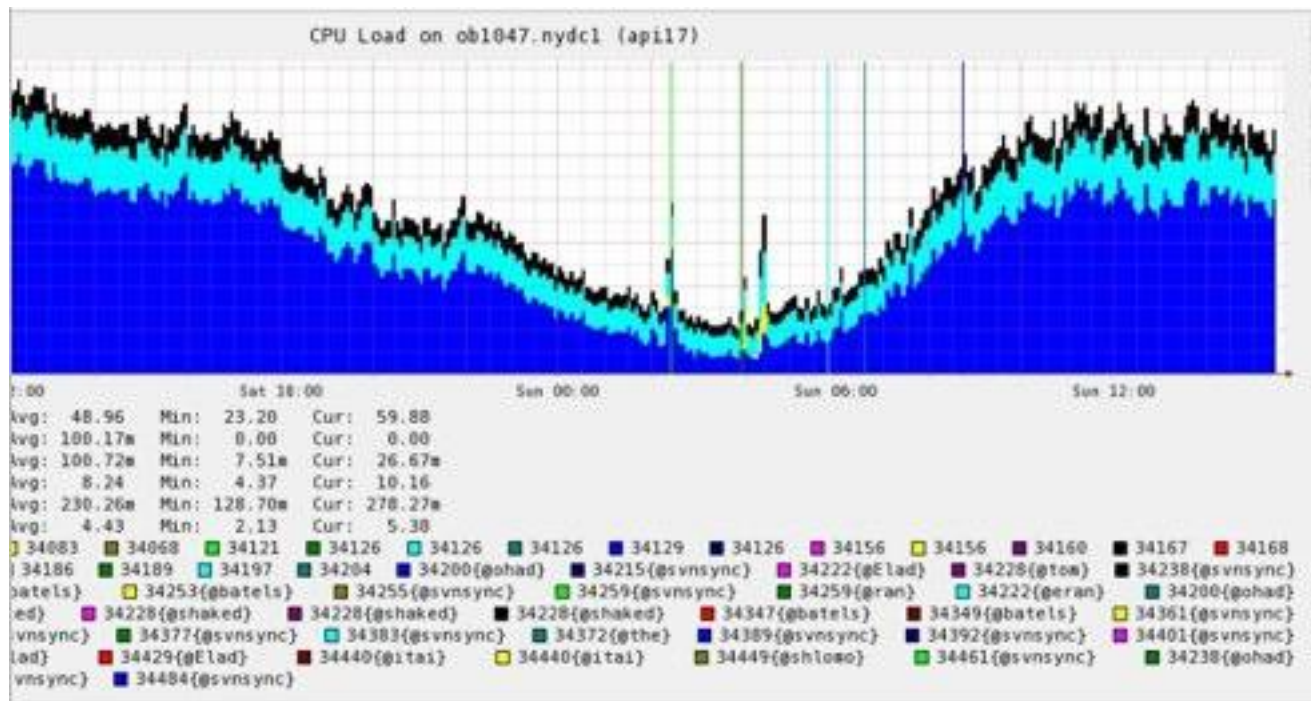● The line of defense will always be broken

=> Multiple lines of defense

INGREDIENTS
Visibilty

- Everyone monitor the services
- When there's a deployment, you see it on the graph

INGREDIENTS
Visibilty

● Yammer

INGREDIENTS
Visibilty

- svn changelog
- glu changelog
- glu audit log

origin=rest - action=deploy - filter=metadata.version=34449 - SEQUENTIAL	api	02/11/11 15:19:10 EST	02/11/11 15:29:24 EST	10m13s
origin=rest - action=deploy - filter=metadata.version=34440 - SEQUENTIAL	api	02/10/11 14:37:43 EST	02/10/11 14:42:54 EST	5m10s
origin=rest - action=deploy - filter=metadata.version=34440 - SEQUENTIAL	api	02/10/11 14:22:42 EST	02/10/11 14:24:08 EST	1m26s
origin=rest - action=deploy - filter=metadata.version=34429 - SEQUENTIAL	api	02/10/11 11:32:44 EST	02/10/11 11:34:27 EST	1m42s
origin=rest - action=deploy - filter=metadata.version=34349 - SEQUENTIAL	api	02/10/11 10:42:58 EST	02/10/11 10:48:54 EST	5m55s
origin=rest - action=deploy - filter=metadata.version=34415 - SEQUENTIAL	api	02/10/11 09:12:15 EST	02/10/11 09:17:03 EST	4m48s
origin=rest - action=deploy - filter=metadata.version=34401 - SE				
origin=rest - action=deploy - filter=metadata.version=34392 - SE				
origin=rest - action=deploy - filter=metadata.version=34389 - SE				
origin=rest - action=deploy - filter=metadata.version=34372 - SE				
origin=rest - action=deploy - filter=metadata.version=34383 - SE				
origin=rest - action=deploy - filter=metadata.version=34377 - SE				
origin=rest - action=deploy - filter=metadata.version=34372 - SE				

Date	Username	Type	Details
02/13/11 17:24:16 EST	ran	login	
02/13/11 13:34:45 EST	ran	login	
02/13/11 10:10:57 EST	ohad	login	
02/13/11 08:45:53 EST	ohad	plan.execute	plan: 344, desc: mountPoint [/VotesOnlineDB/i001] - SEQUENTIAL, systemId: 5300ef1896ce733137cdb553
02/13/11 08:45:21 EST	ohad	plan.execute	plan: 343, desc: mountPoint [/VotesOnlineDB/i001] - SEQUENTIAL, systemId: 5300ef1896ce733137cdb553
02/13/11 08:41:43 EST	api	plan.execute	plan: 342, desc: origin=rest - action=deploy - filter=metadata.version=34484 - SEQUENTIAL, systemId: 5300ef1896ce733137cdb5533bebed324c8a1483
02/13/11 08:41:43 EST	api	system.change	fabric: outbrain, systemId: 5300ef1896ce733137cdb5533bebed324c8a1483
02/13/11 08:39:36 EST	ohad	login	
02/13/11 06:43:38 EST	ohad	agent.tailLog	[fabric:outbrain, maxLine:500, id:testapi1.test.outbrain.com, action:tailLog, controller:agents, __nvbe:System]
02/13/11 06:43:00 EST	ohad	agent.tailLog	[fabric:outbrain, maxLine:500, id:testapi1.test.outbrain.com, action:tailLog, controller:agents, __nvbe:System]
02/13/11 06:42:49 EST	ohad	agent.tailLog	[fabric:outbrain, maxLine:500, id:testapi1.test.outbrain.com, action:tailLog, controller:agents, __nvbe:System]
02/13/11 06:42:39 EST	ohad	agent.tailLog	[fabric:outbrain, maxLine:500, id:testapi1.test.outbrain.com, action:tailLog, controller:agents, __nvbe:System]
02/13/11 06:42:26 EST	ohad	agent.tailLog	[fabric:outbrain, maxLine:500, id:testapi1.test.outbrain.com, action:tailLog, controller:agents, __nvbe:System]
02/13/11 06:41:58 EST	ohad	plan.execute	plan: 341, desc: mountPoint [/VotesOnlineDB/i001] - SEQUENTIAL, systemId: 6d1ae52be9c7d59bed20b984

INGREDIENTS
Learn Fast, Adapt Fast

- 5 Ys

Fun Numbers

- 5-50 production changes a day!!!
- More then 2000 code tests running in less then 4 minutes.
- More then 600 production services tests runs every 10 minutes.
- It takes ~30 minutes from code complete to ~100 machines deployed.

References

- [Why Continuous Deployment](#) / Eric Ries
- [Continuous Deployment at outbrain](#) / Ran Tavory
- [Deployment Infrastructure for Continuous Deployment](#) / WealthFront
- [Continuous Deployment presentation](#) / Eishay Smith
- [Quantum of Deployment](#) / Etsy
- [Chrome Release Cycle](#) / Anthony Laforge