

**MOBILE:** ONE SMALL STEP FOR CONSUMERS,  
ONE GIANT LEAP FOR ENTERPRISE



# TOM LEVEY

EMEA Tech Evangelist

APPDYNAMICS

 @tlevey

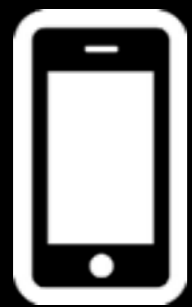


# THE WORLD IS GOING MOBILE

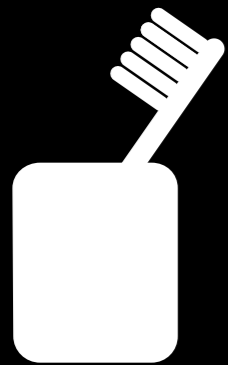


Global smartphone use will  
reach **2 billion** by **2015**

(Bloomberg)



**5.1  
Billion**

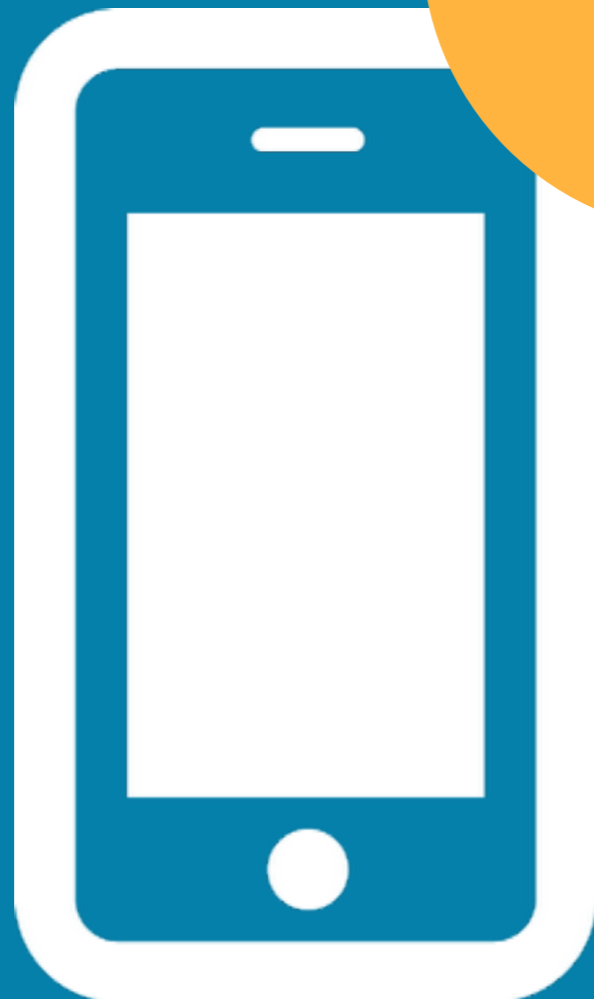


What?!

**4.2  
Billion**



**715,000**  
smartphones  
were sold between  
2002 and 2006



**74**  
days

**1,000,000**  
Apple iPhones  
2007

# TIME TAKEN TO REACH 50 MILLION USERS





**68 minutes**

to report a lost phone

**26 hours**

to report a lost wallet

source: Unisys





**127 mins/day**

average time people  
spend using apps

source: Flurry

# APPS MEAN BUSINESS



20%

global eCommerce  
is on mobile



234k users  
Manchester derby

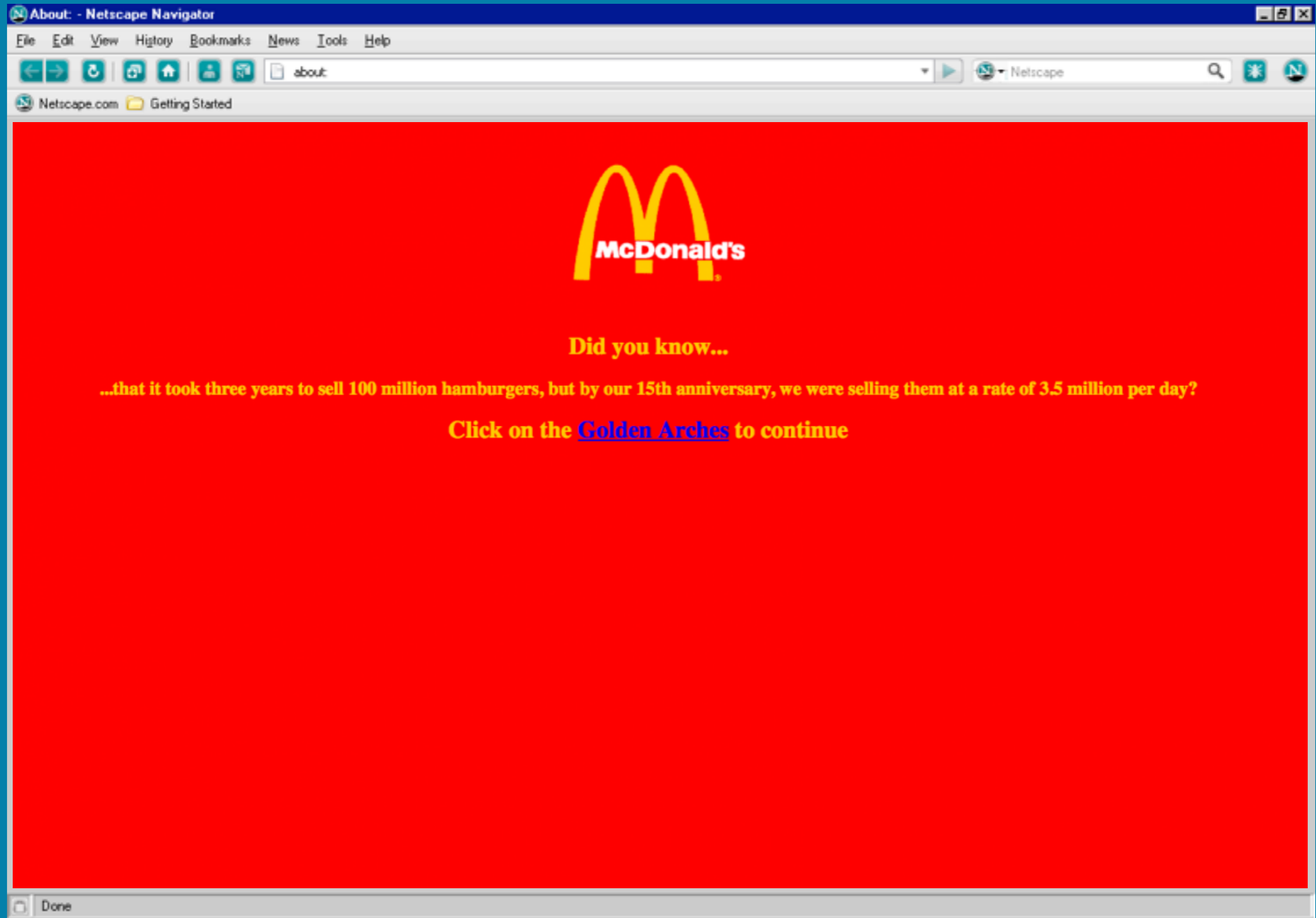


\$20 Billion  
2013



50%  
revenue

#WeHaveAnApp



# NOW THERE IS COMPETITION

2013

80 billion

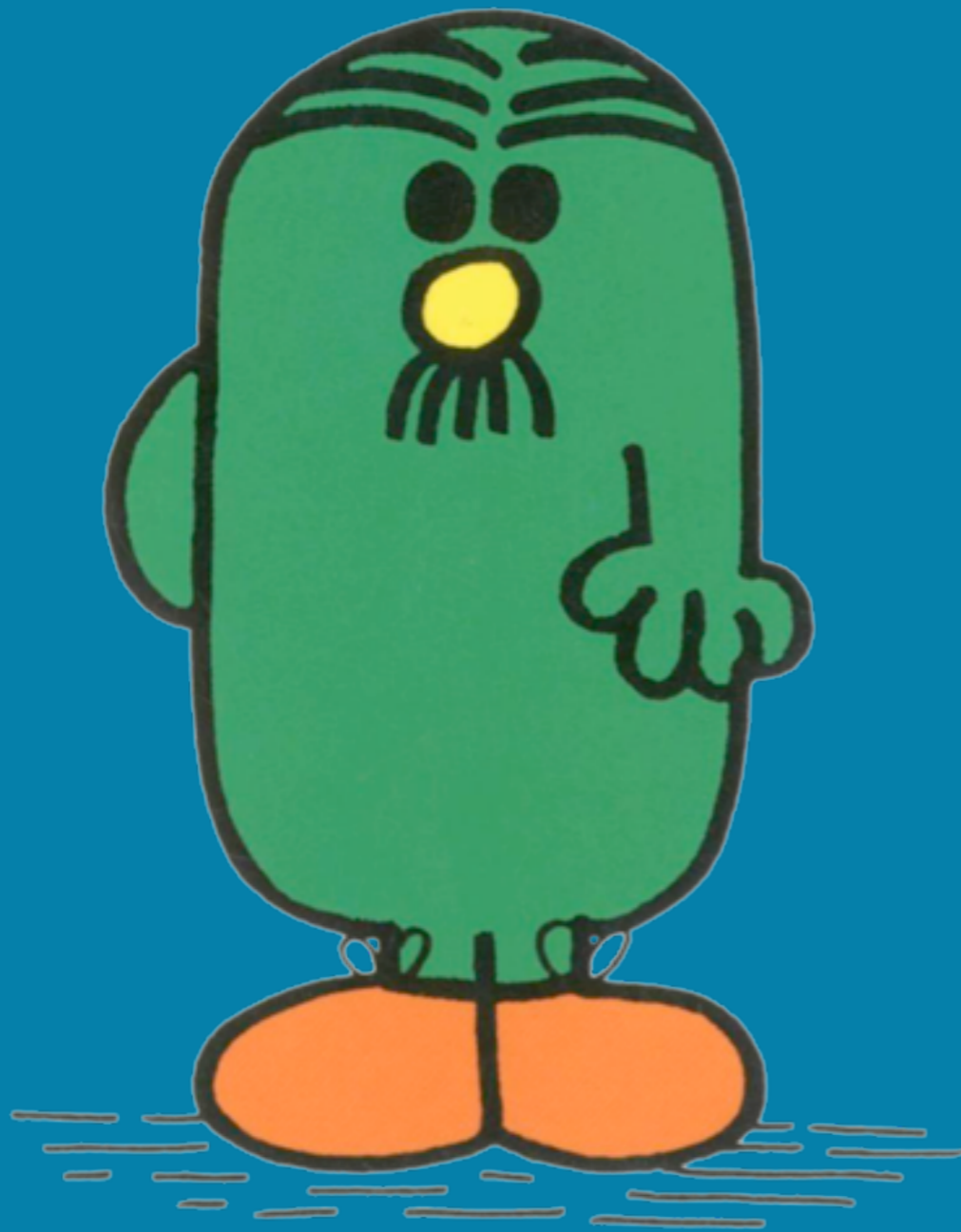


2016

300 billion



# MR. FUSSY



Battery life



Security



Stability



Update frequency



Performance

# CUSTOMER CONVERSION



**-100ms**

**=**



**-1%  
fewer**



>3 seconds

=

57%

user abandonment



# Google

**3 billion**  
daily transactions

**250**  
milliseconds

**500**  
updates/yr

# USER EXPECTATIONS



1 million+ servers



100 million GB



1,000 man years



1,500 miles



# PERFORMANCE

## Must-have Apps



## High-risk Apps



Functionality



Data usage



Battery drain



Security/privacy



We waited  
30 min  
NO SERVICE

# THE COST OF POOR PERFORMANCE



“This app is un-usable. It’s slower than my old dial-up modem!”



“Slower than a herd of snails travelling through peanut butter. Do not download”



“This is the best app ever!”

# BRAND REPUTATION



LinkedIn



facebook

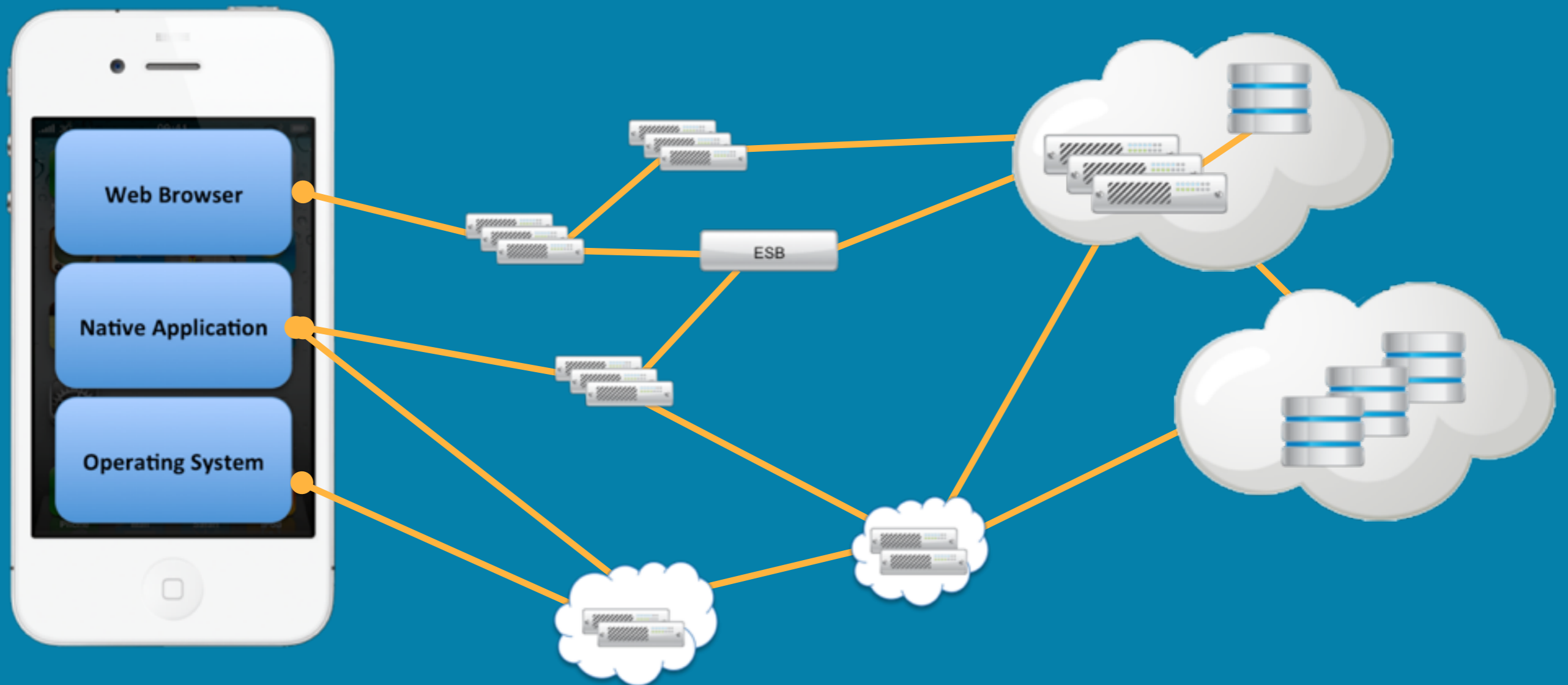
tumblr.

twitter

tripadvisor

yelp

# DISTRIBUTED AND COMPLEX



# CHALLENGES

We created a mobile App

Will it work?

Who will use it?

My mobile App crashed...

Resource contention or bad code?

Device, or application?

My mobile App is slow, is it the...

Device, carrier or application?

Local Logic or Remote Logic?

Native Application, Web Browser or Server?





**BIG DATA  
IS BAD**

**BIG** monitoring **DATA**

**IS BAD**

# ENTERPRISE DATA BLOATING



**LOG FILES**



**EMAIL**



**MONITORING**



**LEGAL**



**BUSINESS**



**KEEP EVERYTHING?**



**KEEP NOTHING?**

A photograph of a well-organized pantry. The shelves are white and filled with various food items. On the left, there are wire baskets containing lemons and dark-colored items. The shelves are stocked with jars of jam, canned goods, and bottles. A central orange banner with white text reads "JUST WHAT YOU NEED".

**JUST WHAT YOU NEED**

# IT ENVIRONMENT

**1200**  
servers

**300,000**  
trans/min

# MONITORING ENVIRONMENT

**700**  
cores

**8%**  
servers

**80TB**  
storage



# SMART DATA

**ACTIONABLE, INTELLIGENT, INFORMATION**

# IS THIS PERSON PERFORMING WELL?



**Heart rate**

**150bpm**

**Blood pressure**

**165/100**



**ARE WE TALKING ABOUT THIS PERSON?**



**OR THIS PERSON?**

# WHAT DATA **COULD** WE COLLECT?

Attribute	Person 1	Person 2
Heart Rate	150	150
Blood Pressure	180/90	180/90
Eye Color	Blue	Brown
Blood Type	O+	O-
White Blood Cell Count	3.5	3.8
Hair Color	Brown	Blue
Height	180cm	175cm
Shoe size	11	10
Weight	180kg	94kg
Current activity	sitting	skating

# IS PERSON 2 PERFORMING WELL?



**DISTANCE**

10,000 metres

**TIME**

12min 44sec

**RECORD TIME: 12MIN 58SEC**



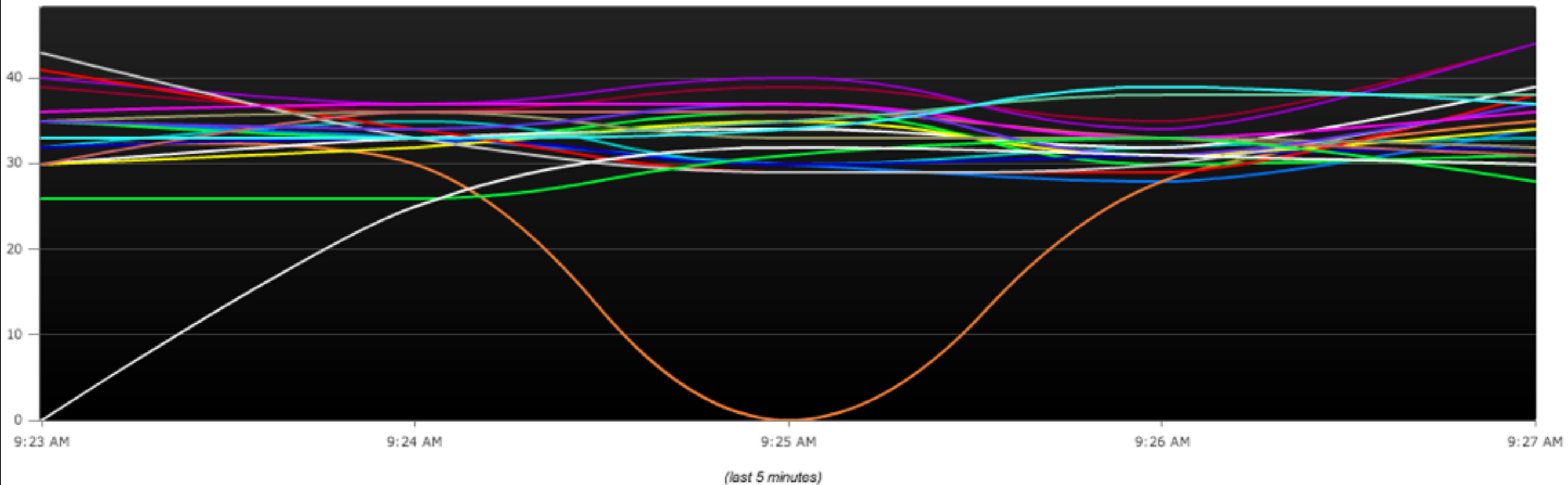
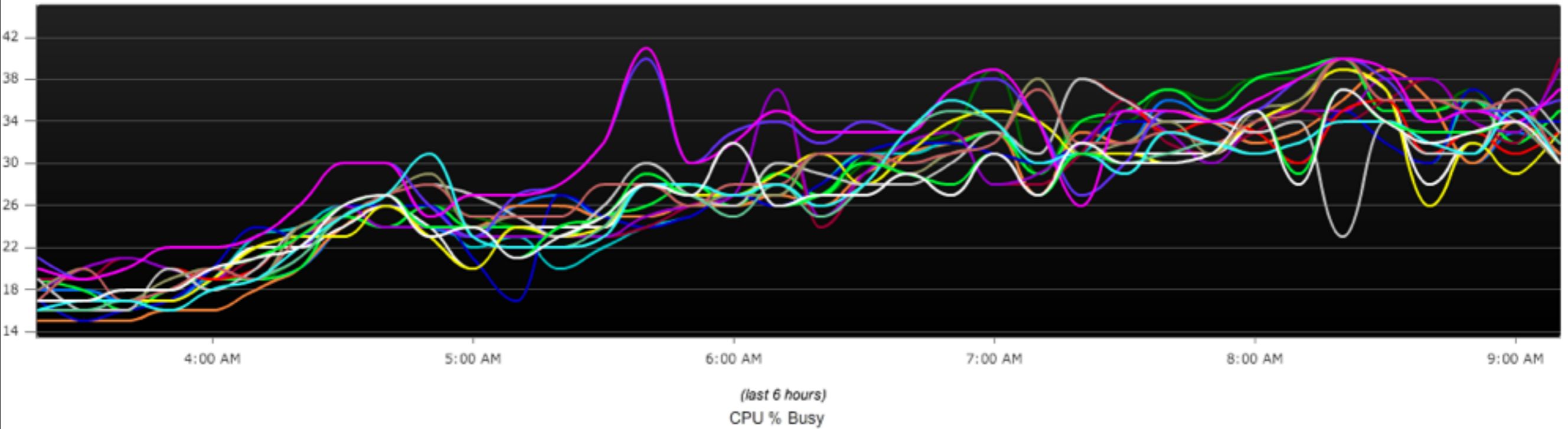
baseline



**NEW OLYMPIC RECORD**

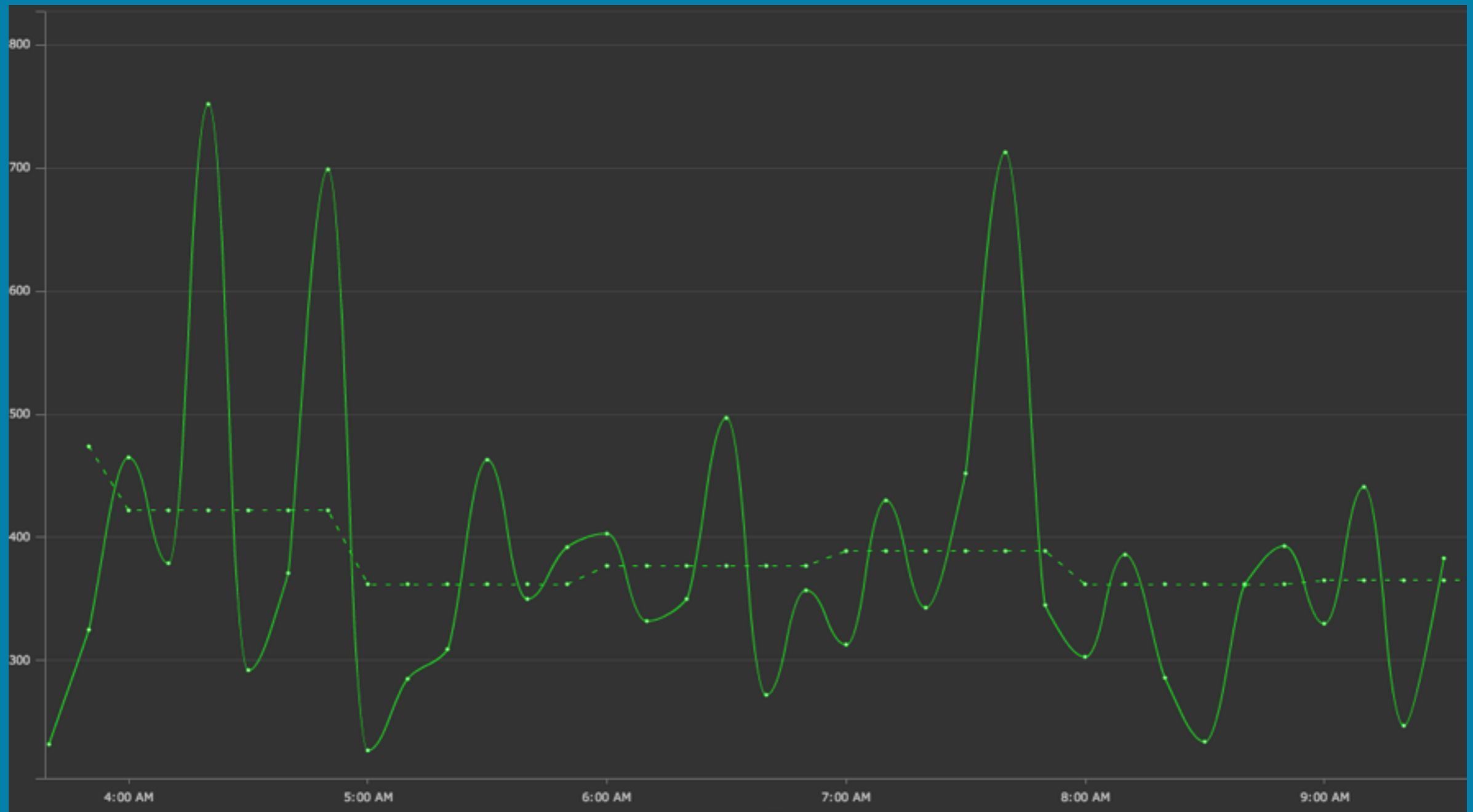
**JORRIT BERGSMA 10,000M WINNER**

# WHAT DO THESE CHARTS TELL US ABOUT APPLICATION PERFORMANCE OR BUSINESS IMPACT?





# AVERAGE RESPONSE TIME WITH HISTORICAL BASELINE



# MONITORING PLATFORMS SHOULD DO THE HEAVY LIFTING

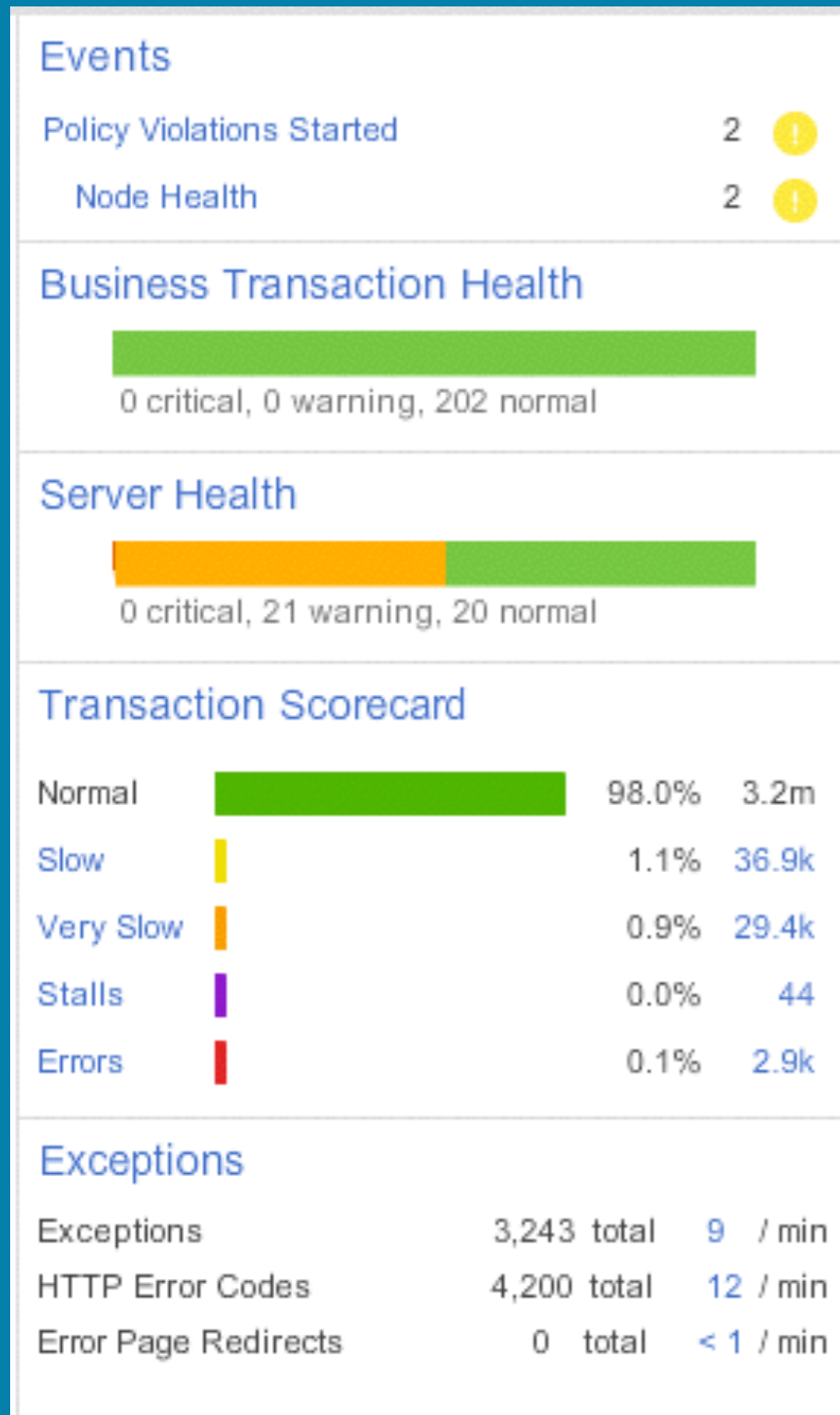
User & IT perspective

Analytics

Correlation

Intelligent alerting

Resolution path



**GOOD LUCK**



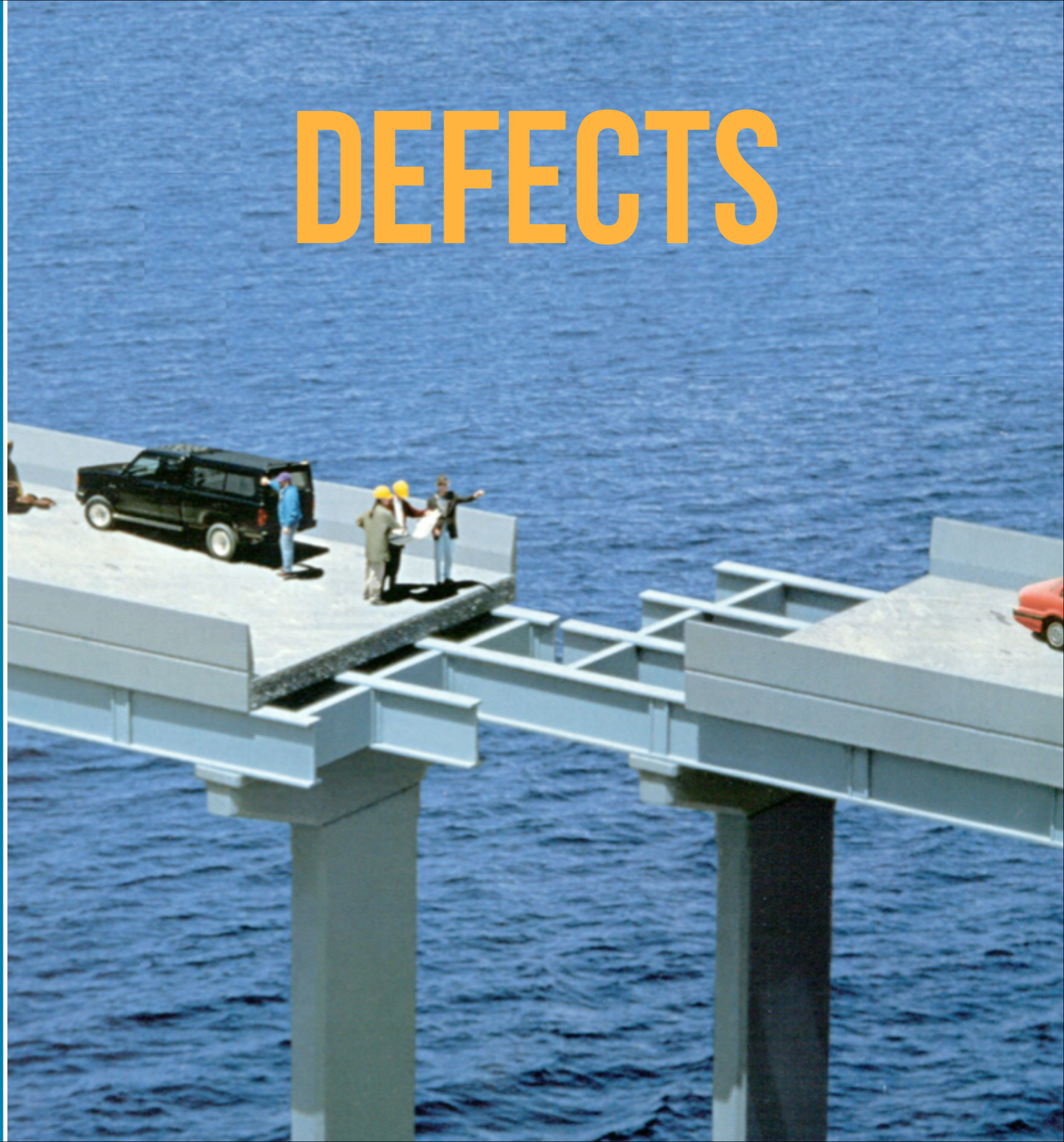
# DEFECTS

Identify early

Troubleshoot fast

Resolve quickly

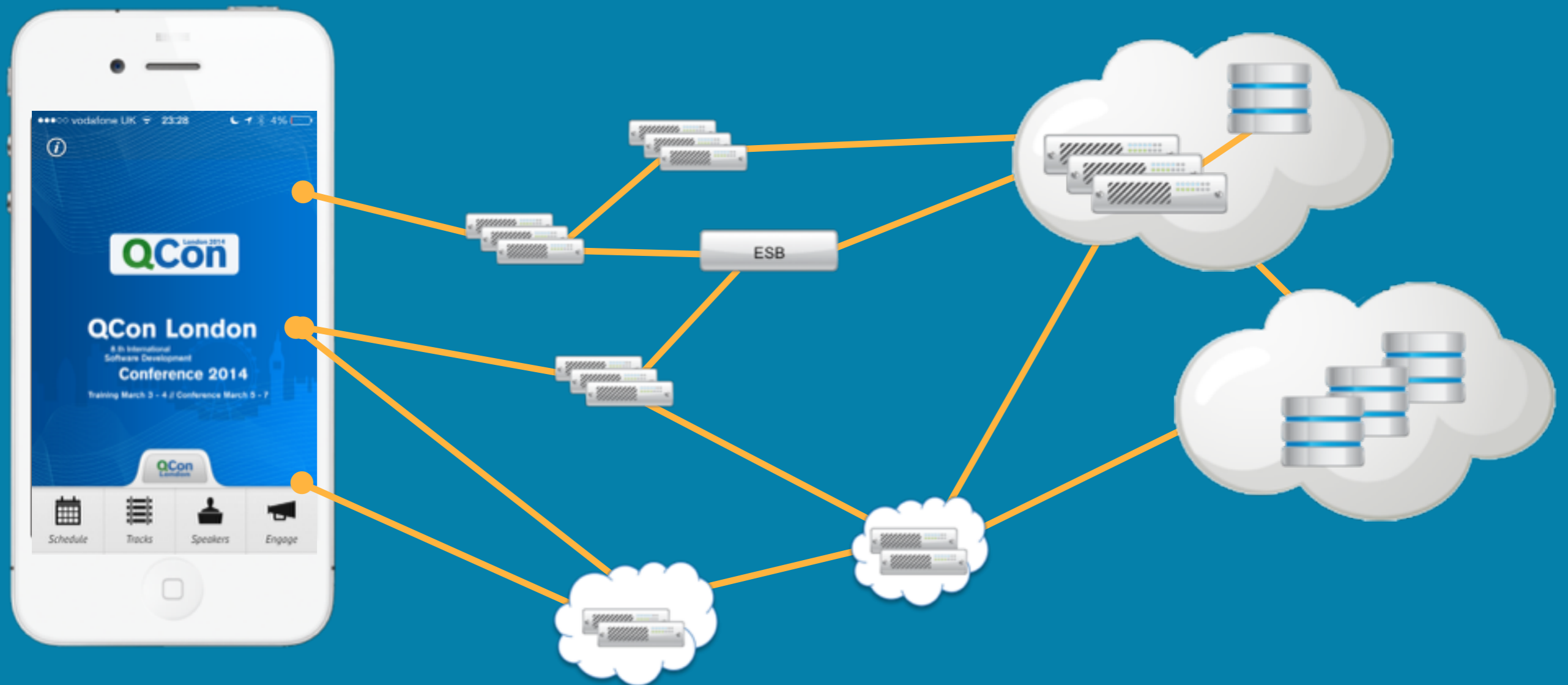
Quantify impact



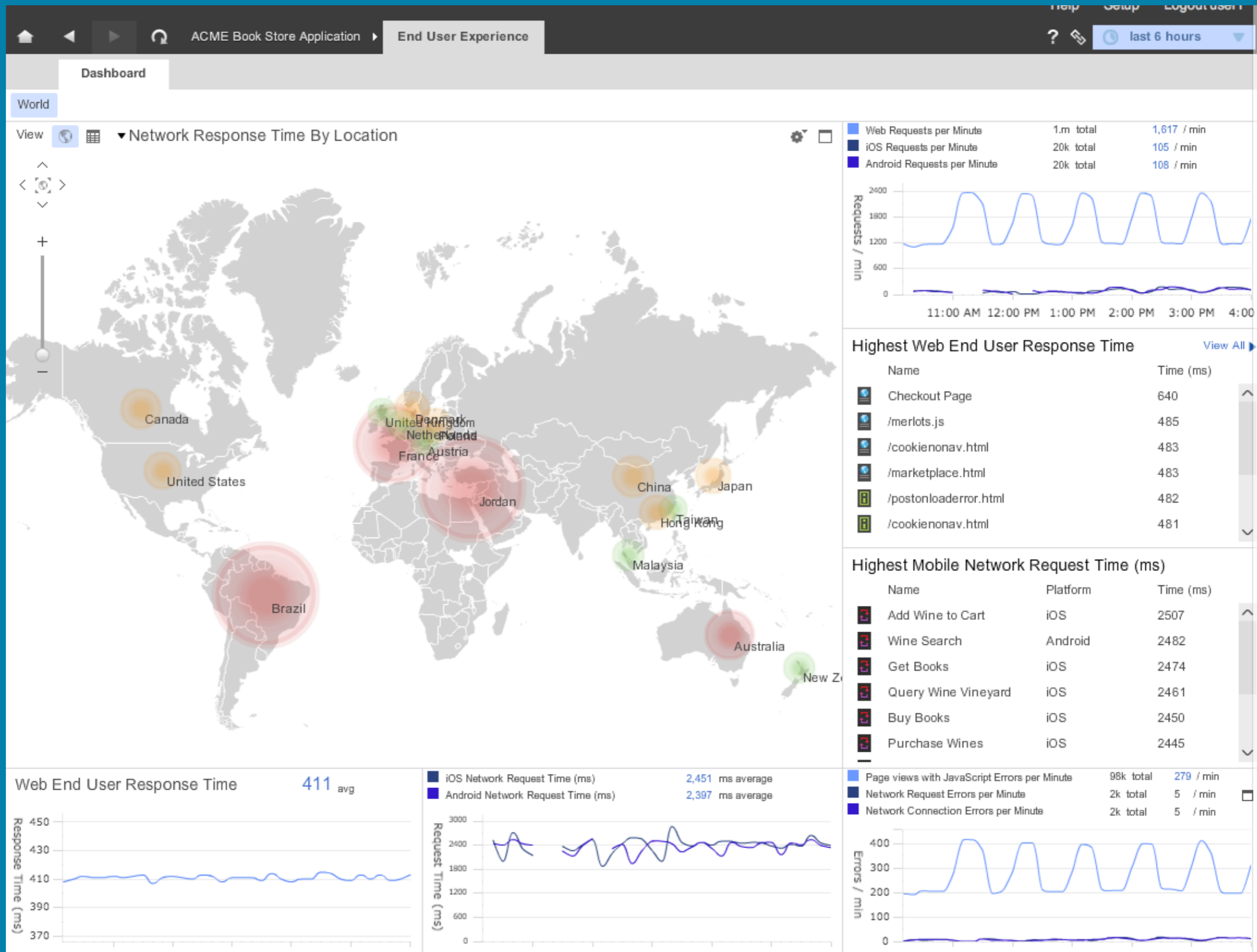


Loading

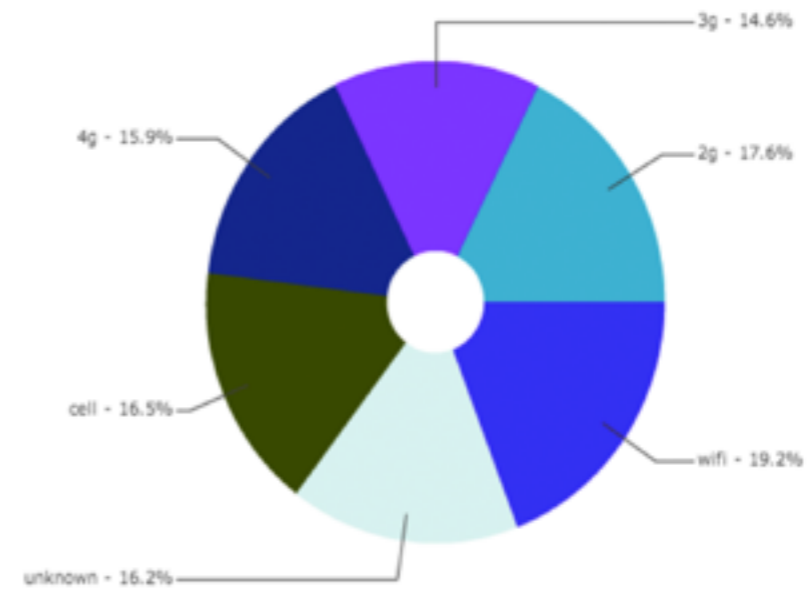
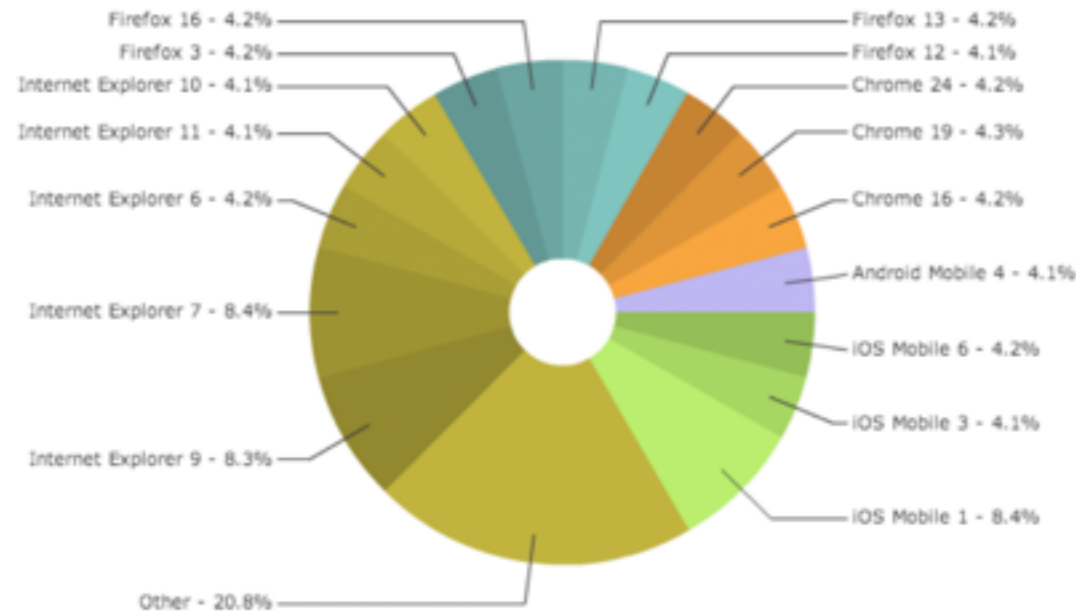
# DISTRIBUTED AND COMPLEX



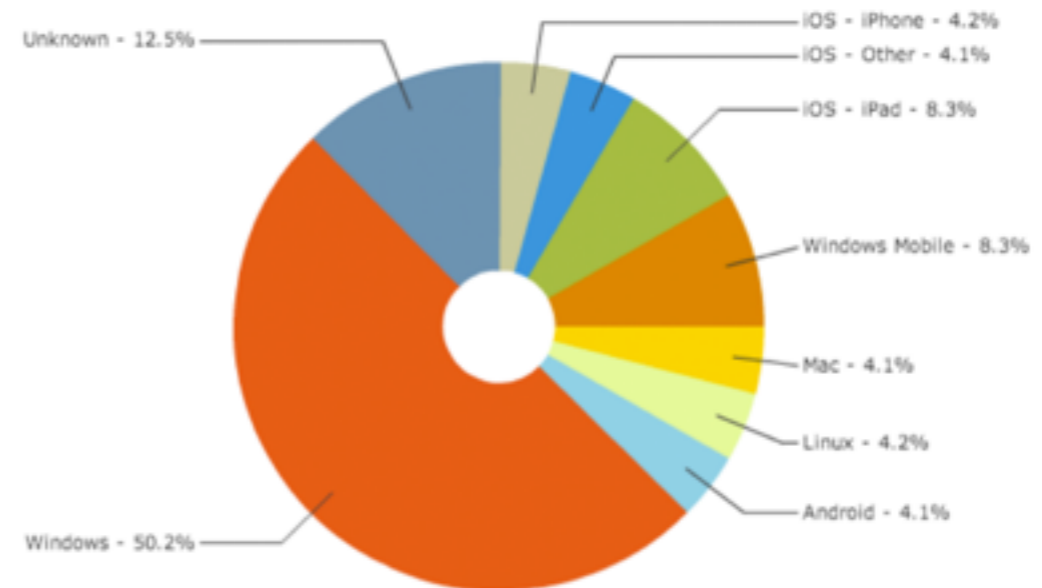
# WHO IS USING MY APP?



# DEVICE, BROWSER, NETWORK, CARRIER...



Name	Page Requests per Minute	Total Number of Page Requests	End User Response Time (ms)
Internet Explorer 6	3	147	462
Android Mobile 4	3	141	470
Other	14	728	471
Firefox 16	3	147	471
Internet Explorer 9	6	299	478
Firefox 12	3	136	479
iOS Mobile 1	6	302	480
iOS Mobile 6	3	149	482
Internet Explorer 7	6	283	486
Chrome 24	3	148	486
iOS Mobile 3	3	139	487
Chrome 19	3	149	487
Internet Explorer 11	3	139	492
Chrome 16	3	143	493
Firefox 13	3	153	503
Internet Explorer 10	3	135	504
Firefox 3	3	149	509

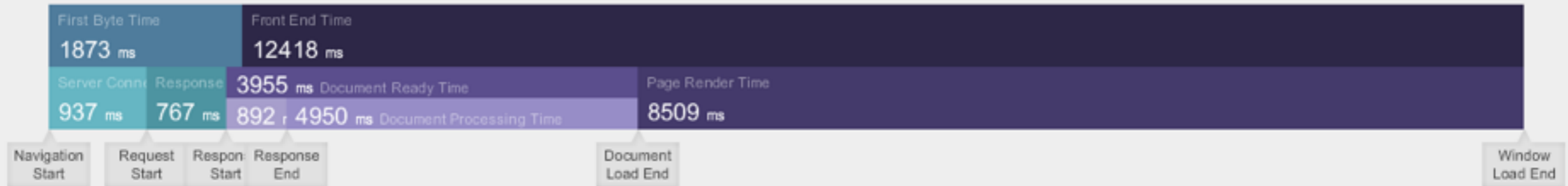




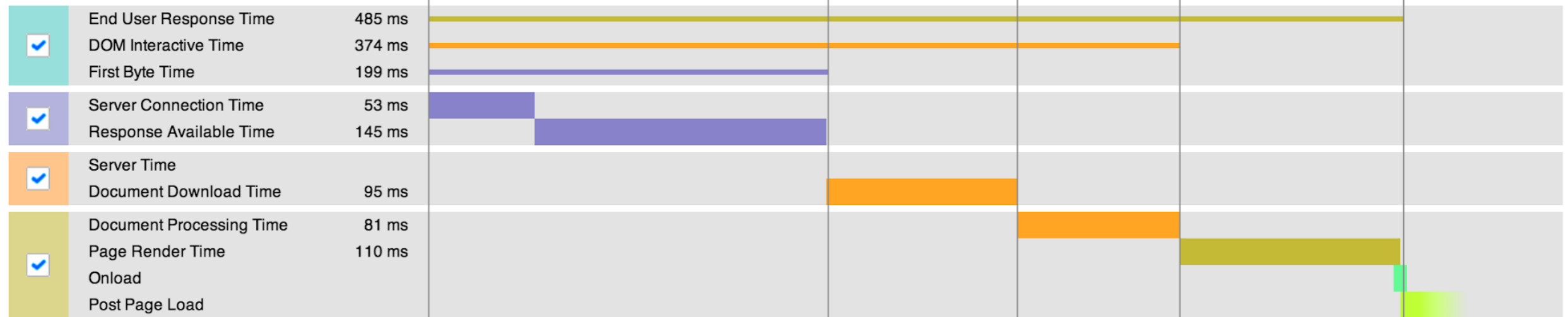
# FAULT DOMAIN

End User Response Time - average for last 6 hours

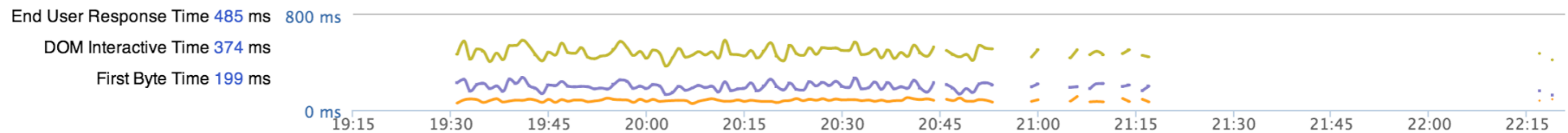
13083 ms End User Response Time



Trends/  
Details



## Overall - Details

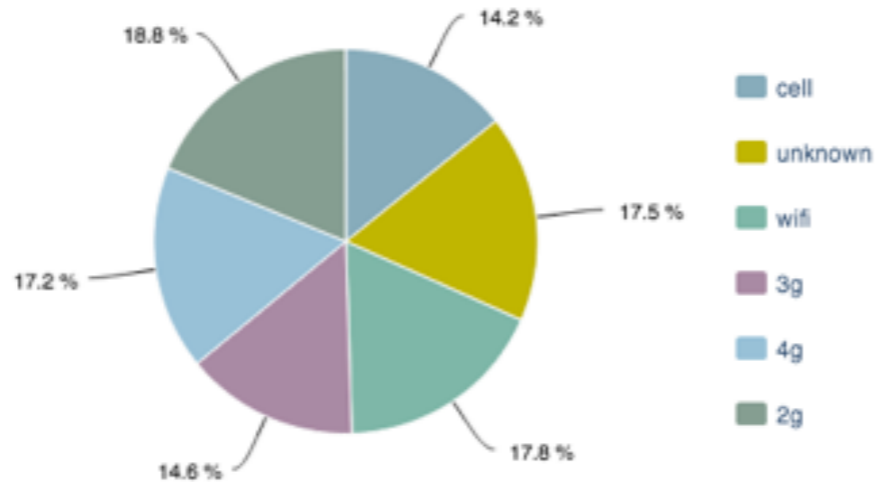


## Server Connect Time Breakdown - Trends



# DETAILED CRASH ANALYSIS

Crashes By Connection Type



Crashes By OS Version



```

Incident Identifier: 9155a0fa-f4b4-43c2-aa0f-80a5281e7d0f
CrashReporter Key: TODO
Hardware Model: iPhone5,1
Process: UISampleApp [137]
Path: /var/mobile/Applications/3B87801B-4AB1-42DB-AD6B-86E45F79BA85/UISampleApp
Identifier: com.appdynamics.UISampleApp
Version: 1.0
Code Type: ARM (Native)
Parent Process: launchd[1]

Date/Time: 2014-01-07 18:32:00 +0000
OS Version: iOS 6.1.4 (10B350)
Report Version: 104

Exception Type: SIGSEGV
Exception Codes: SEGV_ACCERR at 0x00000000
Crashed Thread: 2

Thread 0:
0 libsystem_kernel.dylib 0x3c1e3e30 mach_msg_trap + 20
1 CoreFoundation 0x33fe22bb __CFRunLoopServiceMachPort + 130
2 CoreFoundation 0x33fe0fdb __CFRunLoopServiceMachPort + 818
3 CoreFoundation 0x33f5423d CFRunLoopRunSpecific + 356
4 CoreFoundation 0x33f540c9 CFRunLoopRunInMode + 104
5 GraphicsServices 0x37b3333b GSEventRunModal + 74
6 UIKit 0x35e702b9 UIApplicationMain + 1120
7 UISampleApp 0x000530a7 main + 138

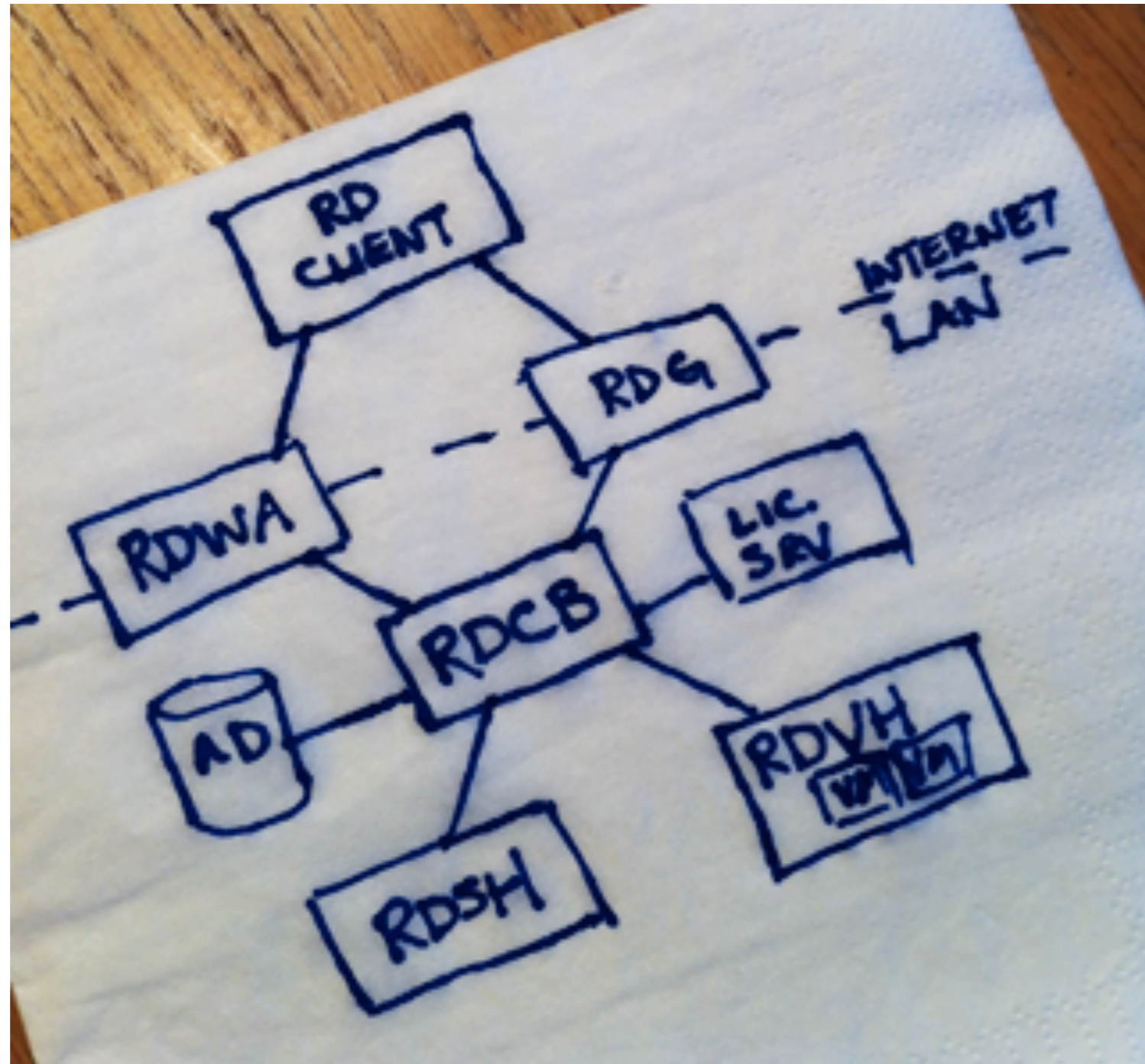
Thread 1:
0 libsystem_kernel.dylib 0x3c1ec5d0 kevent64 + 24
1 libdispatch.dylib 0x3c123378 _dispatch_mgr_thread + 35

Thread 2 Crashed:
0 libobjc.A.dylib 0x3bd035ca objc_msgSend + 9
1 UISampleApp 0x00054d3b __27-[SAOperationQueue execute]_block_invoke + 154
2 libdispatch.dylib 0x3c122793 _dispatch_call_block_and_release + 10
3 libdispatch.dylib 0x3c125b3b _dispatch_queue_drain + 142
4 libdispatch.dylib 0x3c12367d _dispatch_queue_invoke + 44
5 libdispatch.dylib 0x3c126613 _dispatch_root_queue_drain + 210
6 libdispatch.dylib 0x3c1267d9 _dispatch_worker_thread2 + 92
7 libsystem_c.dylib 0x3c14a7f1 _pthread_wqthread + 360

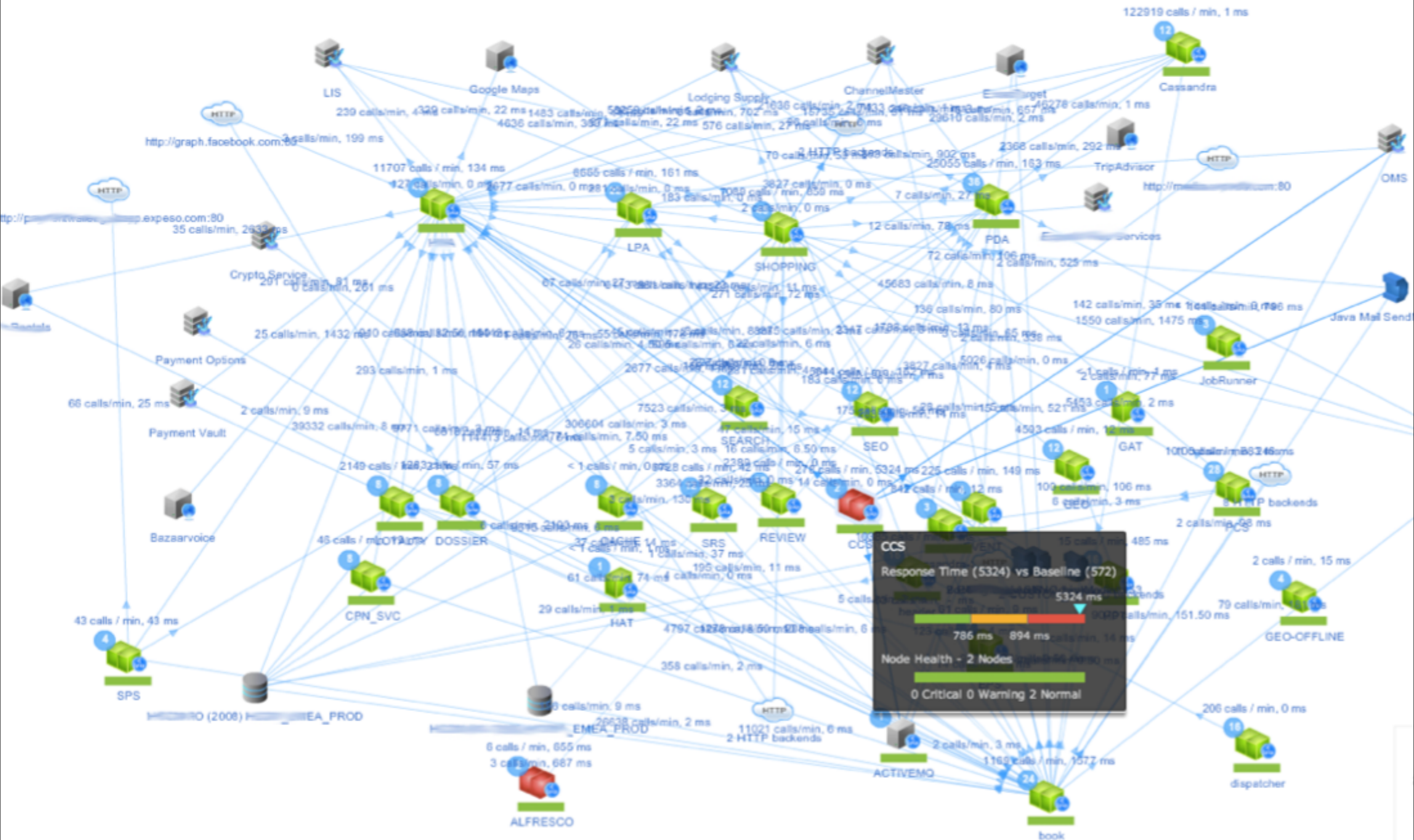
Thread 3:
0 libsystem_kernel.dylib 0x3c1e3e30 mach_msg_trap + 20
1 CoreFoundation 0x33fe22bb __CFRunLoopServiceMachPort + 130
2 CoreFoundation 0x33fe1031 __CFRunLoopRun + 904
3 CoreFoundation 0x33f5423d CFRunLoopRunSpecific + 356
4 CoreFoundation 0x33f540c9 CFRunLoopRunInMode + 104
5 WebCore 0x39f5c395 _ZL12RunWebThreadPv + 444
6 libsystem_c.dylib 0x3c1550e1 _pthread_start + 308

Binary Images:
0x4c000 - 0x73fff ACMEShoppingApp armv7s <25e3c5e7b6ef3b9d84232da2b4cd8014> /var/mobile/Applications/3B87801B-4AB1-42DB-AD6B-86E45F79BA85/UISampleApp
0x33209000 - 0x33209fff Accelerate armv7s <4e8c4c464953429ab6bd3160aadd176> /System/Library/Frameworks/Accelerate.framework/Versions/A/Accelerate
0x3320a000 - 0x33347fff vImage armv7s <49d3cf19d0a23f4d836fc313e5fd6bab> /System/Library/Frameworks/VectorLib.framework/Versions/A/vImage
0x33348000 - 0x33434fff libBLAS.dylib armv7s <584e045442be39fc847ffe1a5e4c99b2> /System/Library/Frameworks/vecLib.framework/Versions/A/libBLAS.dylib
0x33435000 - 0x336ebfff libLAPACK.dylib armv7s <30a3e7dd8c603a9d81b5e42704ba5971> /System/Library/Frameworks/vecLib.framework/Versions/A/libLAPACK.dylib
0x336ec000 - 0x33744fff libvDSP.dylib armv7s <936354553eb93d2dafa76ffcad65f9b7> /System/Library/Frameworks/vecLib.framework/Versions/A/libvDSP.dylib
0x33745000 - 0x33757fff libvMisc.dylib armv7s <5fae8715a0403315bb1991b79677f916> /System/Library/Frameworks/vecLib.framework/Versions/A/libvMisc.dylib
0x33758000 - 0x33758fff vecLib armv7s <30275ee8819331229ba21256d7b94596> /System/Library/Frameworks/vecLib.framework/Versions/A/vecLib
0x33c62000 - 0x33d27fff CFNetwork armv7s <ef41814d8641319c96cdeb1264d2d150> /System/Library/Frameworks/CFNetwork.framework/Versions/A/CFNetwork
0x33d28000 - 0x33d7efff CoreAudio armv7s <19aa715b19a93a5c8563dbc706e899be> /System/Library/Frameworks/CoreAudio.framework/Versions/A/CoreAudio
0x33f4b000 - 0x3407dfff CoreFoundation armv7s <bd8e6c9f94b43e3d9af96a0f03f3011> /System/Library/Frameworks/CoreFoundation.framework/Versions/A/CoreFoundation
0x3407e000 - 0x341b7fff CoreGraphics armv7s <ef057fe1c715314cabf133ec26fa718c> /System/Library/Frameworks/CoreGraphics.framework/Versions/A/CoreGraphics
    
```

# Napkin architecture...

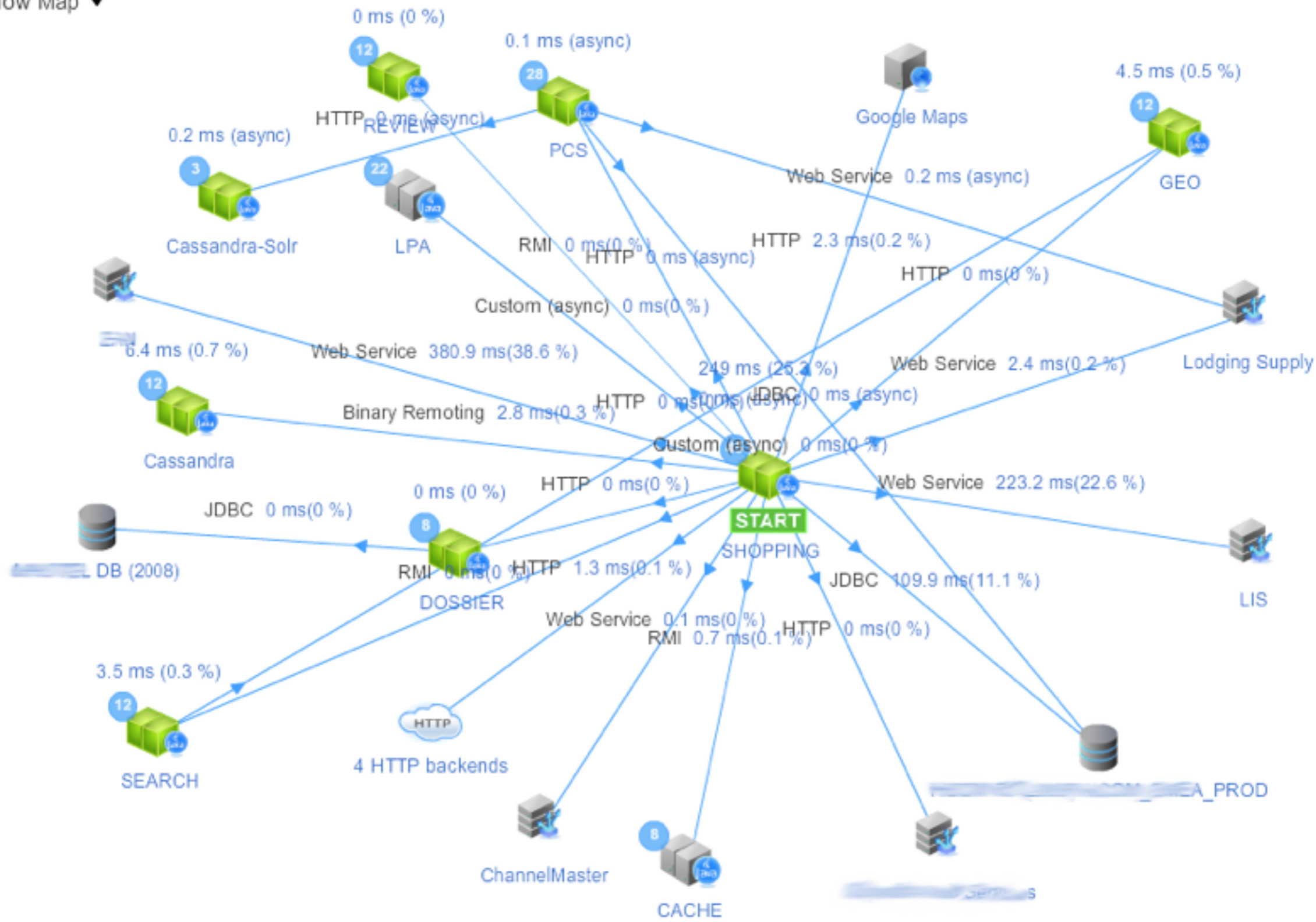


# A challenge to manage...

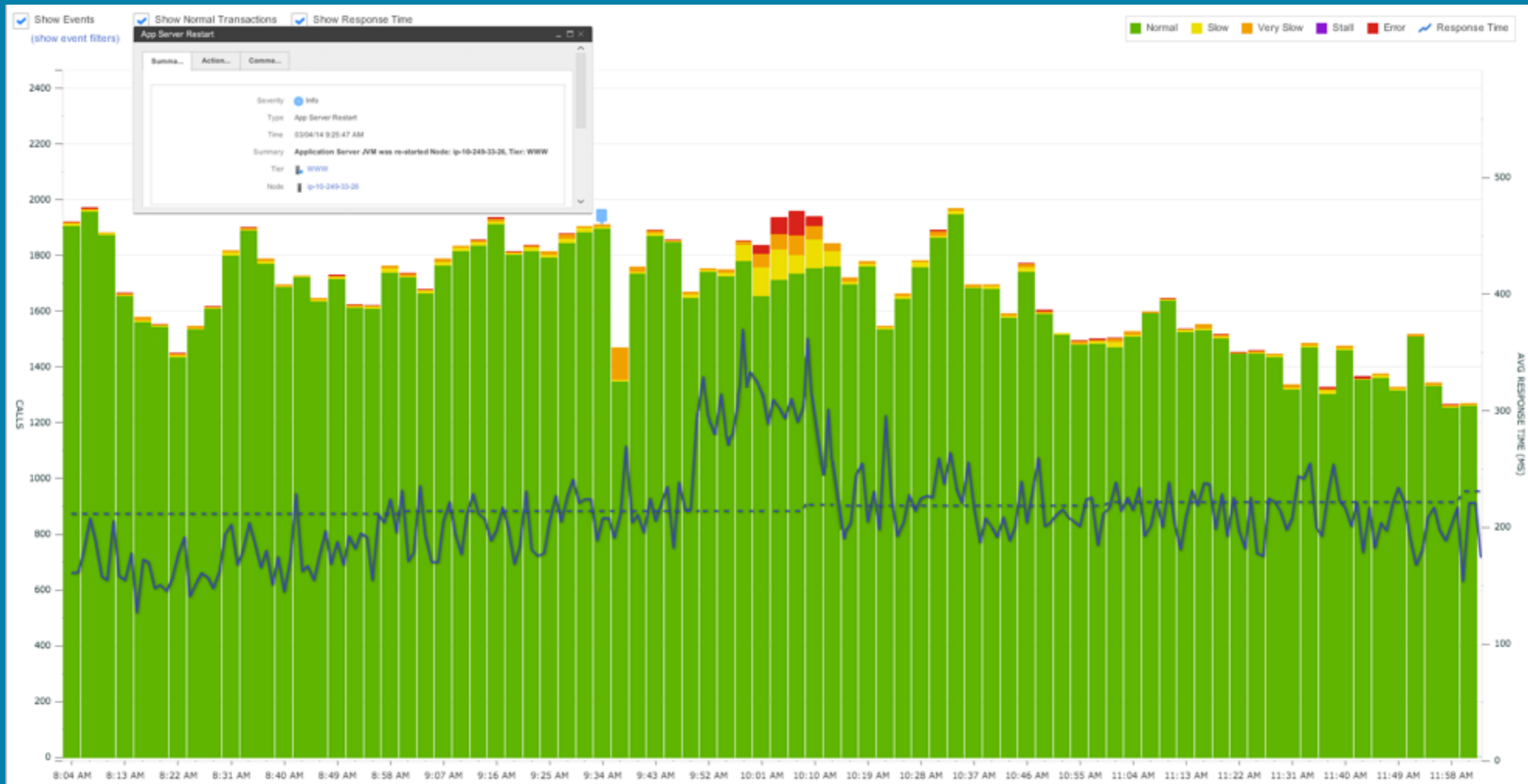


# A simple travel search...

Flow Map ▾



# BUSINESS TRANSACTION ANALYSIS



# CODE EXECUTION DIAGNOSTICS

Execution Time: 23553 ms. Node [redacted]. Timestamp: 01/14/13 10:42:17 AM.

Set as Root Reset Root (?)

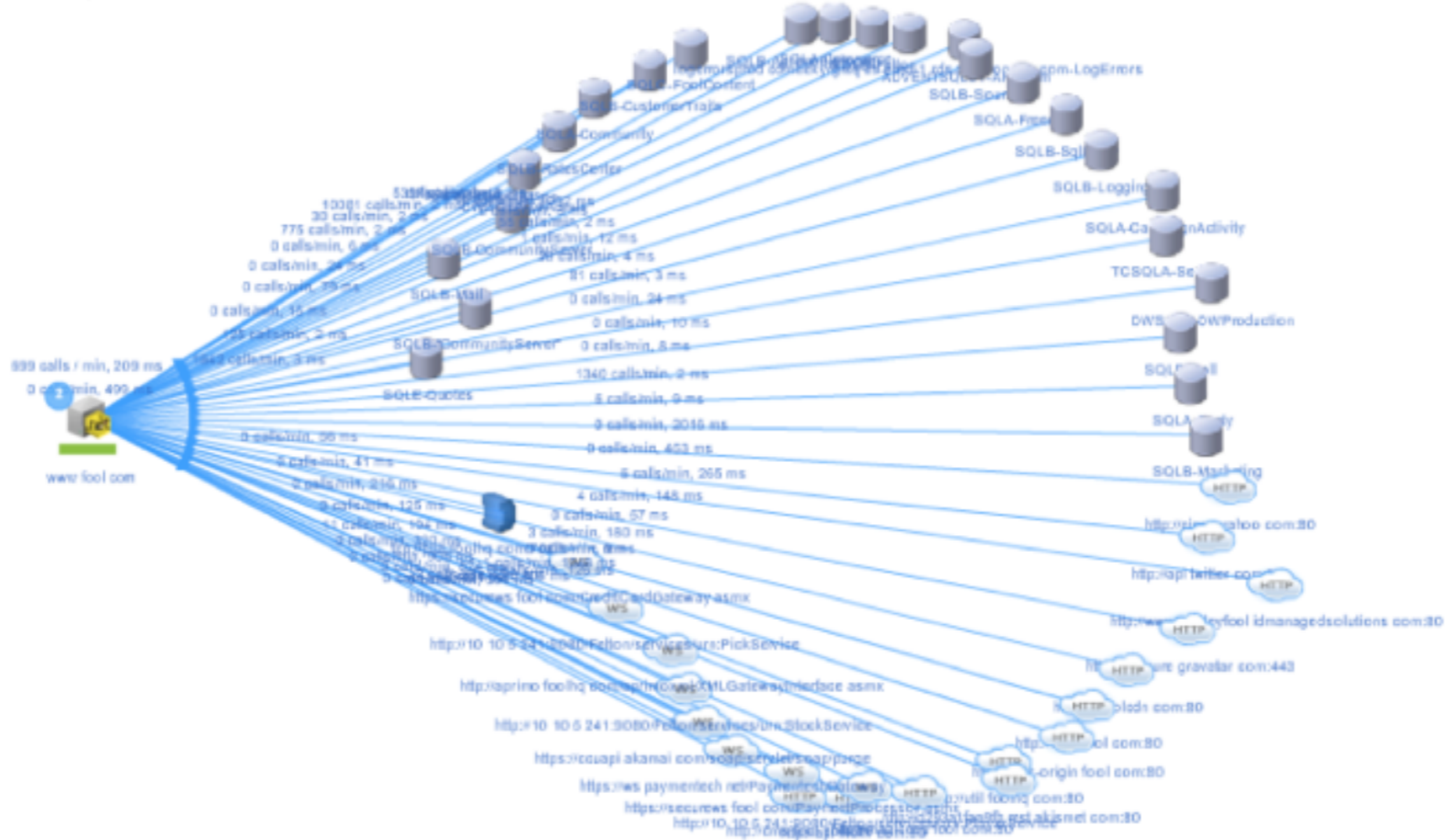
Name	Time (ms)	Exit C
Struts 1.x Request Processor:processActionPerform	30 ms (self) 0.1 %	
[redacted].web.struts.action.EPHTTPSDA:execute:26	0 ms (self) 0 %	
[redacted].web.struts.action.EPDA:execute:44	0 ms (self) 0 %	
Struts Action - checkout-[redacted]:submit:710	0 ms (self) 0 %	
[redacted].business.action.AbstractBA:doExecute:51	0 ms (self) 0 %	
[redacted].business.action.RecalculateCartBA:execute:49	416 ms (total) 1.8 % HTTP (7)	
[redacted].business.action.CheckOutBA:execute:356	0 ms (self) 0 %	
[redacted].HibernateUtil:beginTransaction:23	11 ms (total) 0 %	
[redacted].business.action.CheckOutBA:buildCartItemInventoryHash:1640	11 ms (total) 0 %	
[redacted].business.action.CheckOutBA:isCreditCardApproved:1807	0 ms (self) 0 %	
[redacted].billing.service.BillingService:authorize:283	0 ms (self) 0 %	
[redacted].billing.service.payflowpro.PayFlowProBillingServiceAdapter:authorize:18	0 ms (self) 0 %	
[redacted].billing.service.payflowpro.PayFlowProBillingService:authorize:108	0 ms (self) 0 %	
[redacted].billing.service.payflowpro.PayFlowProBillingService:authorize:157	0 ms (self) 0 %	
[redacted].billing.service.payflowpro.PayFlowProBillingService:sendVerisignRequest:401	0 ms (self) 0 %	
paypal.payflow.PayflowAPI:submitTransaction	0 ms (self) 0 %	
paypal.payflow.g:j	0 ms (self) 0 %	
paypal.payflow.a:b	119 ms (total) 0.5 %	
paypal.payflow.b:b	0 ms (self) 0 %	
paypal.payflow.p:g	15021 ms (self) 63.8 % HTTP	
paypal.payflow.g:a	11 ms (total) 0 %	
paypal.payflow.m:b	996 ms (total) 4.2 %	
paypal.payflow.a:b	115 ms (total) 0.5 %	
paypal.payflow.b:b	6552 ms (total) 27.8 % HTTP (2)	
[redacted].billing.service.BillingService:voidAuth:326	269 ms (total) 1.1 % HTTP (2)	

**EXAMPLE**



# 3RD PARTY SERVICES

Application Flow Map



Explain this View

Not co

Load

1.8m calls

711 /min



Response Time (ms)

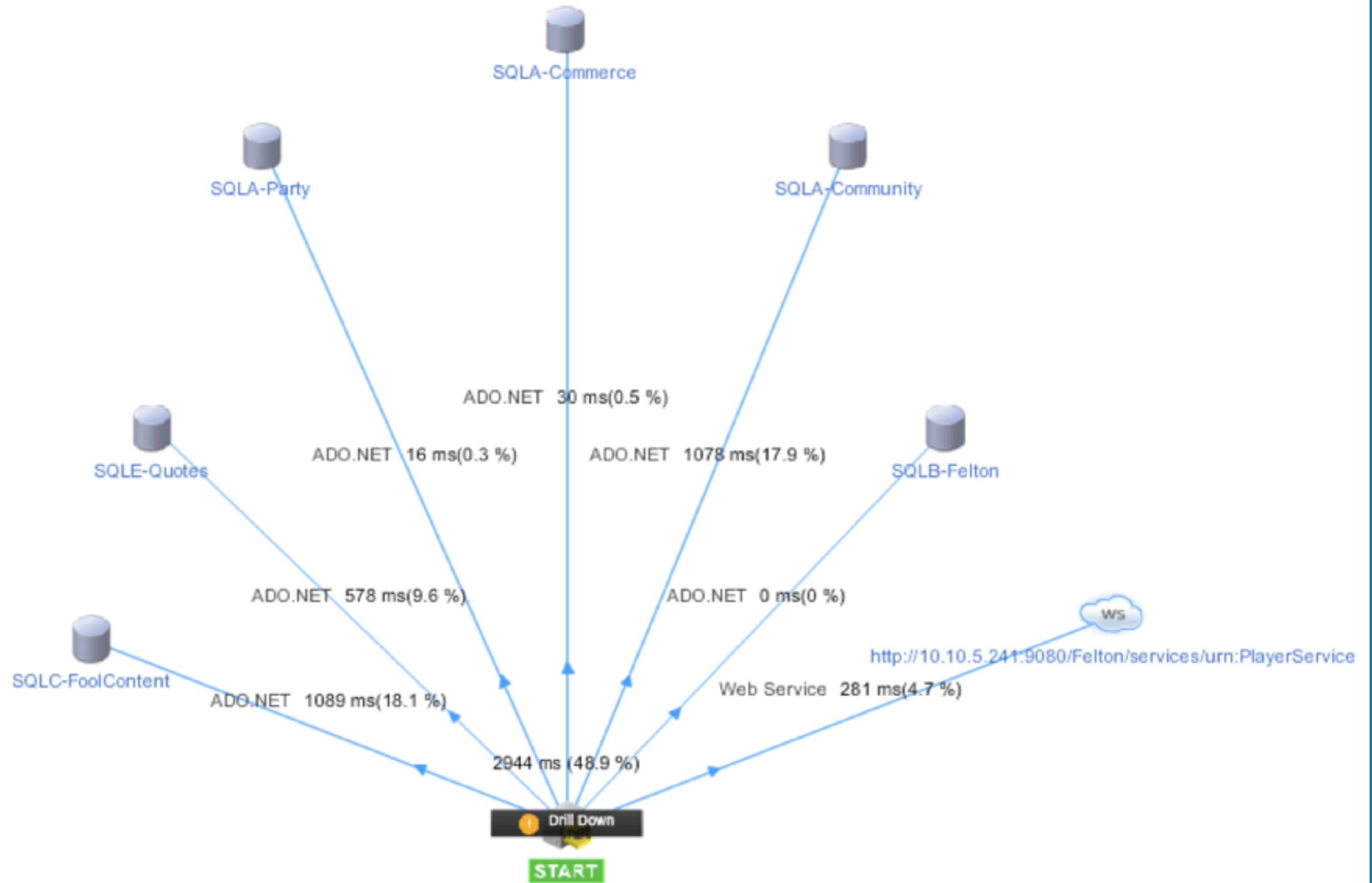
209 ms average



# ISOLATE BUSINESS TRANSACTION

Name	Health	Server Time (ms)	Calls	Calls / min	Errors	Error %	Slow Transactions	Very Slow Transactions	Stalled Transactions
/investing/general	✖	370	600,672	229	2,411	0.4	5,866	11,459	0
/investing/press-releases	✔	198	161,572	62	3,394	2.1	1,465	3,294	0
/common/ecap	✔	164	218,855	83	1	0	1,550	3,281	0
/ecap/remote	✔	33	189,715	71	0	0	550	1,182	0
/Index.aspx	✔	646	36,642	14	5	0	570	969	5
/reports/ad.ashx	✔	84	63,559	24	0	0	220	628	0
/common/pages	✔	117	40,026	15	1	0	522	484	0
/img.ashx	✔	135	32,480	12	183	0.6	155	446	0
/investing/businesswire	✔	314	15,333	6	520	3.4	144	353	0
/investing/international	✔	392	11,409	4	89	0.8	123	312	0
/search/solr.aspx	✔	1258	7,814	3	41	0.5	106	312	1
/fool/free-report	✔	149	23,736	9	2	0	157	292	0

# TRANSACTION FLOW MAP



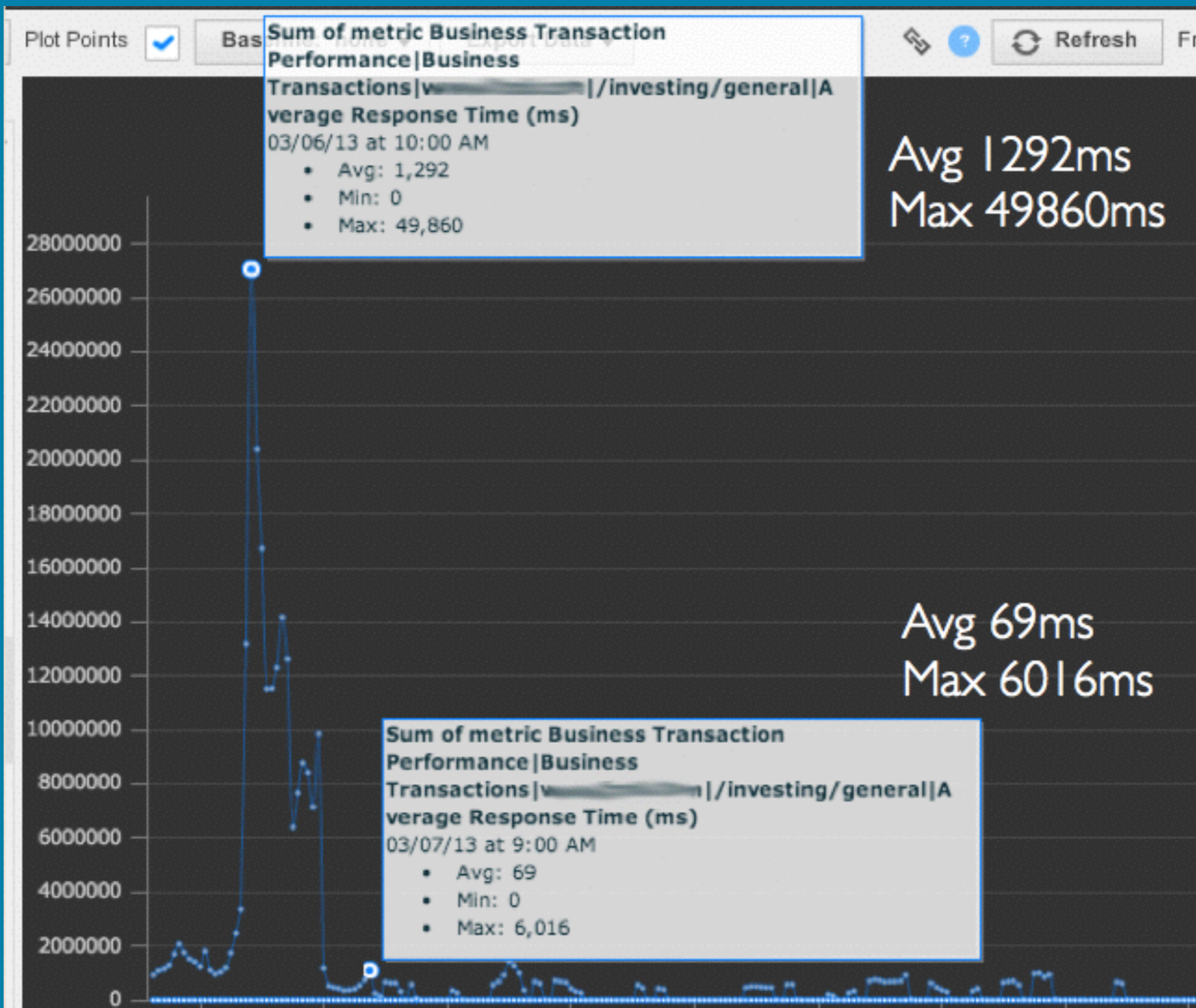
# TRANSACTION CALL GRAPH

Name	Time (ms)	Exit
System.Web.Hosting.PipelineRuntime:ProcessRequestNotification	0 ms (self) 0%	
System.Web.Hosting.PipelineRuntime:ProcessRequestNotificationHelper	0 ms (self) 0%	
System.Web.Hosting.PipelineRuntime:ProcessRequestNotification	0 ms (self) 0%	
System.Web.Hosting.PipelineRuntime:ProcessRequestNotificationHelper	0 ms (self) 0%	
System.Web.HttpRuntime:ProcessRequestNotificationPrivate	0 ms (self) 0%	
System.Web.HttpApplication:BeginProcessRequestNotification	0 ms (self) 0%	
System.Web.HttpApplication+PipelineStepManager:ResumeSteps	0 ms (self) 0%	
System.Web.HttpApplication:ExecuteStep	0 ms (self) 0%	
System.Web.HttpApplication+CallHandlerExecutionStep:System.Web.HttpApplication.IExecutionStep.Execute	0 ms (self) 0%	
Http Handler - ASP.articles_articlehandler_aspx:ProcessRequest	0 ms (self) 0%	
System.Web.UI.Page:ProcessRequest	0 ms (self) 0%	
System.Web.UI.Page:ProcessRequest	0 ms (self) 0%	
System.Web.UI.Page:ProcessRequest	0 ms (self) 0%	
System.Web.UI.Page:ProcessRequestMain	0 ms (self) 0%	
System.Web.UI.Control:LoadRecursive	3422 ms (total) 56.8% <a href="#">ADO.NET (66)</a>	
System.Web.UI.Control:PreRenderRecursiveInternal	2047 ms (total) 34% <a href="#">ADO.NET (32)</a>	
System.Web.UI.Control:RenderChildrenInternal	15 ms (total) 0.2% <a href="#">ADO.NET</a>	

# 707 DB CONNECTIONS

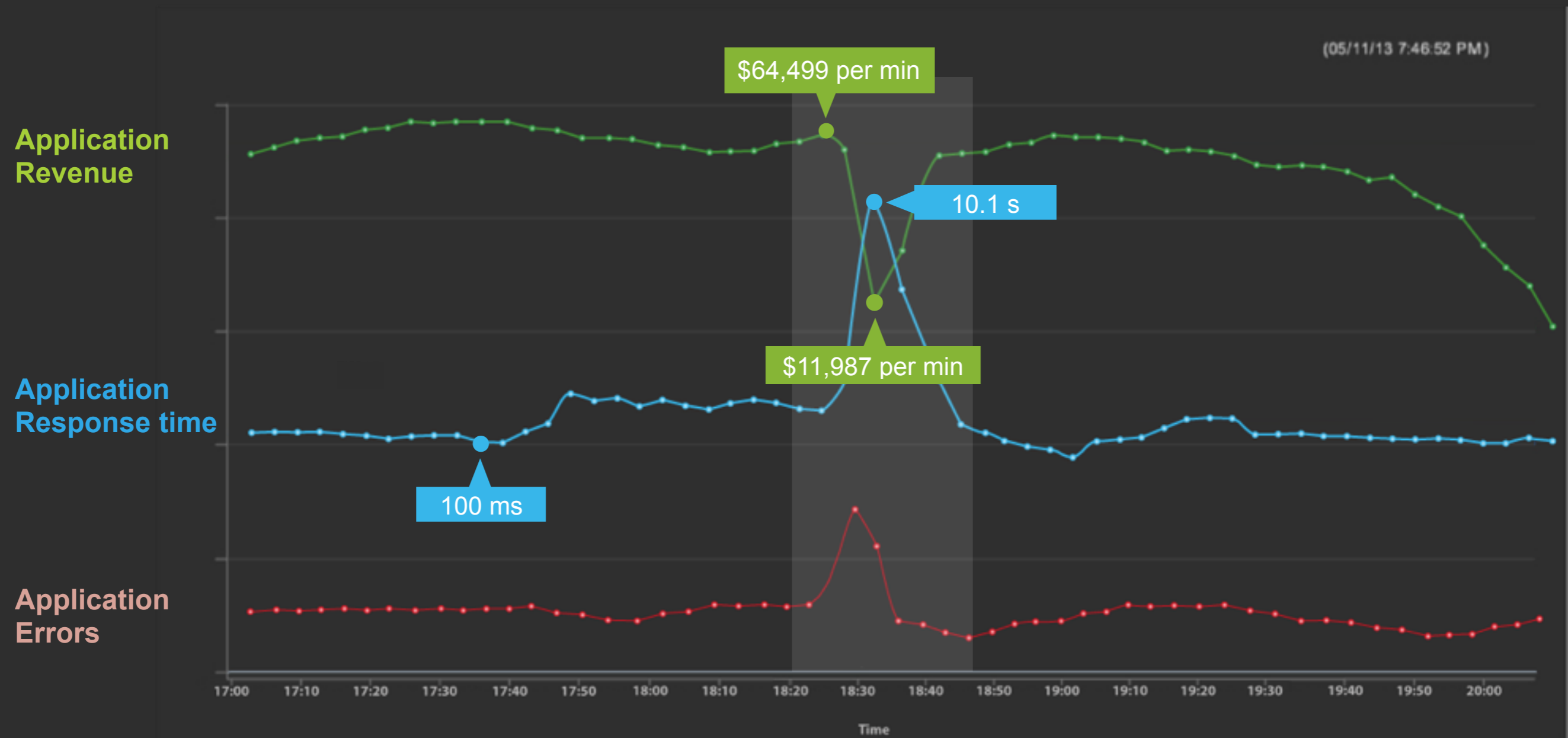
## 1,000+ CALLS/TRANSACTION

Query Type	Query	Avg. Time (ms)	Count	Tot. Time (ms)	% Time
Stored Proc	usp_GetPublicNewsFeed	1078	1	1078	11.1
Query	SELECT symbols0_ExchangeSymbolId as HiResExc3_1_ symbols0_ExchangeSymbolId as Exchange1_1_	1.23	264	325	3.4
Query	SELECT urls0_DocumentId as DocumentId1_ urls0_UrlId as UrlId1_ urls0_UrlId as UrlId356_0_ urls0_	0.9	363	325	5.4
Query	SELECT documentti0_DocumentId as DocumentId1_ documentti0_DocumentTickerId as Document1_1_	0.48	360	173	2.9
Query	SELECT instrument0_InstrumentId as Instrume1_234_4_ instrument0_Symbol as Symbol234_4_ instrur	0.61	260	158	2.6
Query	SELECT list0_DocumentId as DocumentId1_ list0_TermId as TermId1_ vocabulary1_TermId as TermId3	0.43	360	154	2.6
Stored Proc	dbo.usp_BatchGetUrlsBySiteAndTickers	110	1	110	1.8
Query	SELECT document0_DocumentId as DocumentId357_0_ document0_Title as Title357_0_ document0_D	0.46	239	109	1.8
Query	select contentcol0_ContentCollectionId as ContentC1_355_ contentcol0_Name as Name355_ contentcol	1.88	34	64	1.1
Query	select top 10 url0_UrlId as UrlId356_0_ document1_DocumentId as DocumentId357_1_ documentse2_C	7.63	8	61	1.0
Query	SELECT TOP (@p0) this_InstrumentId as Instrume1_234_4_ this_Symbol as Symbol234_4_ this_Name	24	2	48	0.8
Query	SELECT top 10 this_UrlId as UrlId356_0_ this_Url as Url356_0_ this_PublishDate as PublishD3_356_C	1.39	23	32	0.5
Query	SELECT this_InstrumentId as Instrume1_235_3_ this_CurrentPrice as CurrentP2_235_3_ this_OpenPr	2.13	15	32	0.5
Connection Op	server=sqlc;application name=;database=;connection id=urluser;connect timeout =15"	0.04	707	30	0.5
Stored Proc	nt.dbo.usp_GetDocumentRating	16	1	16	0.3



# **BUSINESS IMPACT**

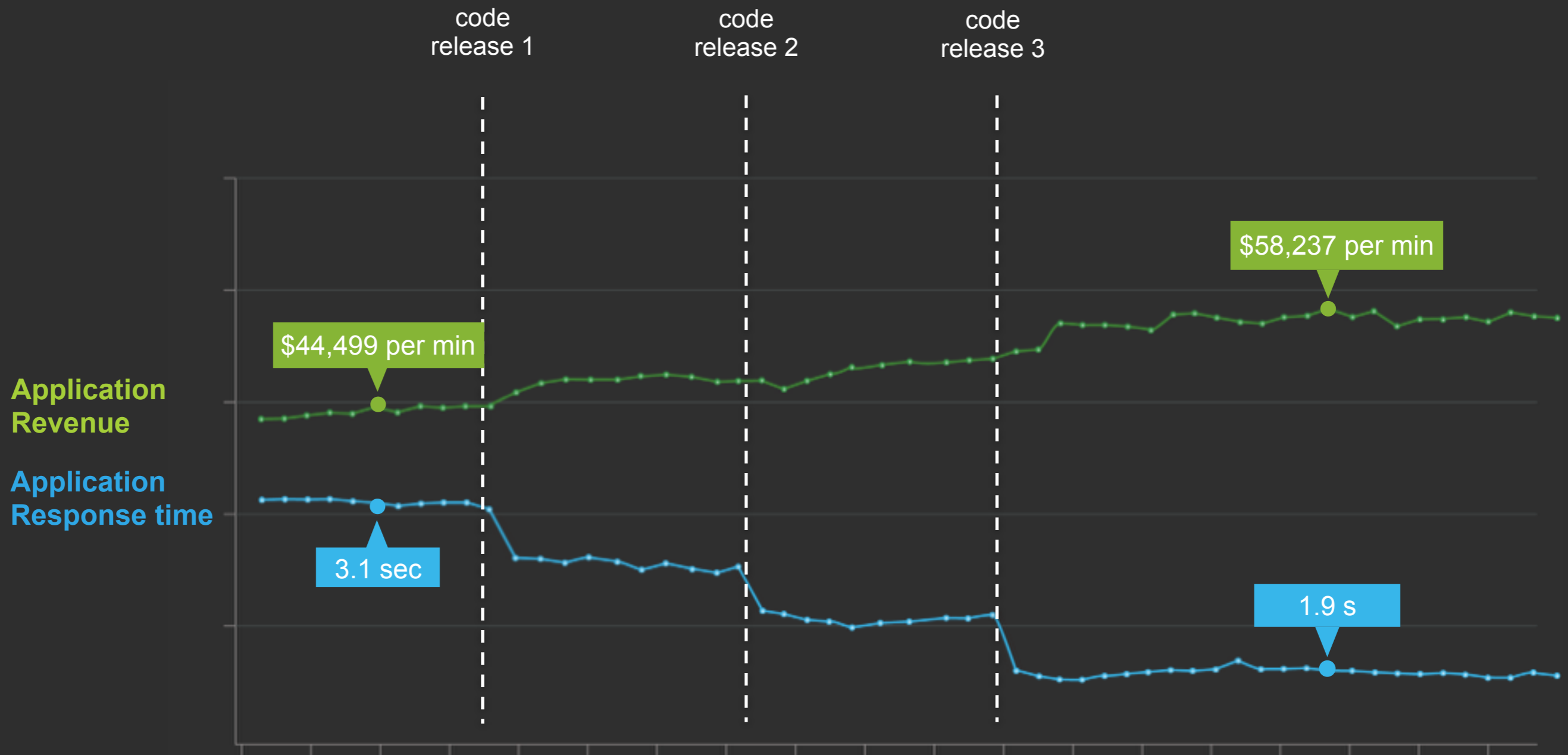
# KNOW THE IMPACT OF SLOW APPLICATION PERFORMANCE



\* Screenshot from US e-Commerce AppDynamics Customer



# UNDERSTAND THE BENEFIT OF AN APPLICATION RELEASE



**CONSUMERS EXPECT  
FLAWLESS EXECUTION**

**PERFORMANCE MATTERS!**

**INTELLIGENT TROUBLESHOOTING**

**DON'T BE THIS PERSON...**



**PLAN AHEAD**

**ANTICIPATE NEEDS**

**INTENDED PURPOSE**



**THE WORLD IS GOING MOBILE**

**ARE YOU READY?**



# APPDYNAMICS

[appdynamics.com/freetrial](http://appdynamics.com/freetrial)



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