CALL OF DUTY:

DEV OPS

STEPHEN BURTON, TECH EVANGELIST, APPDYNAMICS

I'M STEVE BURTON

TECH EVANGELIST

@BURTONSAYS

MY COMPANY

AppDynamics

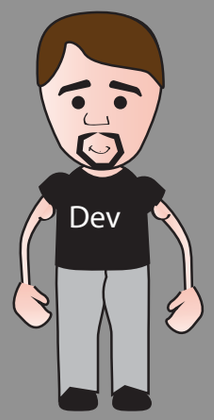
MY PASSION

THE GAME TODAY

GAME SELECT

- A DEVELOPER
- OPERATIONS
- DEVOPS
- NOOPS

DEVELOPER



MISSION PARAMETERS:
- DESIGN, DEVELOP, TEST

MISSION OBJECTIVES
- MEET FUNCTIONAL REQUIREMENTS

RECOMMENDED ESSENTIALS
- BEER, COFFEE, REDBULL, PIZZA

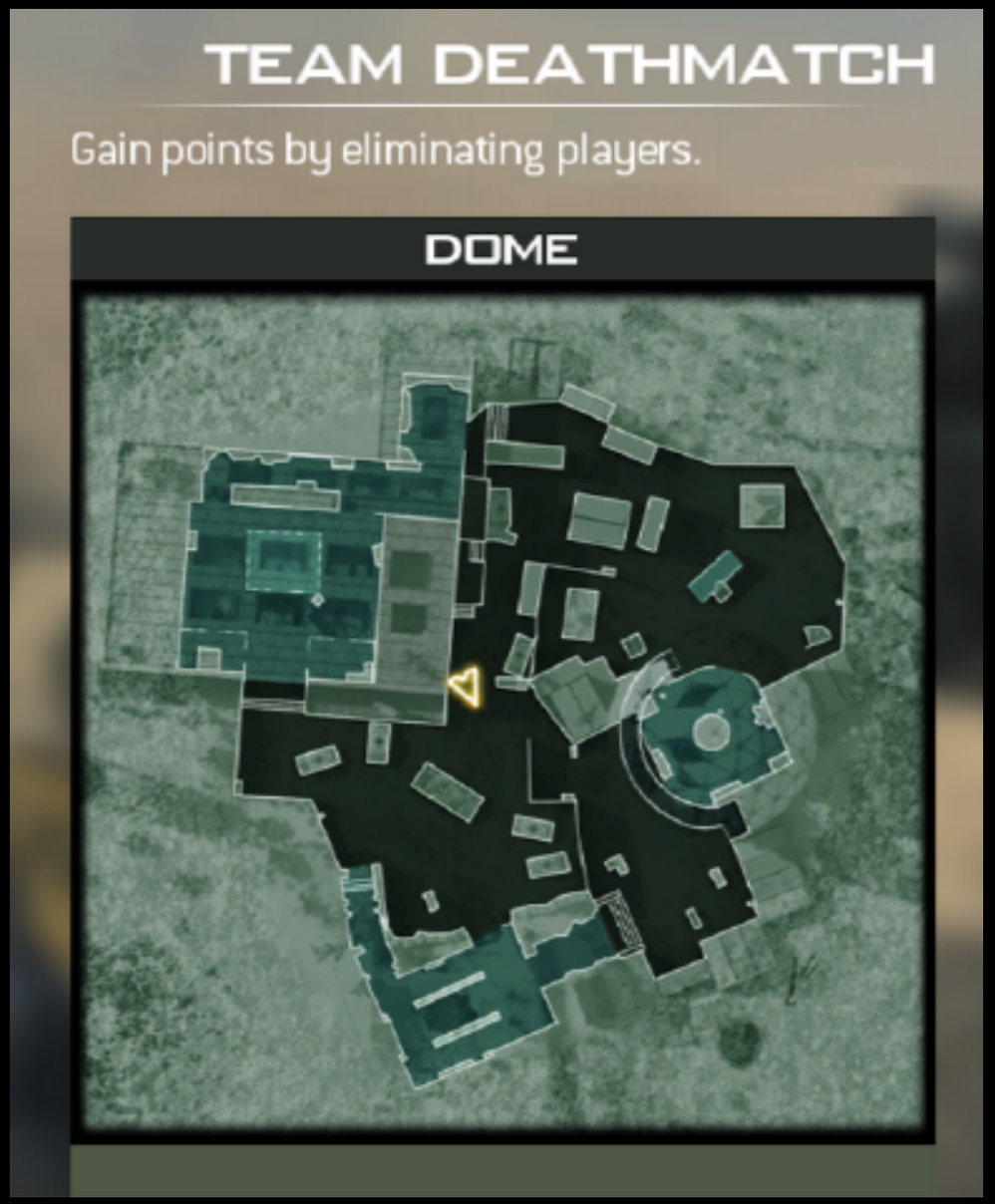
YESTERDAY'S BATTLE

AGILE DEVELOPMENT

YESTERDAY'S BATTLE

UNIT & FUNCTIONAL TESTING

YESTERDAY'S BATTLE

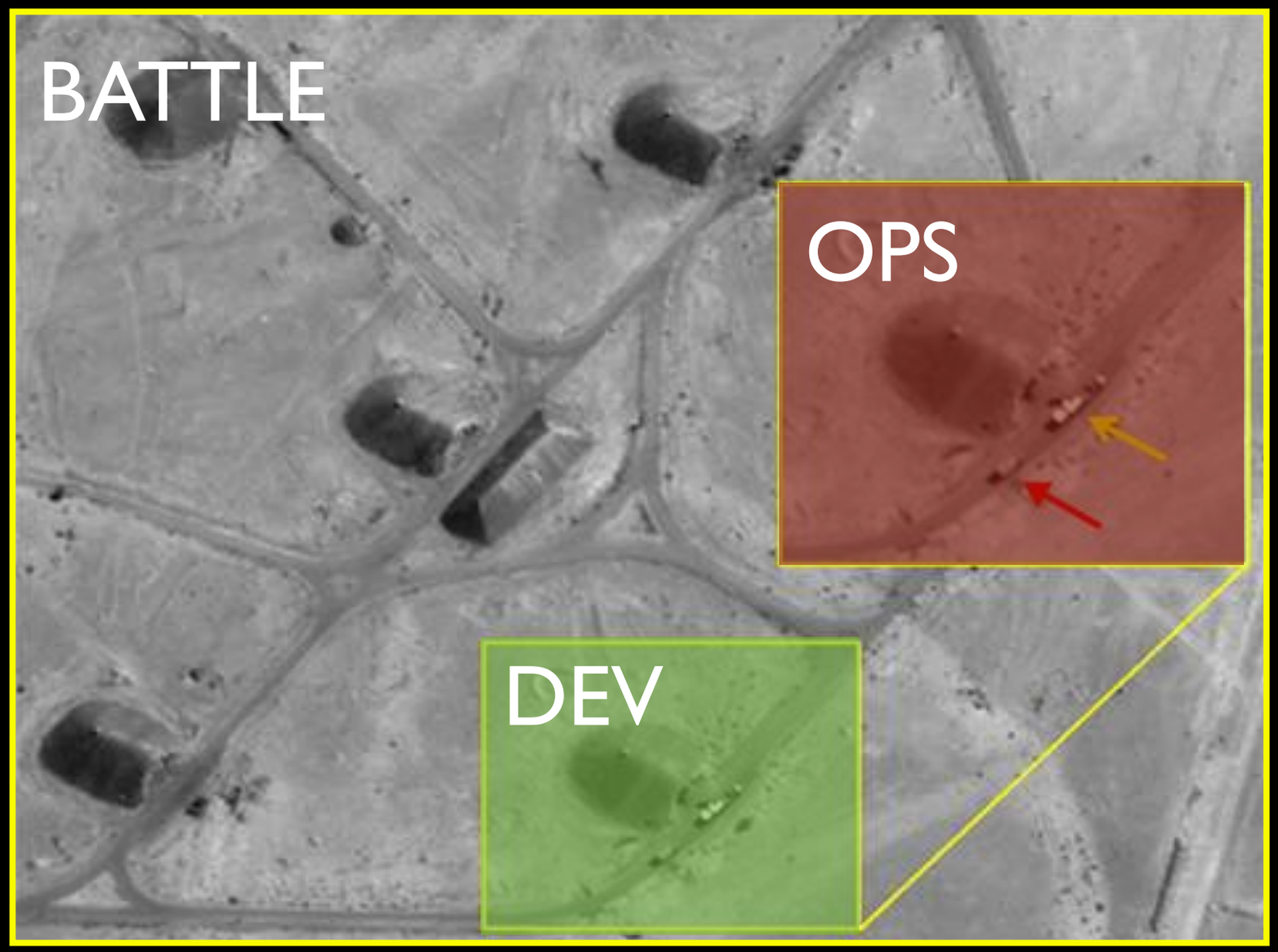


FRIENDLY FIRE

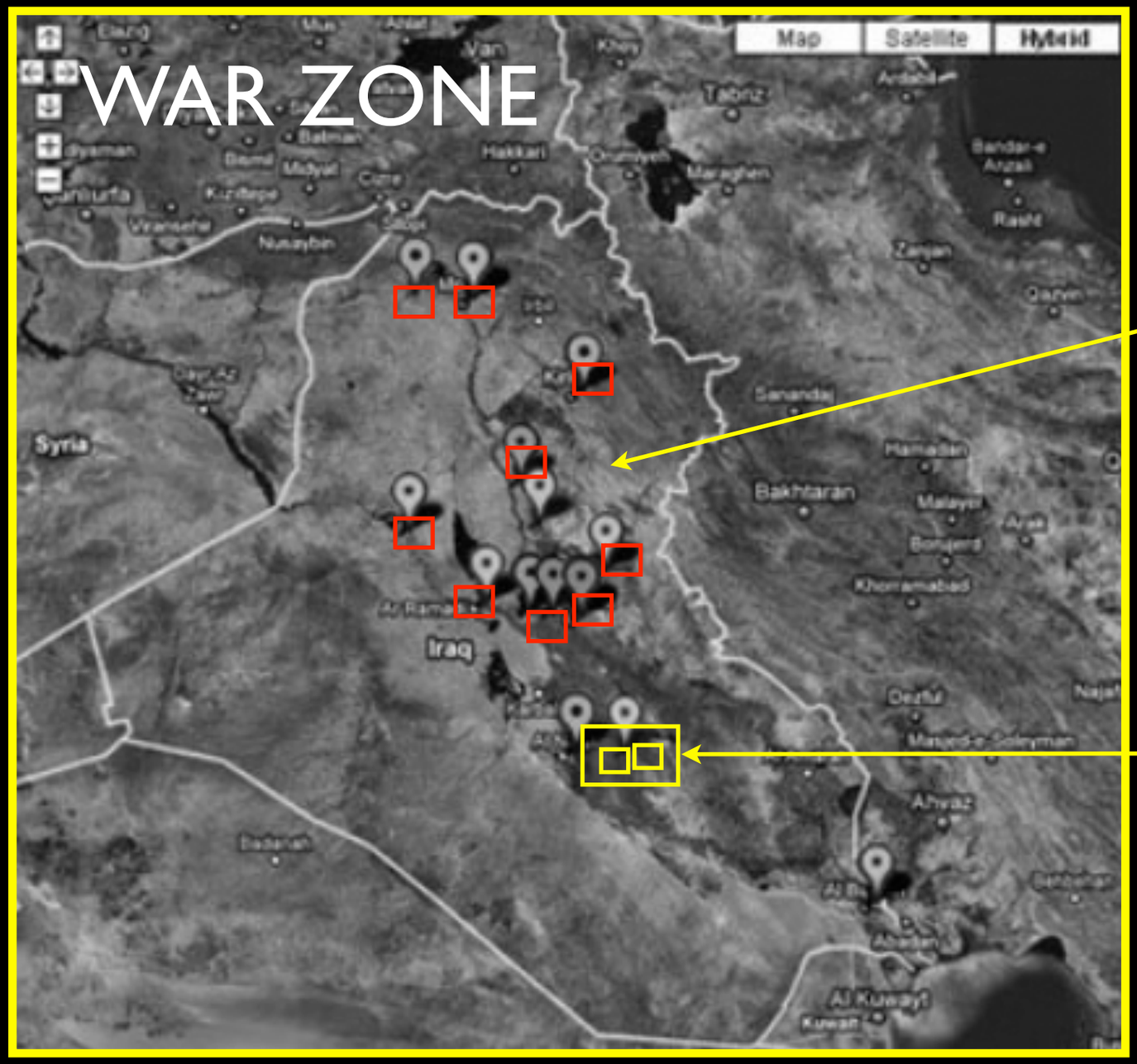
YESTERDAY'S BATTLE

THE WAR ROOM

THE PROBLEM



THE BIGGER PICTURE



YOUR COMPETITORS

YOUR BUSINESS

ENEMY IS
ON THE OUTSIDE

APPLICATION LIFECYCLE

10 DEVELOP

20 TEST < Pay Attention to Monitoring

30 RUN < Live and Die by Monitoring

40 GOTO 10

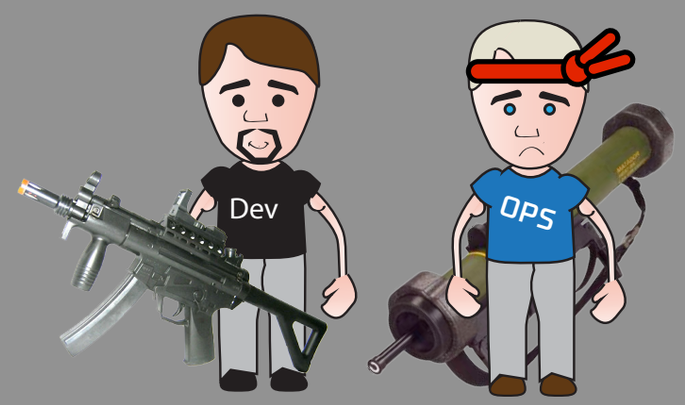
*Taken from “How Netflix Monitors & Operates in the Cloud” by Ariel Tsetlin

THE GAME IS CHANGING

GAME SELECT

- DEVELOPER
- OPERATIONS
- A DEVOPS
- NOOPS

DEVOPS



MISSION PARAMETERS:
- DEVELOP, TEST, DEPLOY, OPERATE
- AUTOMATION & BUSINESS AGILITY

MISSION OBJECTIVES

KILL YOUR COMPETITORS

RECOMMENDED ESSENTIALS

BEER, WHITEBOARDS, COMMUNICATION

THE ENVIRONMENT IS CHANGING

MAP SELECT

- DEVELOPMENT
- TEST
- QA
- STAGING
- A PRODUCTION

PRODUCTION

DESCRIPTION
WHERE THE BUSINESS RUNS.
EXPECT OUTAGES & END USER CASUALTIES.

MAP SIZE
LARGE, DISTRIBUTED, VIRTUAL, COMPLEX

RECOMMENDED EQUIPMENT
RELEASE AUTOMATION & MONITORING

BUT WHAT IS SUCCESS?

OF DEPLOYMENTS ?

OF FEATURES ?

TIME TO MARKET ?

AVAILABILITY?

99.9%

The most meaningless metric in IT today.

DEVELOP, TEST, DEPLOY & AVAILABILITY

!= SUCCESS

AUTOMATION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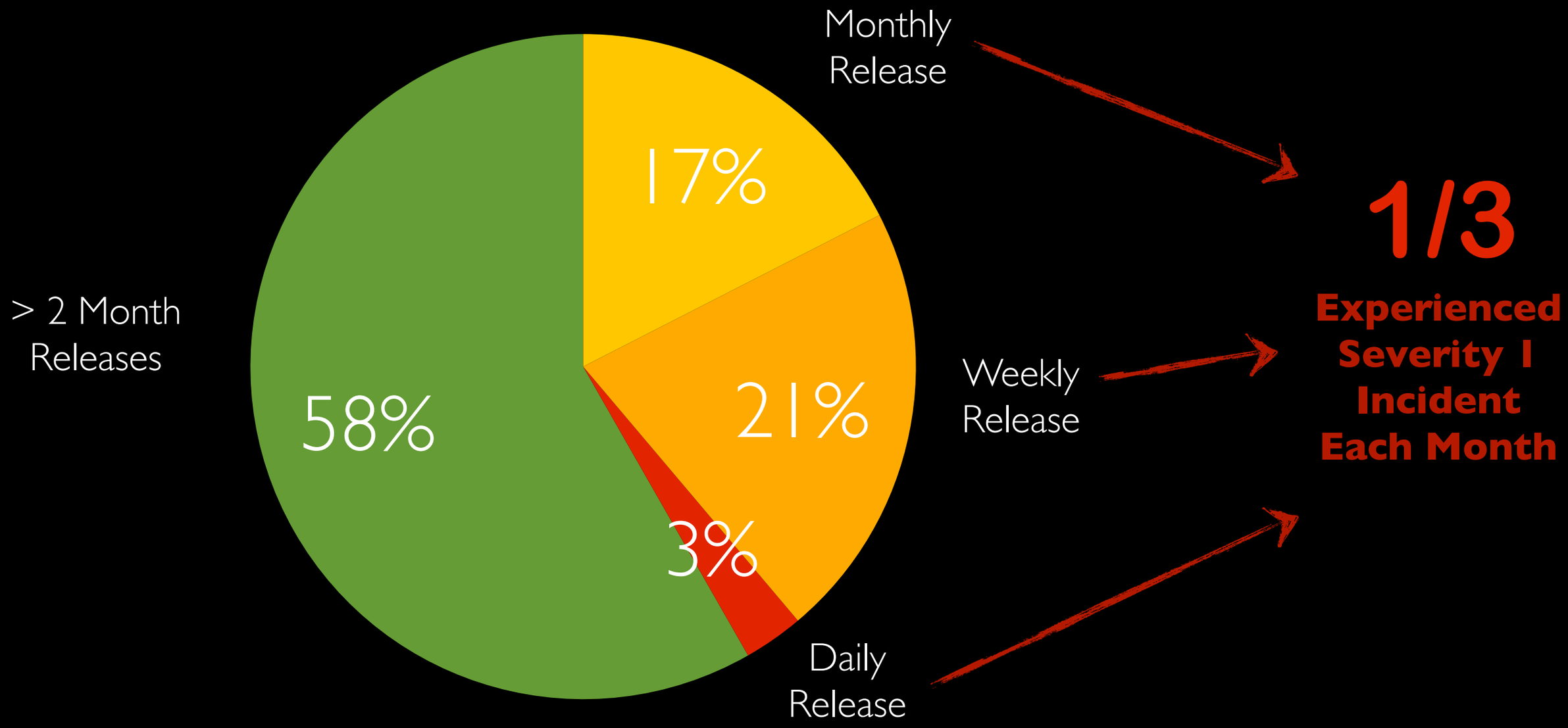
www.defenceimages.mod.uk


U.S. AIR FORCE
ANG
MICHIGAN
37800

CAN AUTOMATE FAILURE

AppDynamics 2011 Survey: 250+ respondents



Source: http://www.appdynamics.com/blog/2011/12/14/storm-clouds-in-2012-summary-of-appdynamics-apm-customer-survey/

FAILURE

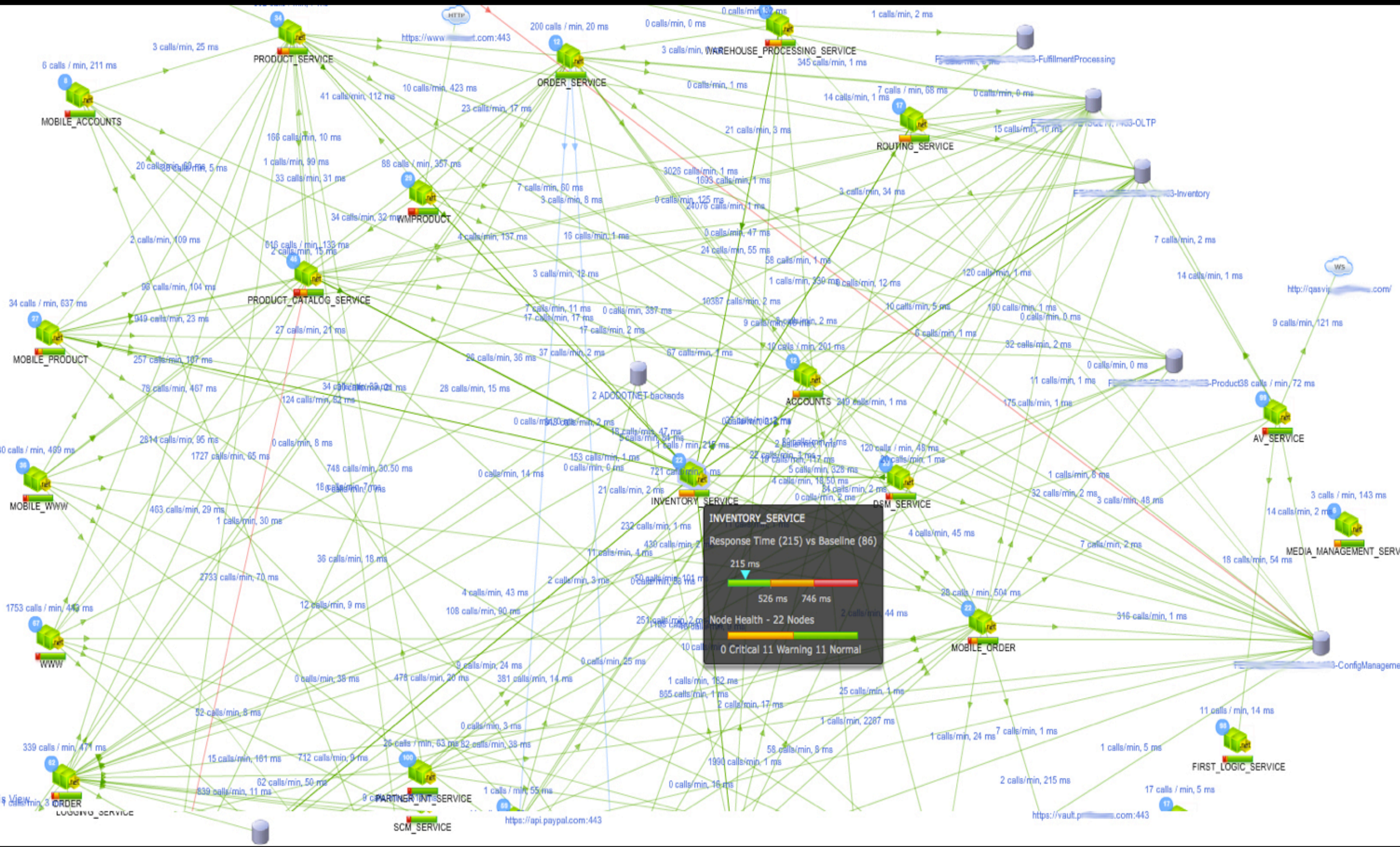
MONITORING

COMMUNICATION IS KEY

BUT...SO IS INTELLIGENCE

WHAT SHOULD DEVOPS MONITOR?

BIG PICTURE IS USEFUL



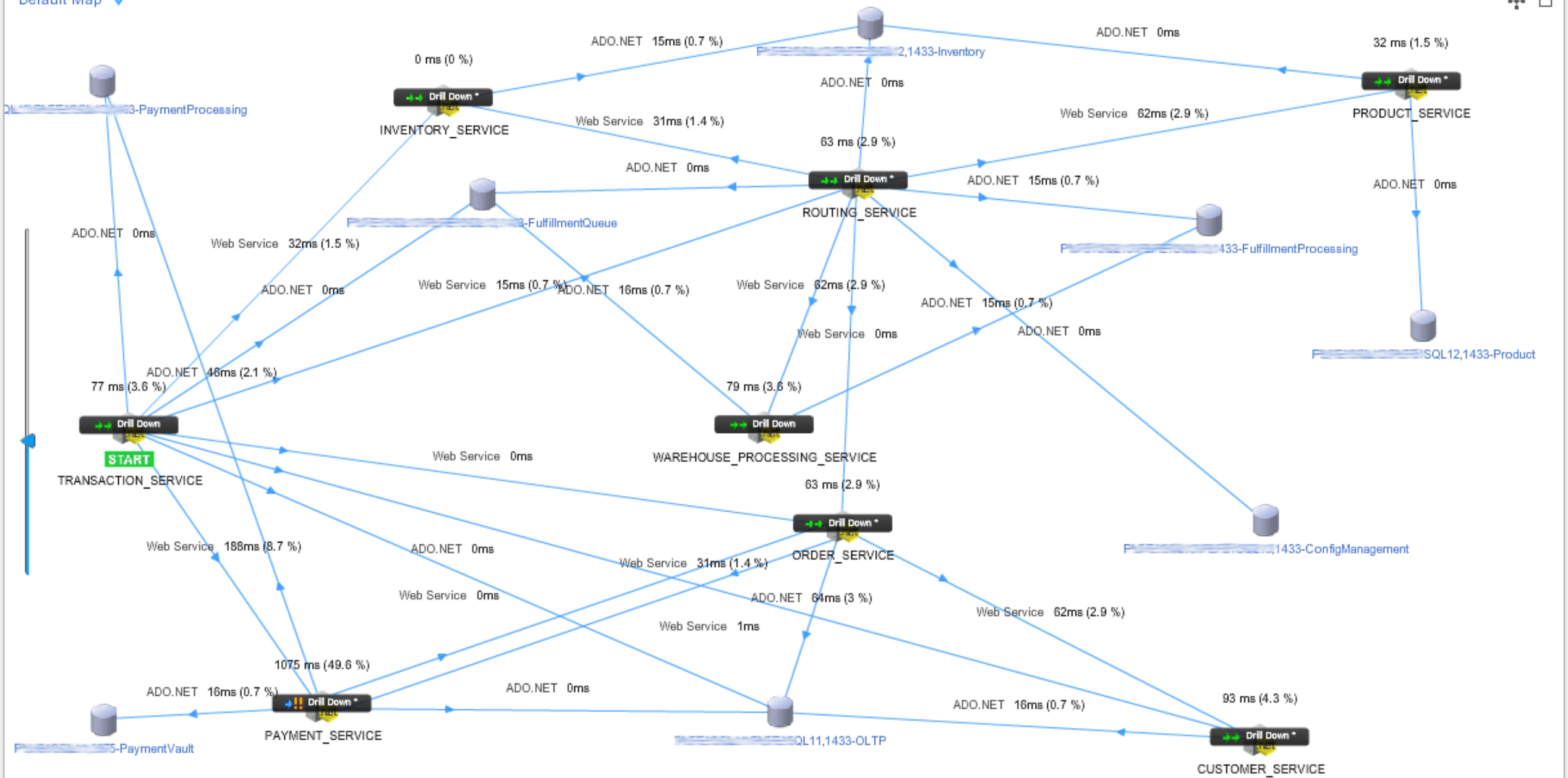
MAPS HELP ALOT

Request: 52ce7998-f475-469b-9b66-b60d0033a341

USER EXPERIENCE	EXECUTION TIME	TIMESTAMP	BUSINESS TRANSACTION	REQUEST GUID
NORMAL	2168 ms	08/07/12 5:59:54 PM	TransactionRouter.submitOrder	52ce7998-f475-469b-9b66-b60d0033a341

Archive

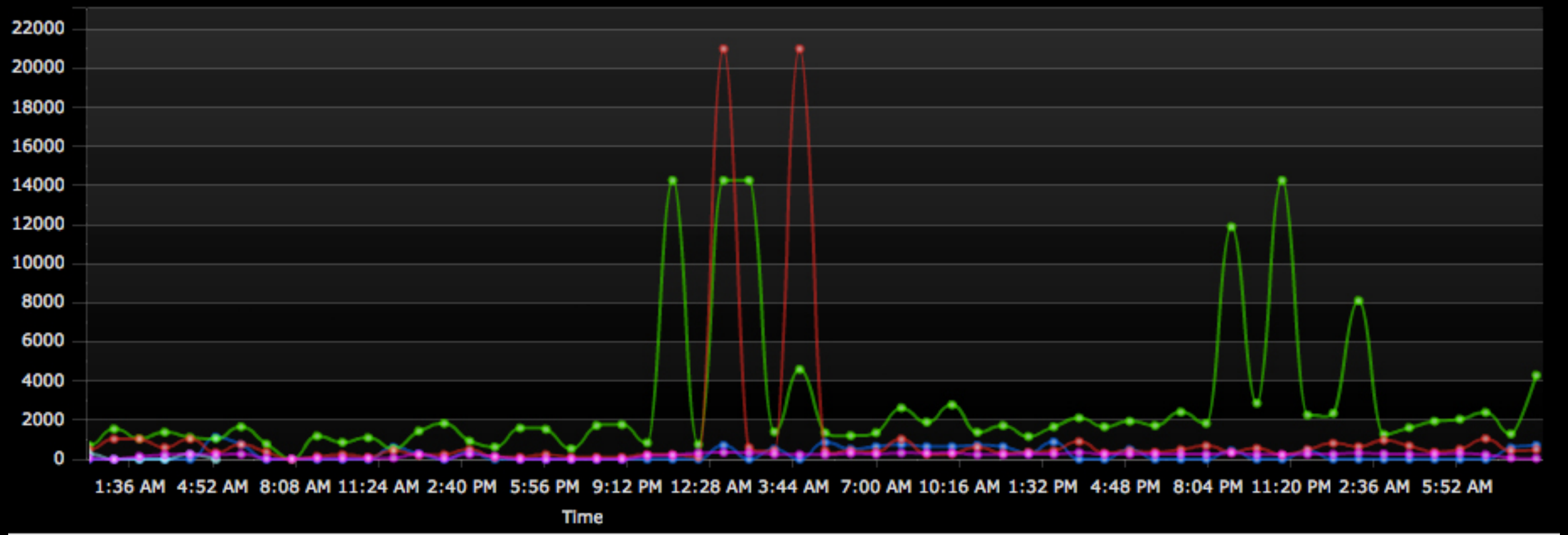
Default Map



Explain this View

(close)

APPLICATION DEPENDANCIES



Backends|http://api.[redacted]net/soap.asmx|Average Response Time (ms) Obs. Min Max Base

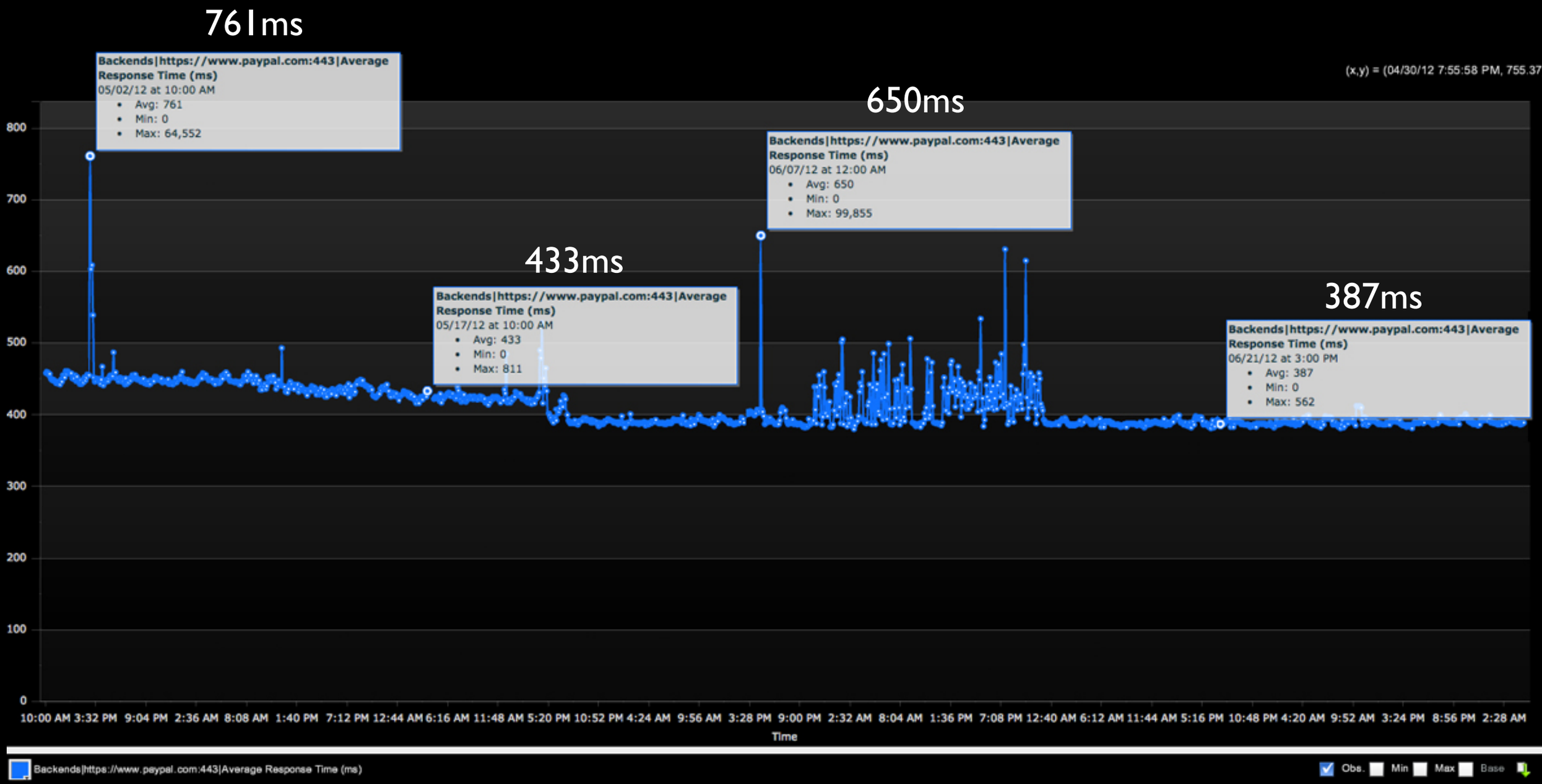
Backends|http://ws.[redacted].com/se-xml/default.asmx|Average Response Time (ms) Obs. Min Max Base

Backends|http://api.[redacted].com/api_service.asmx|Average Response Time (ms) Obs. Min Max Base

Backends|http://ws.[redacted].com/partnerauth/msrpslogotag.asmx|Average Response Time (ms) Obs. Min Max Base

Backends|https://res-client6[redacted]net/faclientservice-6x/faclientservice.asmx|Average Response Time (ms) Obs. Min Max Base

E.G. PAYPAL

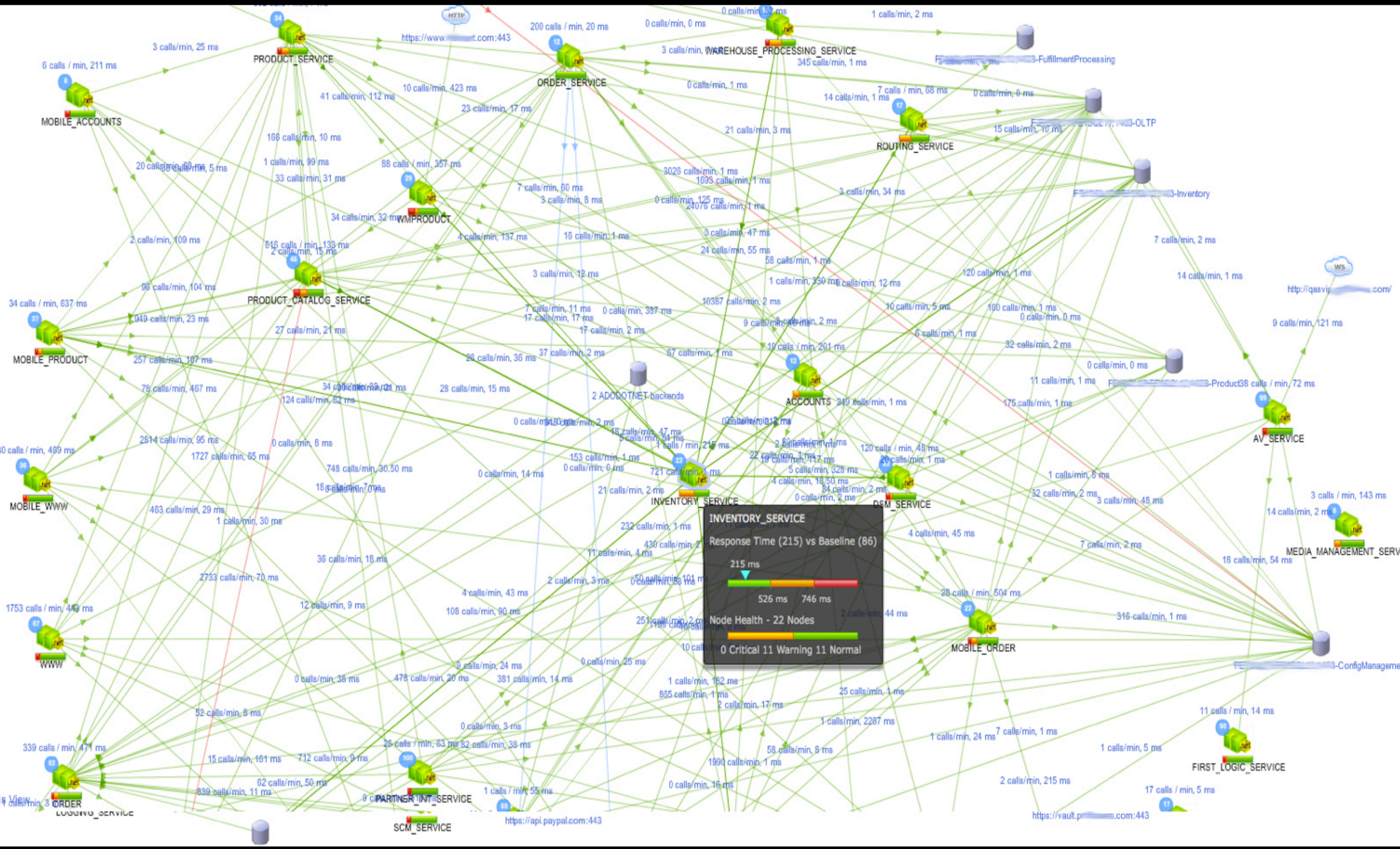


End User Experience improved by 49% in 6 months

NO MONITOR. NO LEARN.

- RESTART SERVERS
- ROLLBACK
- REPRODUCE
- TROUBLESHOOT VS INNOVATE

TRY REPRODUCING THIS....



LEADERS LEARN FROM FAILURE

- AMAZON
- BUSINESS IMPACT
- ROOT CAUSE ANALYSIS

LEADERS LEARN FROM FAILURE

Summary of the Amazon EC2 and Amazon RDS Service Disruption in the US East Region

April 29, 2011

Now that we have fully restored functionality to all affected services, we would like to share more details with our customers about the events that occurred with the Amazon Elastic Compute Cloud ("EC2") last week, our efforts to restore the services, and what we are doing to prevent this sort of issue from happening again. We are very aware that many of our customers were significantly impacted by this event, and as with any significant service issue, our intention is to share the details of what happened and how we will improve the service for our customers.

The issues affecting EC2 customers last week primarily involved a subset of the Amazon Elastic Block Store ("EBS") volumes in a single Availability Zone within the US East Region that became unable to service read and write operations. In this document, we will refer to these as "stuck" volumes. This caused instances trying to use these affected volumes to also get "stuck" when they attempted to read or write to them. In order to restore these volumes and stabilize the EBS cluster in that Availability Zone, we disabled all control APIs (e.g. Create Volume, Attach Volume, Detach Volume, and Create Snapshot) for EBS in the affected Availability Zone for much of the duration of the event. For two periods during the first day of the issue, the degraded EBS cluster affected the EBS APIs and caused high error rates and latencies for EBS calls to these APIs across the entire US East Region. As with any complicated operational issue, this one was caused by several root causes interacting with one another and therefore gives us many opportunities to protect the service against any similar event reoccurring.

Overview of EBS System

It is helpful to understand the EBS architecture so that we can better explain the event. EBS is a distributed, replicated block data store that is optimized for consistency and low latency read and write access from EC2 instances. There are two main components of the EBS service: (i) a set of EBS clusters (each of which runs entirely inside of an Availability Zone) that store user data and serve requests to EC2 instances; and (ii) a set of control plane services that are used to coordinate user requests and propagate them to the EBS clusters running in each of the Availability Zones in the Region.

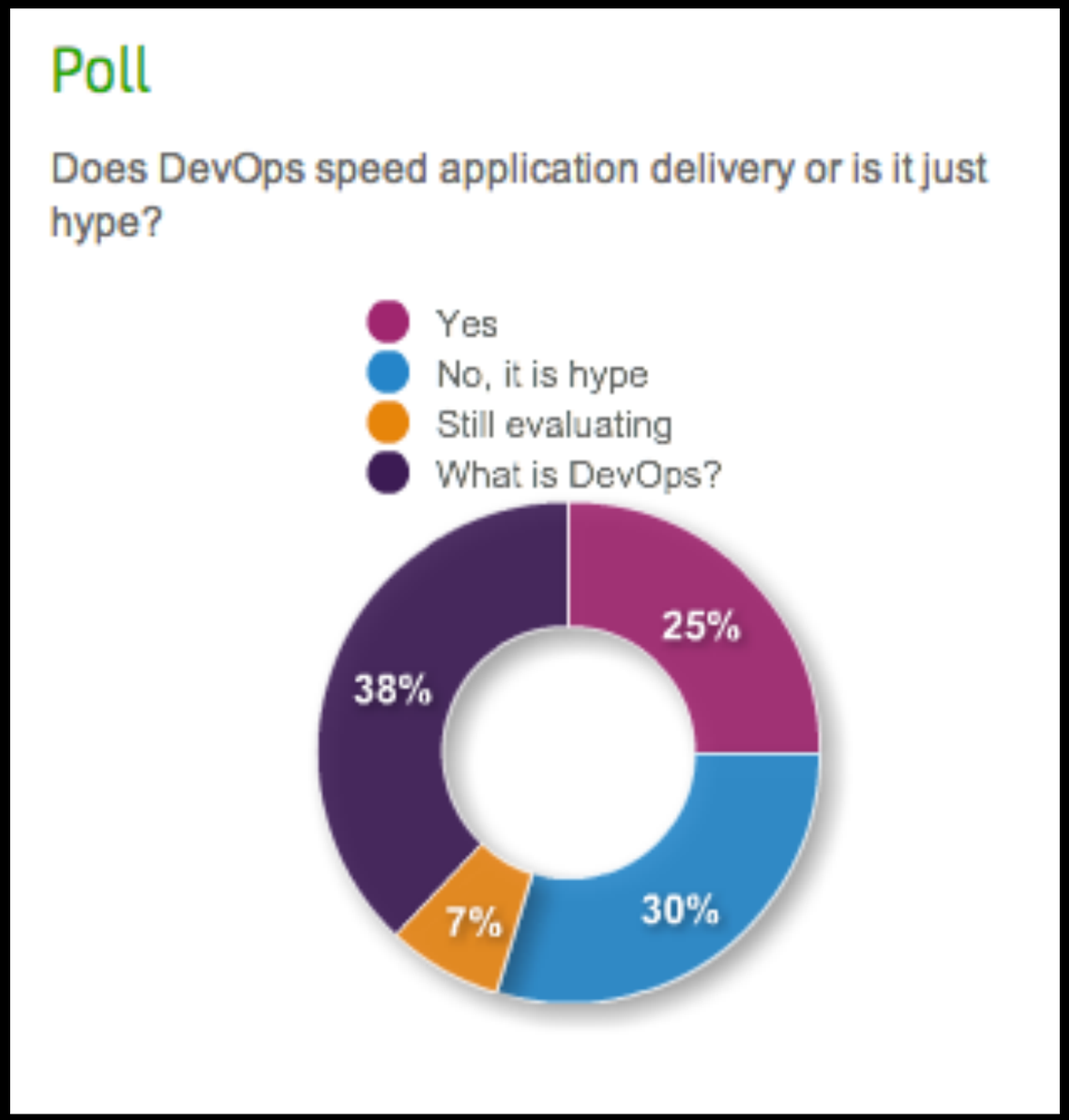
An EBS cluster is comprised of a set of EBS nodes. These nodes store replicas of EBS volume data and serve read and write requests to EC2 instances. EBS volume data is replicated to multiple EBS nodes for durability and availability. Each EBS node employs a peer-to-peer based, fast failover strategy that aggressively provisions new replicas if one of the copies ever gets out of sync or becomes unavailable. The nodes in an EBS cluster are connected to each other via two networks. The primary network is a high bandwidth network used in normal operation

WHAT IS DEVOPS?

"DEVOPS IS ABOUT BEING AGILE AND GOING FROM A-HA TO CHA CHING AS QUICKLY AS POSSIBLE."

John Willis
DevOps Evangelist
DevOps Days 2011

DEVOPS SURVEY



Source: CA.com

WHAT MAKES YOUR BUSINESS SUCCESSFUL?

- REVENUE
- CUSTOMERS
- PRODUCT LEADERSHIP
- DOWNLOADS

WHAT IMPACT DO YOU HAVE ON THE BUSINESS?

IDEA

LET'S MEASURE THE CHA CHING

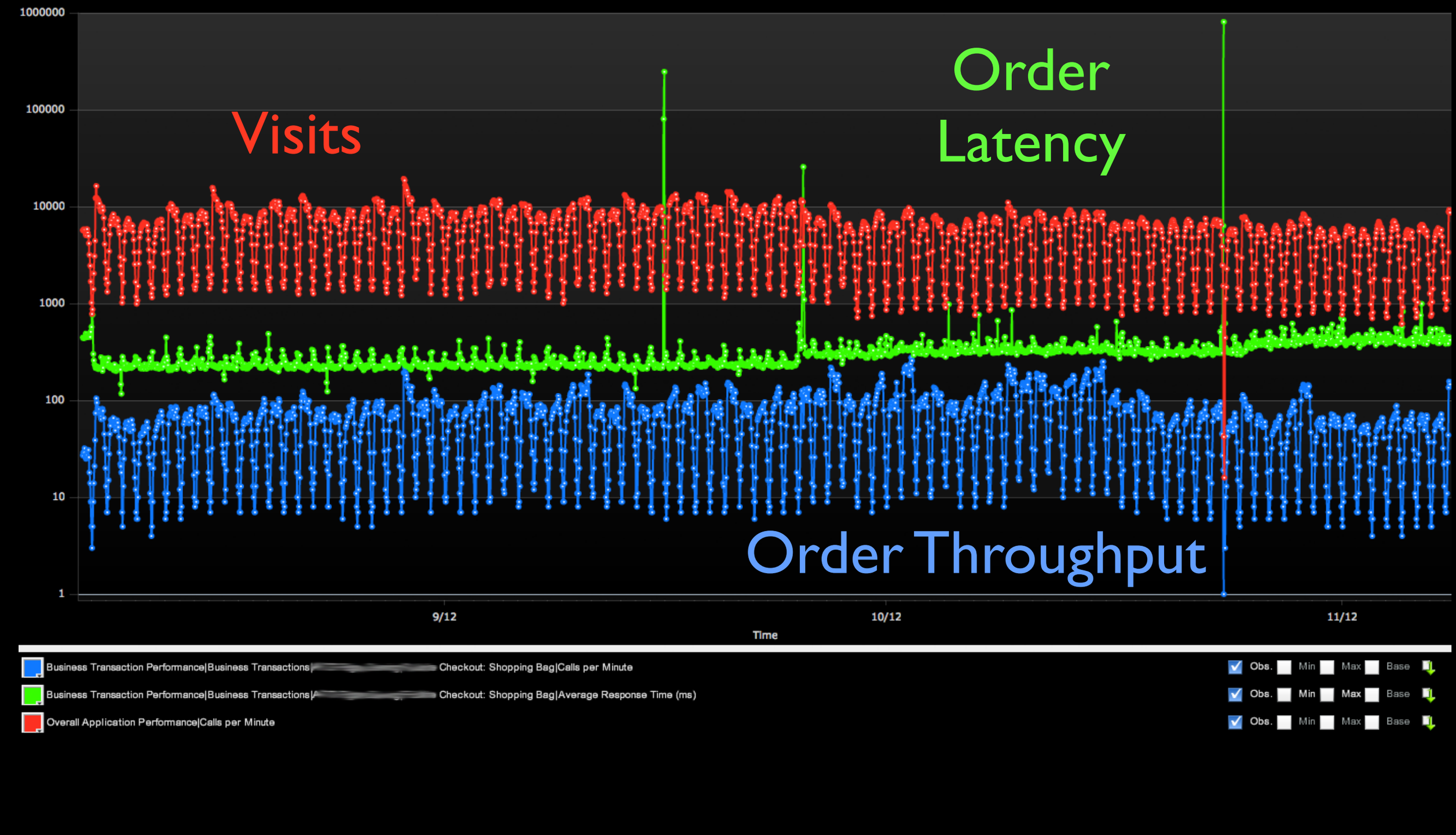
MONITOR BUSINESS TRANSACTIONS

Name	Service Levels	Time (ms)	Calls ▼	Calls / min	Errors	Slow Requests	Very Slow Requests	Stalled Requests
Profile	!	5	3,154,817	2,204	138	9,766	6,616	556
Product Page	x	633	676,516	473	161	10,574	7,379	466
Items Data	x	45	661,287	462	0	3,382	2,643	1
Results Data	x	1015	323,589	226	69	5,958	4,183	9
Autocomplete	✓	20	113,213	79	0	32	7	3
Search	✓	37	106,107	74	27	30	33	3
Collection	x	959	65,550	46	16	1,173	2,062	86
Product	✓	520	61,690	43	1	1,832	1,471	3
Shopping Bag Checkout	x	522	46,463	32	482	1,325	576	111
Login Account	✓	44	21,673	15	33	160	3	13
Shopping Bag Form	✓	446	19,982	14	22	860	356	4
My [redacted]	x	1794	12,425	9	824	377	883	23
Store Locator	✓	40	10,253	7	0	4	2	0
Login	✓	8	10,121	7	0	43	0	0

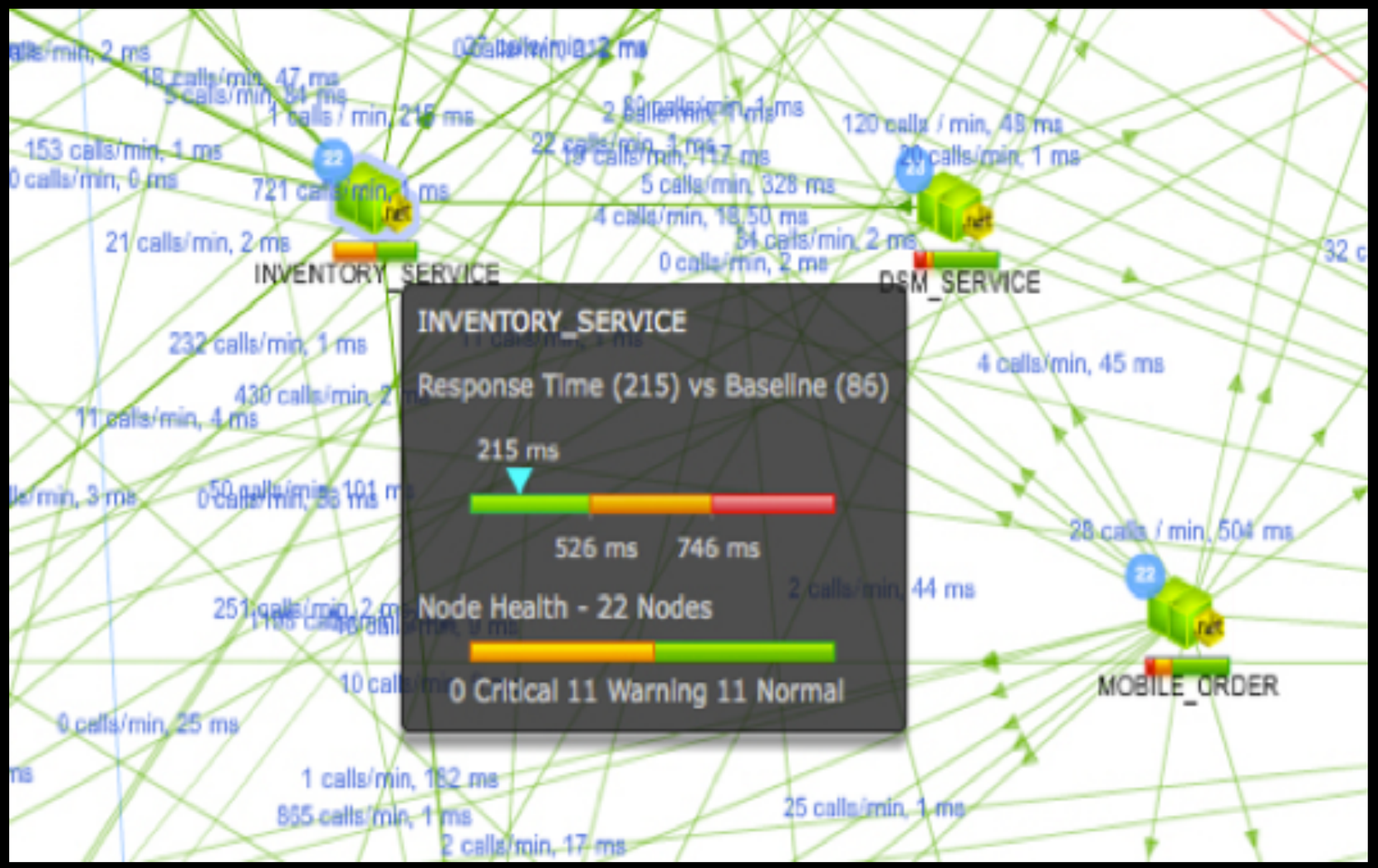
2,492 Checkouts Impacted @ $75 each
= $186,900 revenue risk from incident

99.9% or $186,900

MONITOR SERVICES OVER INFRASTRUCTURE



MONITOR SERVICES OVER INFRASTRUCTURE



COMPARE DEPLOYMENTS

TIME RANGE last 3 hours

Name	Service Levels	Time (ms)	Calls	Calls / min ▼	Errors	Slow Requests	Very Slow Requests	Stalled Requests
Login	✓	11	14,469,900	10,063	37	31	6	0
Get Items	✓	0	701,849	513	0	0	0	0
Make Payment	✓	4	287,497	201	0	1	0	0
Get Product	x	116	252,200	176	0	78	3	1
Search Customer	✓	6	225,868	163	0	0	0	0
Query Details	x	15	202,679	145	0	7	8	0
Get All Products	x	43	179,795	125	0	0	0	0
Search Product	x	23	167,928	118	0	0	1	0
Check Credit Card Details	x	81	147,995	105	0	2	5	1
Homepage	✓	2	143,205	99	0	0	0	0
Order History	✓	2	141,588	99	0	0	0	0
Query Online Orders	✓	21	110,046	77	0	8	7	3
Validate Zip Code	✓	6	98,890	77	0	0	0	1
Confirm Purchase	x	81	107,623	68	0	0	0	0

TIME RANGE last 1 day

Name	Service Levels	Time (ms)	Calls	Calls / min	Errors	Slow Requests	Very Slow Requests	Stalled Requests
Login	✓	11	15,479,592	10,916	31	43	6	0
Get Items	✓	0	930,580	690	0	0	0	0
Make Payment	✓	8	309,043	215	0	1	0	0
Get Product	✓	42	297,798	187	0	0	0	0
Search Customer	✓	7	254,996	177	0	0	0	0
Query Details	✓	86	253,832	178	0	72	9	0
Get All Products	✓	78	222,617	86	0	3	0	0
Search Product	✓	66	206,643	144	0	3	5	0
Check Credit Card Details	✓	2	198,513	140	0	0	0	0
Homepage	✓	5	194,610	141	0	0	0	0
Order History	✓	5	166,351	124	0	0	0	0
Query Online Orders	✓	22	164,868	116	0	0	1	0
Validate Zip Code	✓	3	156,782	109	0	3	0	0
Confirm Purchase	✓	31	82,378	60	0	6	7	0

UNPLANNED DOWNTIME

1 minute = how much revenue?

BUT MY APP ISN'T
REVENUE CRITICAL

DEVOPS IS ABOUT
COLLABORATION.

SO MEASURE
PRODUCTIVITY.

MEAN TIME TO INNOCENCE (MTTI)

MEAN TIME TO RESOLUTION (MTTR)

Weeks, Days, Hours or Minutes?

MEAN TIME BETWEEN FAILURE (MTBF)

Weeks, Days, Hours or Minutes?

EXAMPLE

Total Number of Severity-1 Incidents Per Year	50 ←

Labor Cost to Troubleshoot and Resolve application performance and availabililty problems

IT Role	Annual, Fully Loaded Labor Cost	Troubleshooting & Repair Time per Incident in Hours	Number of FTEs	Troubleshooting & Repair Time as % of Available Productivity (C / Work Hours per Year)	Cost per Incident (B * D * E)	Labor Cost spent resolving Severity-1 Incidents per Year
Application Operations / App Support Engineer	$ 140,000	5	4	0.28%	$ 1,591	$ 79,545
Developers / QA	$ 140,000	10	7	0.57%	$ 5,568	$ 278,409
Infrastructure Operations / IT Operations	$ 170,000	5	4	0.28%	$ 1,932	$ 96,591
Database Administrator	$ 130,000	0	0	0.00%	$ -	$ -
Architects	$ 150,000	5	2	0.28%	$ 852	$ 42,614
Total annual Labor Cost of maintaining performance SLA and availability					**$ 9,943**	**$ 497,159**

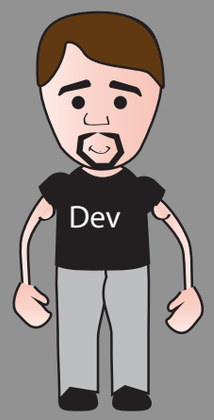
HOW MUCH CAN DEVOPS SAVE YOU?

THATS NOT MY ROLE

GAME SELECT

- A DEVELOPER
- OPERATIONS
- DEVOPS
- NOOPS

DEVELOPER



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- DESIGN, DEVELOP, TEST

MISSION OBJECTIVES
- MEET FUNCTIONAL REQUIREMENTS

RECOMMENDED ESSENTIALS
- BEER, COFFEE, REDBULL, PIZZA

SO WHAT IS SUCCESS FOR ME?

- FINDING A NEW JOB
- EARNING MORE MONEY
- TWITTER FOLLOWERS

SUMMARY

> SEE THE BIG PICTURE
> DEFINE SUCCESS
> AUTOMATE <> MONITOR
> MEASURE SUCCESS
> EVANGELIZE SUCCESS
> GET PAID MORE

MONITOR PRODUCTION. TODAY.

AppDynamics

www.AppDynamics.com

FOR FREE.

GAME OVER