



Releasing Fast Code

dynaTrace
software

The DevOps Approach to Performance

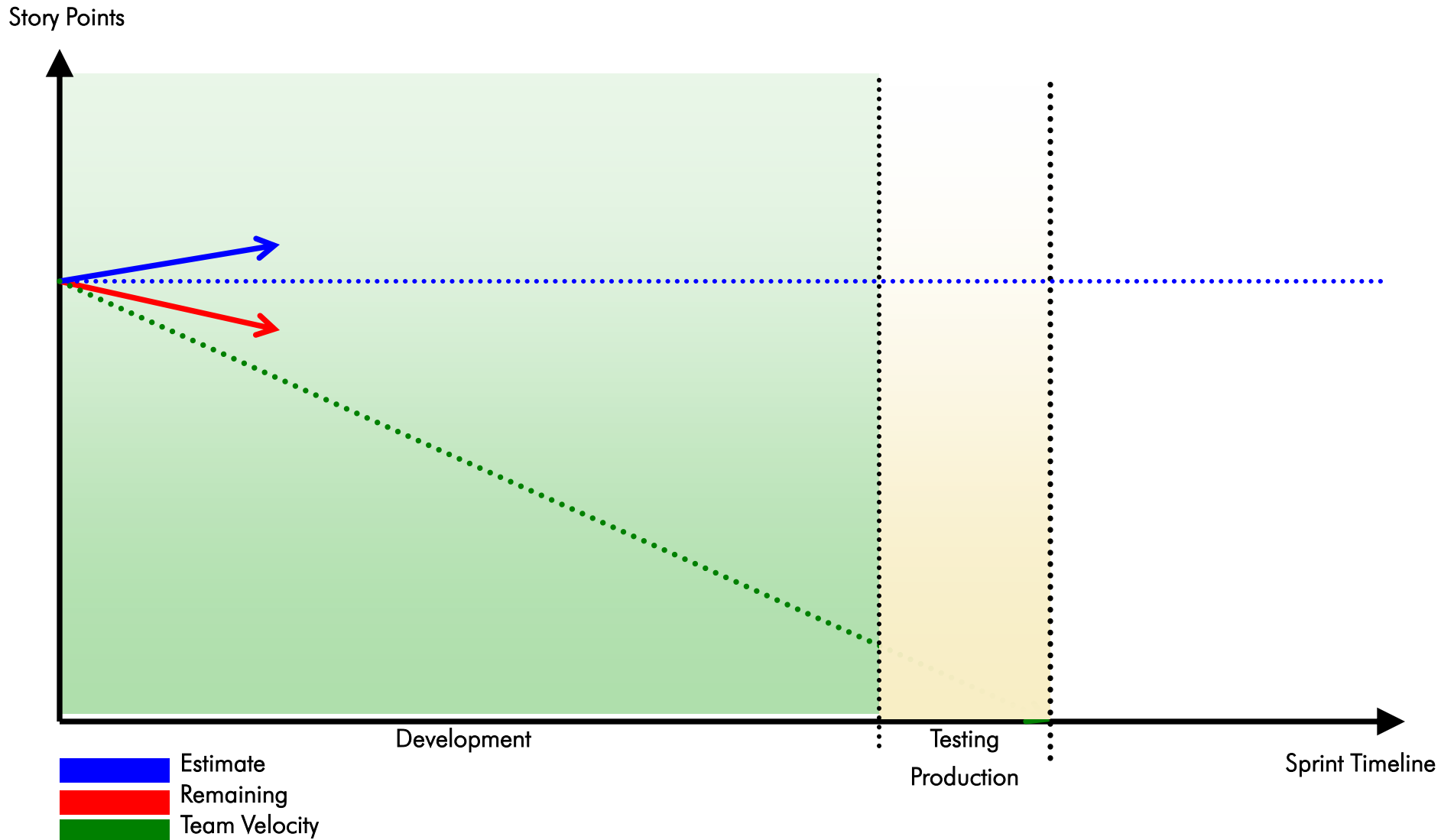
Why Agile Development took off



KEVIN MAZUR

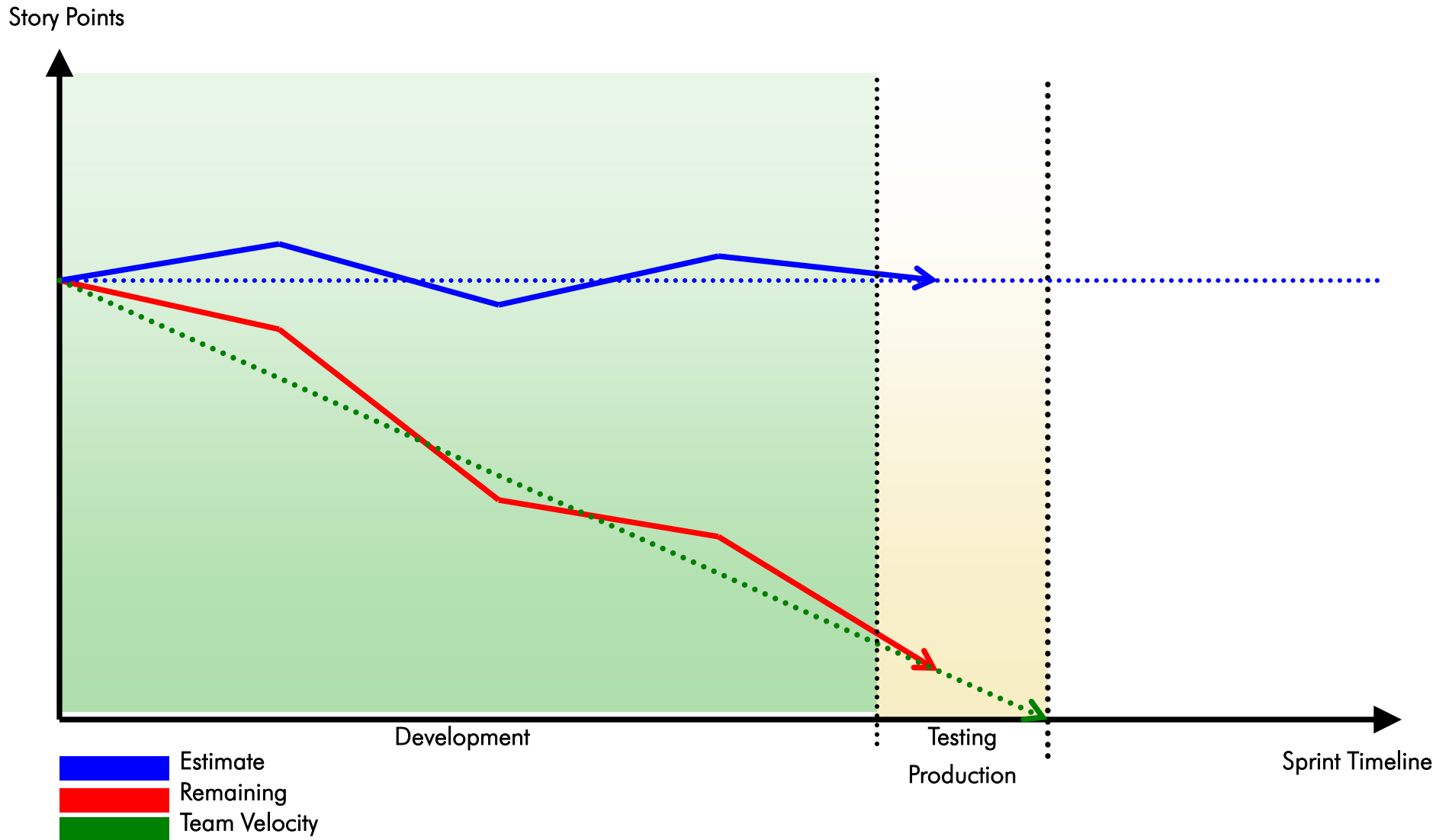


It's Sprint Time



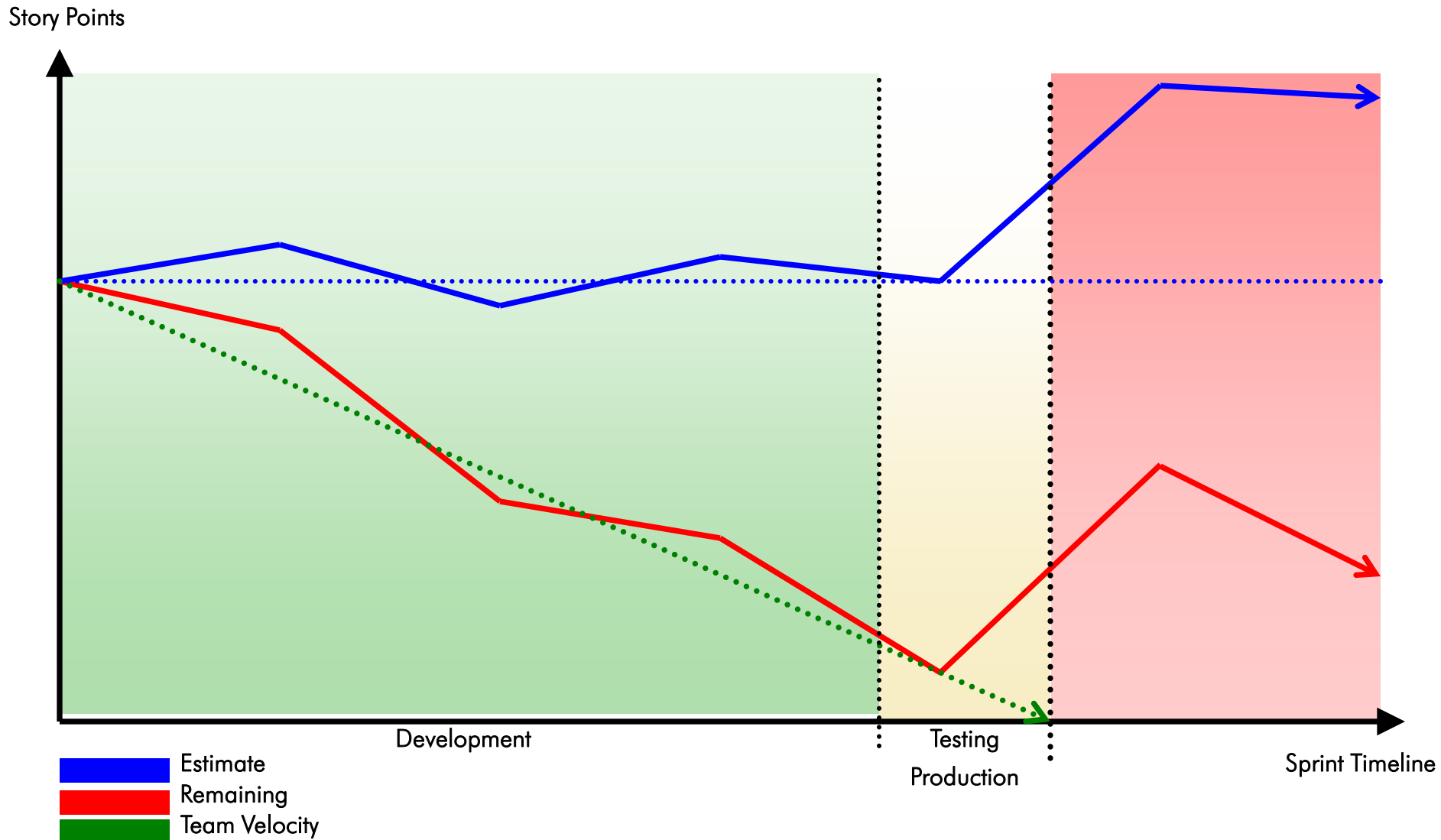


You are in control

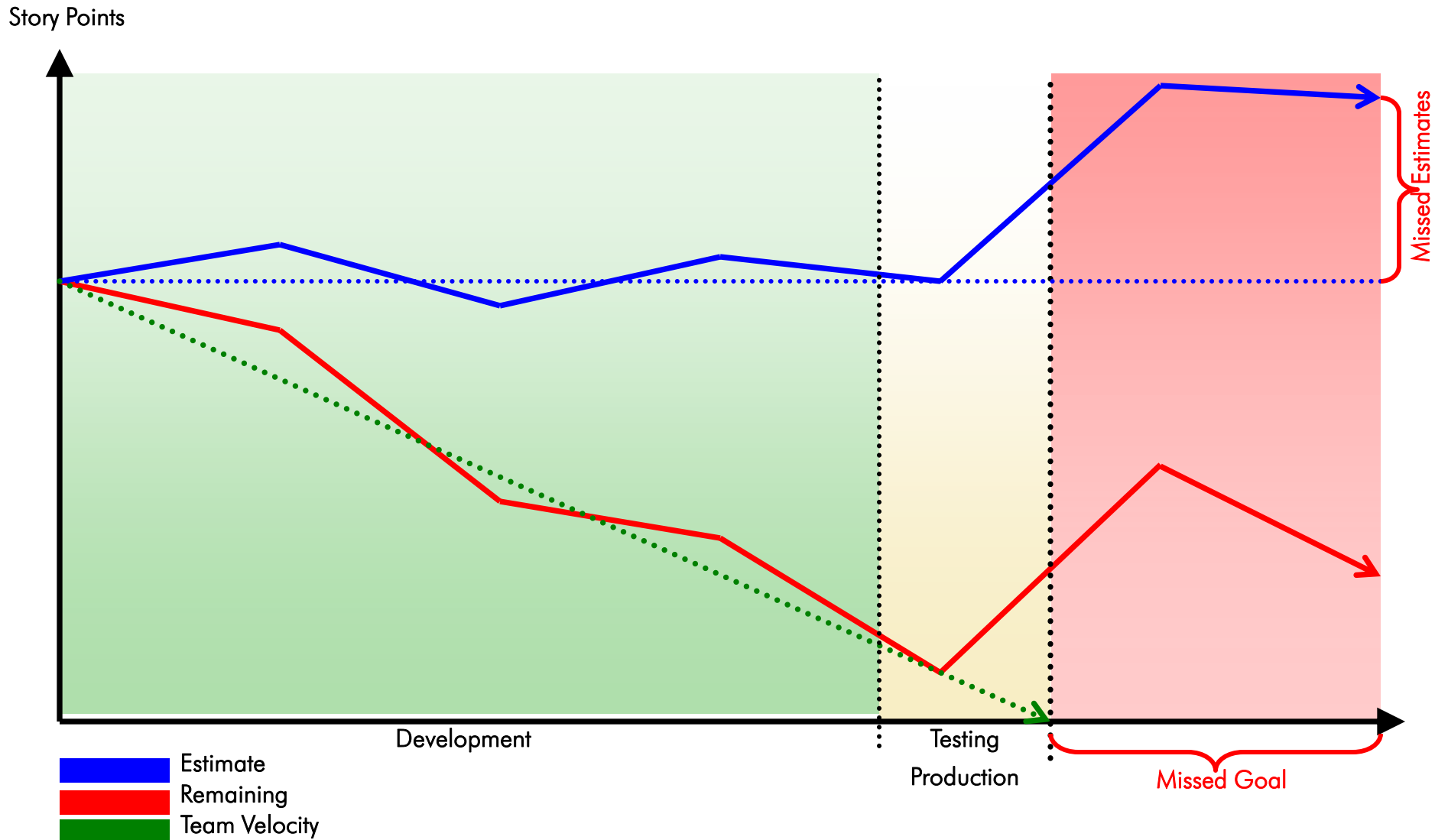




What happened?

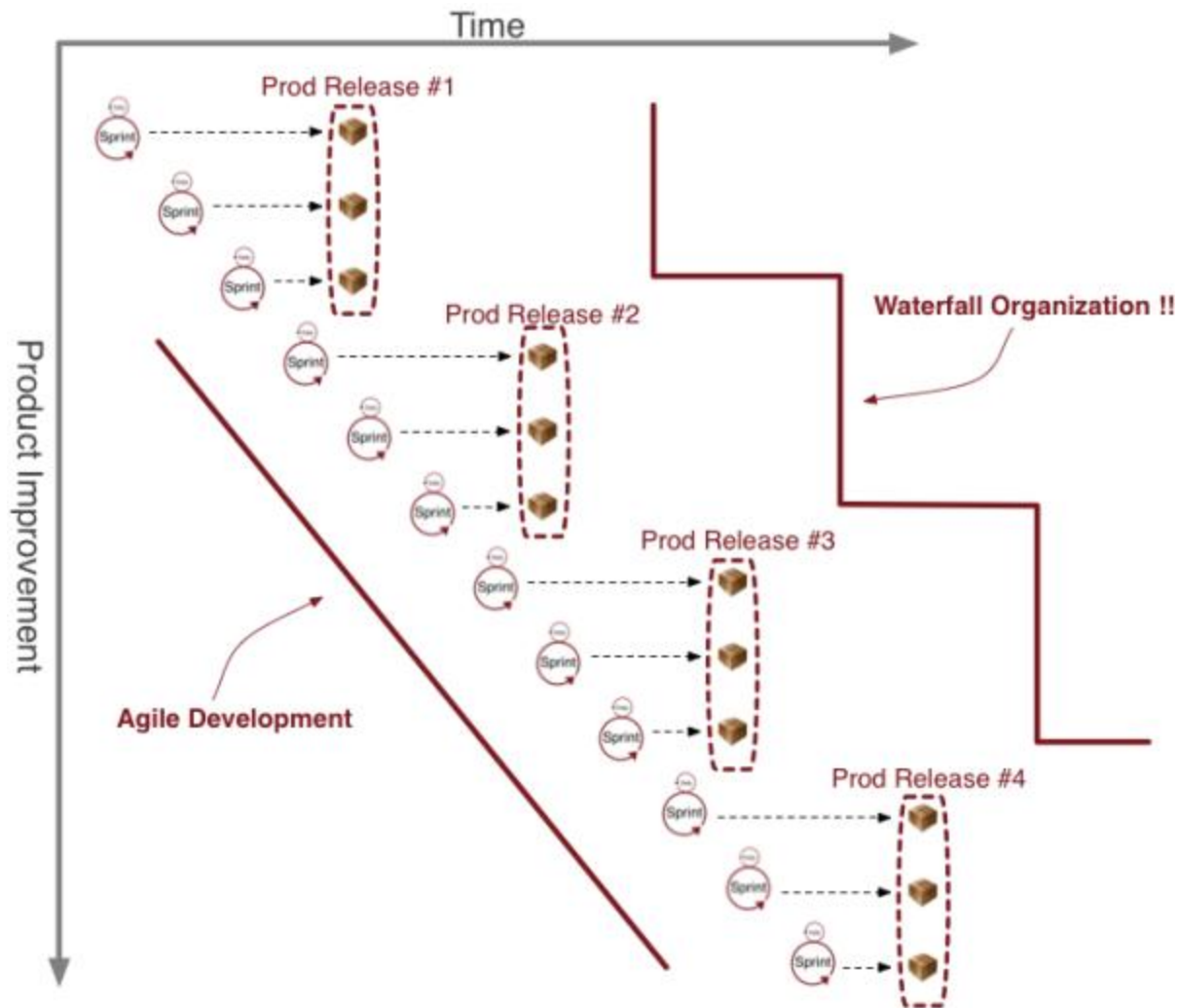


Missed Goals and Estimates

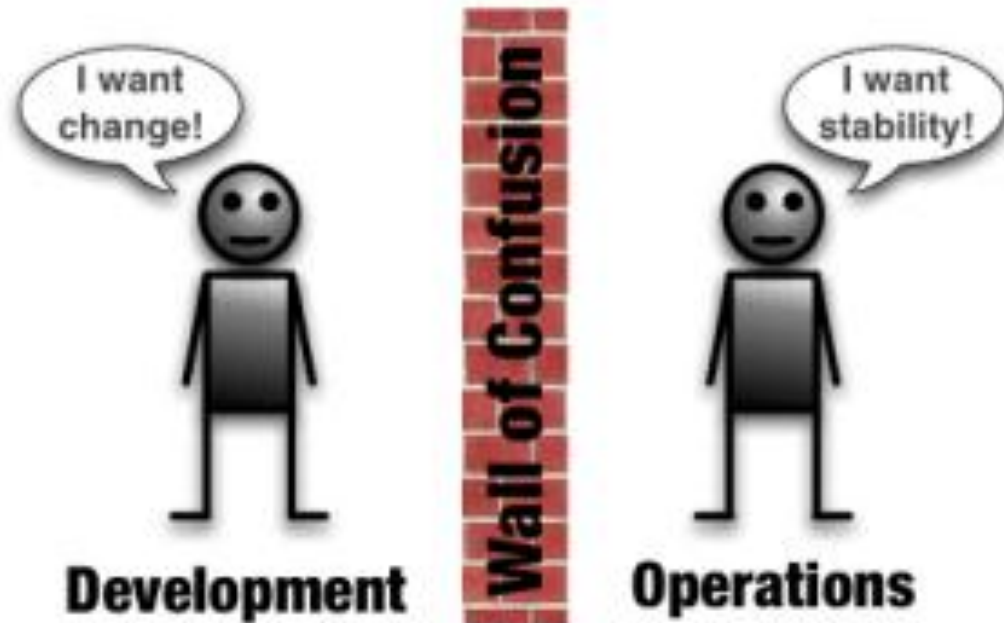




What is the Status Quo beyond Dev?



Problem #1: Different Mindset

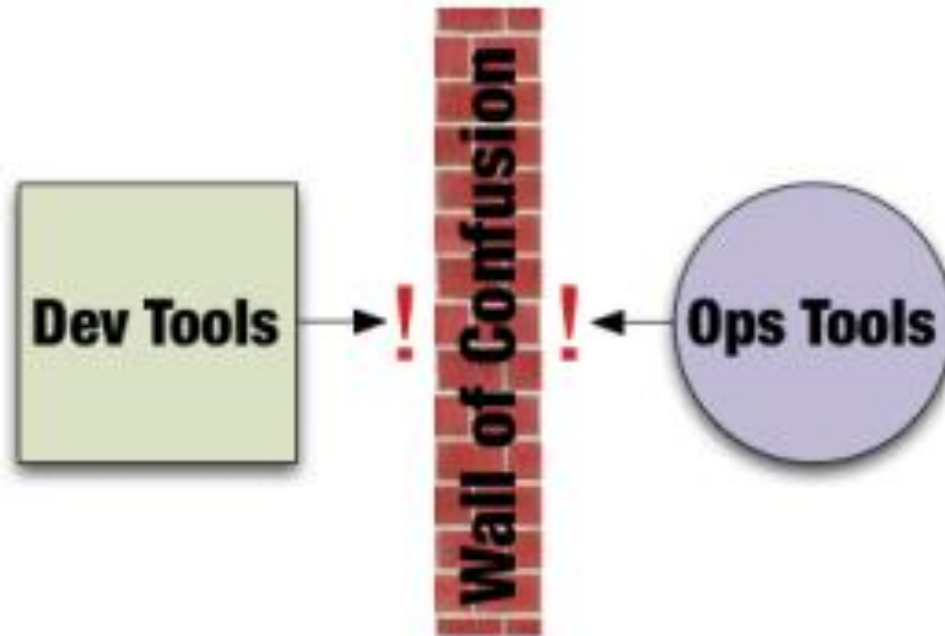


Problem #2: Dislocated Teams



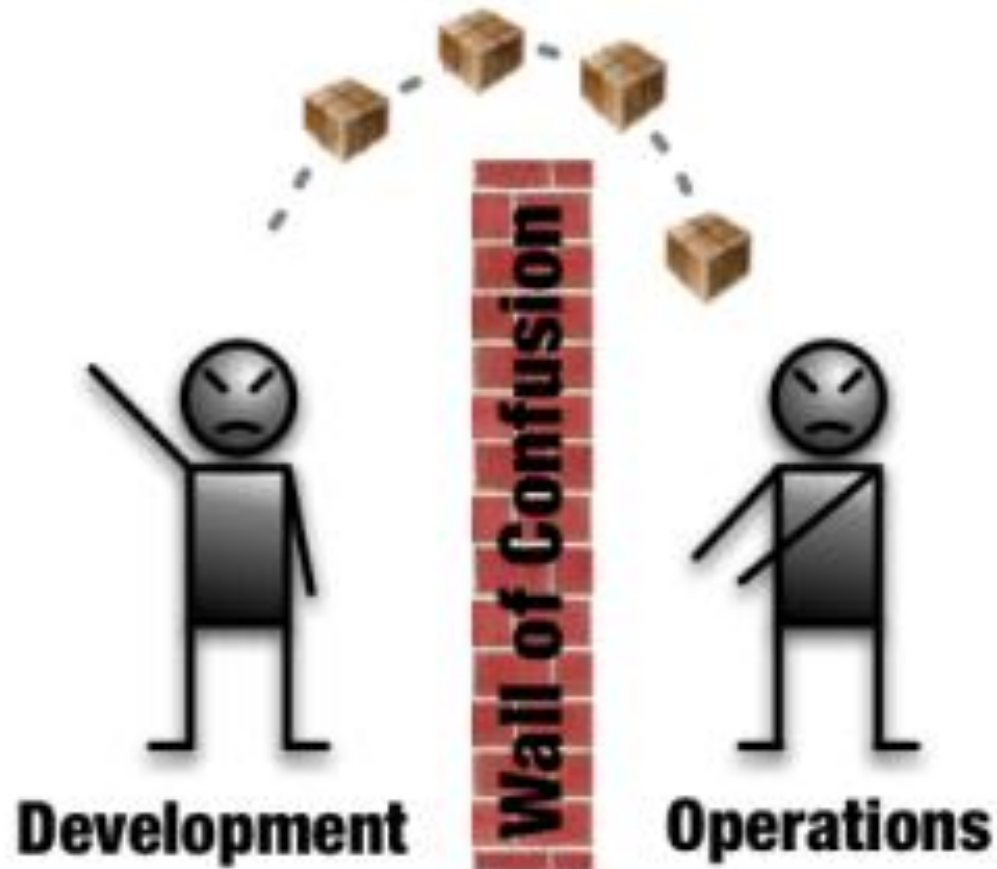
Source: <http://dev2ops.org/blog/2010/2/22/what-is-devops.html>

Problem #2: Different Tools





Problem #4: Over the Fence Attitude



These Problems lead to ...



=





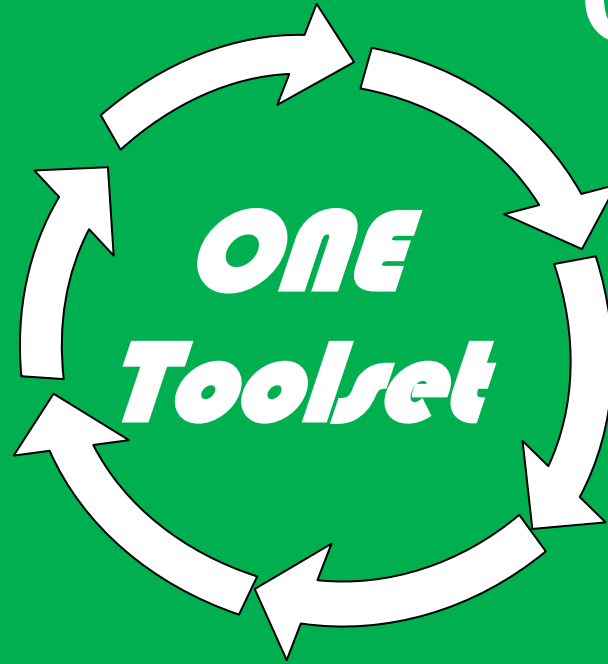
A potential Solution

DevOps =



*Real World
Feedback*

*Perf Test in
CI*



*Architecture
Validation*

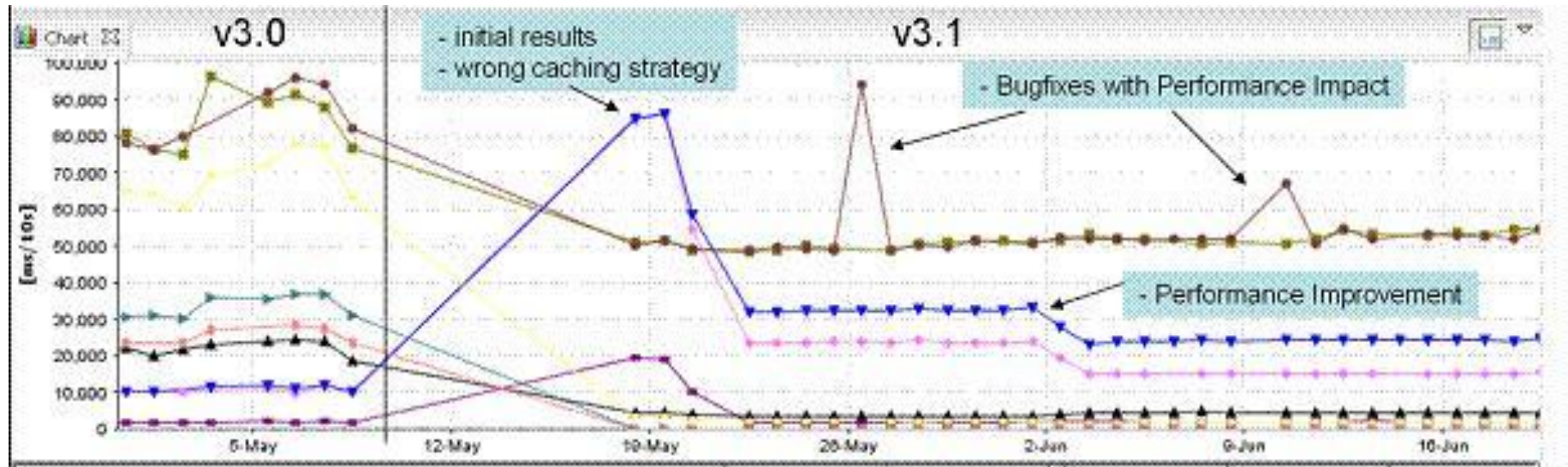
*Cloud based
Testing*

*Test in
Production*

*Traditional
Load Testing*

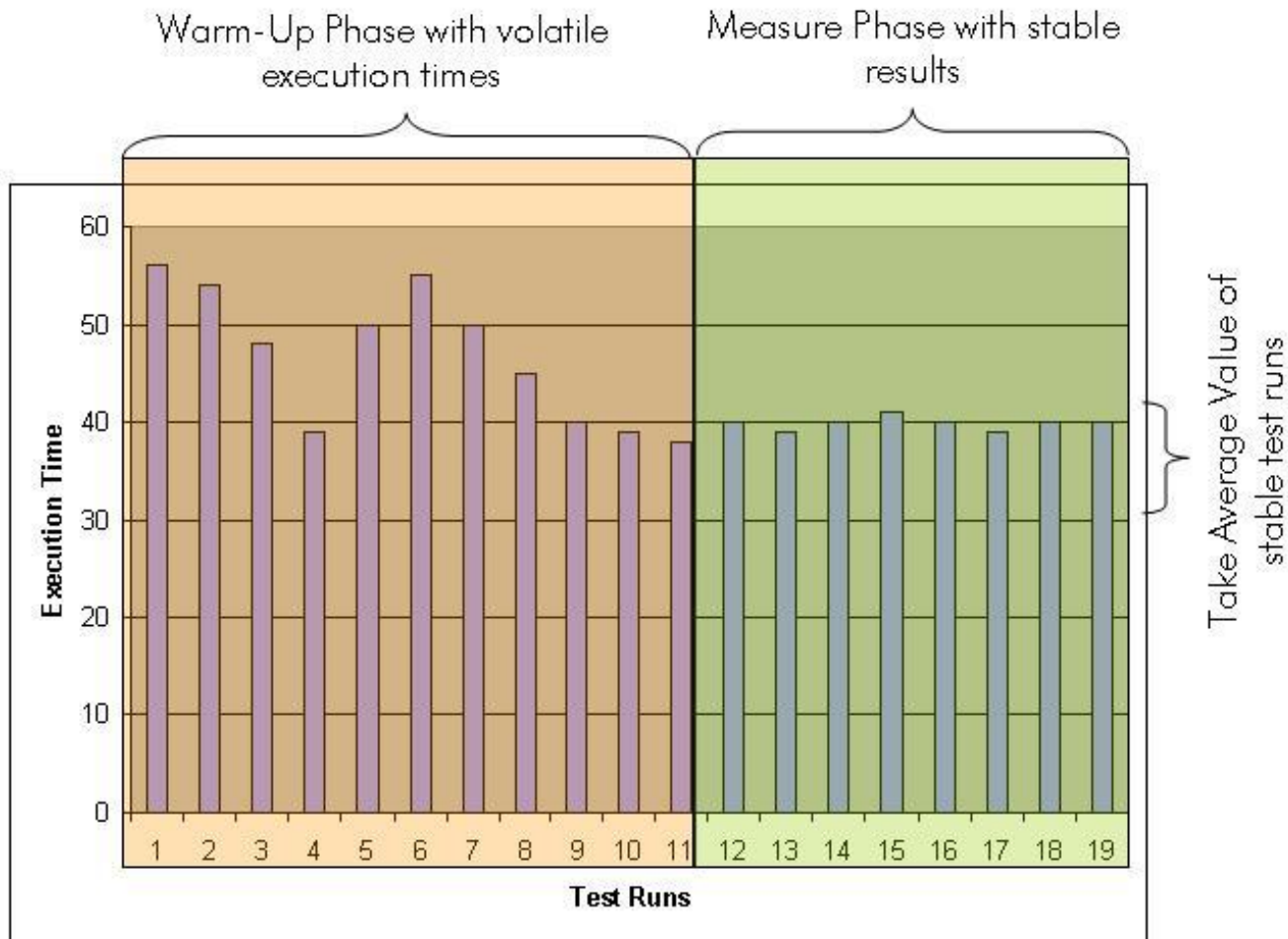


Identify Performance Regressions Early





Tip: Stable Environment





Tip: Exclude Garbage Collection

PurePaths

PurePath	Duration...	CPU Duration [ms]	Suspension Duration [ms]
957@<...	254.36	122.93	26.88
978@<...	174.23	2.12	2.52
954@<...	111.45	38.33	4.71
879@<...	102.51	76.61	3.90
878@<...	58.01	31.25	8.25
1019@...	54.24	33.42	7.88
1015@...	52.83	32.53	7.34
1002@...	44.96	16.85	1.38
935@<...	40.68	7.13	3.73
996@<...	37.92	15.62	2.19
892@<...	36.54	15.62	5.67
893@<...	25.45	6.19	3.12

Runtime Suspension per Transaction

PurePath Hot Spots

Exec [ms]

Exec [ms]

PurePaths Contributors

Method	Class	Exec [ms]	CPU Exec [ms]	Suspension [ms]	Argument
ProcessRequest(System.Web.HttpContext)	ASP.mainform_aspx	0.37	0.37	-	System.Wr...
ProcessRequest(System.Web.HttpContext)	System.Web.UI.Page	63.32	63.32	21.70	System.Wi...
getDotNetPayBackend(System.Web.Ses...	DotNetPayFrontend.Do...	0.12	0.00	-	
LoggedIn()	DotNetPayFrontend.we...	6.87	0.00	-	
GetCustomFormControls()	DotNetPayFrontend.Gl...	0.04	0.00	-	
getDotNetPayBackend(System.Web.Ses...	DotNetPayFrontend.Do...	0.06	0.00	-	
getAccountInformation()	DotNetPayFrontend.we...	6.05	6.05	-	
Synchronous Path		-	-	-	
callLocalWebMethod(int)	DotNetPayBackend.Dot...	0.11	0.00	-	
getAccountInformation()	DotNetPayBackend.Dot...	0.44	0.00	-	
getAccountInformation(int)	DotNetPayBackend.db...	0.18	0.00	-	
System.Data.IDbCommand.Ex...	System.Data.Common...	1.00	0.00	-	SELECT IB...
getDotNetPayBackend(System.Web.Ses...	DotNetPayFrontend.Do...	0.04	0.00	-	
getAccountInformation()	DotNetPayFrontend.we...	11.07	0.00	-	
getTransactionInformation(System.Strin...	DotNetPayFrontend.we...	10.52	10.52	-	
CompareTo(System.Object)	DotNetPayFrontend.we...	0.10	0.00	-	
CompareTo(System.Object)	DotNetPayFrontend.we...	0.09	0.00	-	

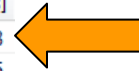
Runtime Suspension per Method

Tree Visualization API Distribution



Architecture Validation

Method	Total [ms]
testFastLastMinuteTransactionRandomOffers()	602.28
getCurrentSpecialOffers(Integer, Calendar, Calendar, String)	599.35
@ invoke(Object[] params)	599.12
exception	-
exception	-
Synchronous Path (HTTP)	-
doFilter(ServletRequest request, ServletResponse response, FilterCha	554.34
@ doPost(HttpServletRequest request, HttpServletResponse respons	554.26
getHome()	0.40
getSpecialOffers(int)	306.38
getSpecialOffers(int amount)	298.37
getHome()	0.28
loadOffer(int)	0.68
loadOffer(int oid)	0.63
findByPrimaryKey(Integer)	0.62
setTransactionTimeout(int seconds)	0.01
start(Xid xid, int flags)	0.01
prepareStatement(String sql)	0.04
executeQuery()	0.07
prepareOfferForWebService(OfferLocal local)	3.25
loadOffer(int)	0.39



Analyze your existing Unit Tests



Validate against your Arch Rules

```
<analysisresult>
- <rule name="MaxDBCalls" description="Verify that we do not have more than 50 DB Calls per transaction">
  <result transaction="AddOrderItemTest" result="OK" resulttext="" />
  <result transaction="RemoveOrderItemTest" result="OK" resulttext="" />
  <result transaction="LastMinuteSearch" result="Error" resulttext="Contains 245 occurrences which exceeds 50" />
</rule>
- <rule name="NoSyncCalls" description="Verify that no synchronous remoting calls get executed">
  <result transaction="AddOrderItemTest" result="OK" resulttext="" />
  <result transaction="RemoveOrderItemTest" result="OK" resulttext="" />
  <result transaction="LastMinuteSearch" result="NotEvaluated" resulttext="Transaction excluded from verification" />
</rule>
- <rule name="MaxRemoteCallSize" description="A remoting call must not transfer more than 100k">
  <result transaction="AddOrderItemTest" result="OK" resulttext="" />
  <result transaction="RemoveOrderItemTest" result="OK" resulttext="" />
  <result transaction="LastMinuteSearch" result="Error" resulttext="Transaction transfers 685k which exceeds 100k" />
</rule>
</analysisresult>
```

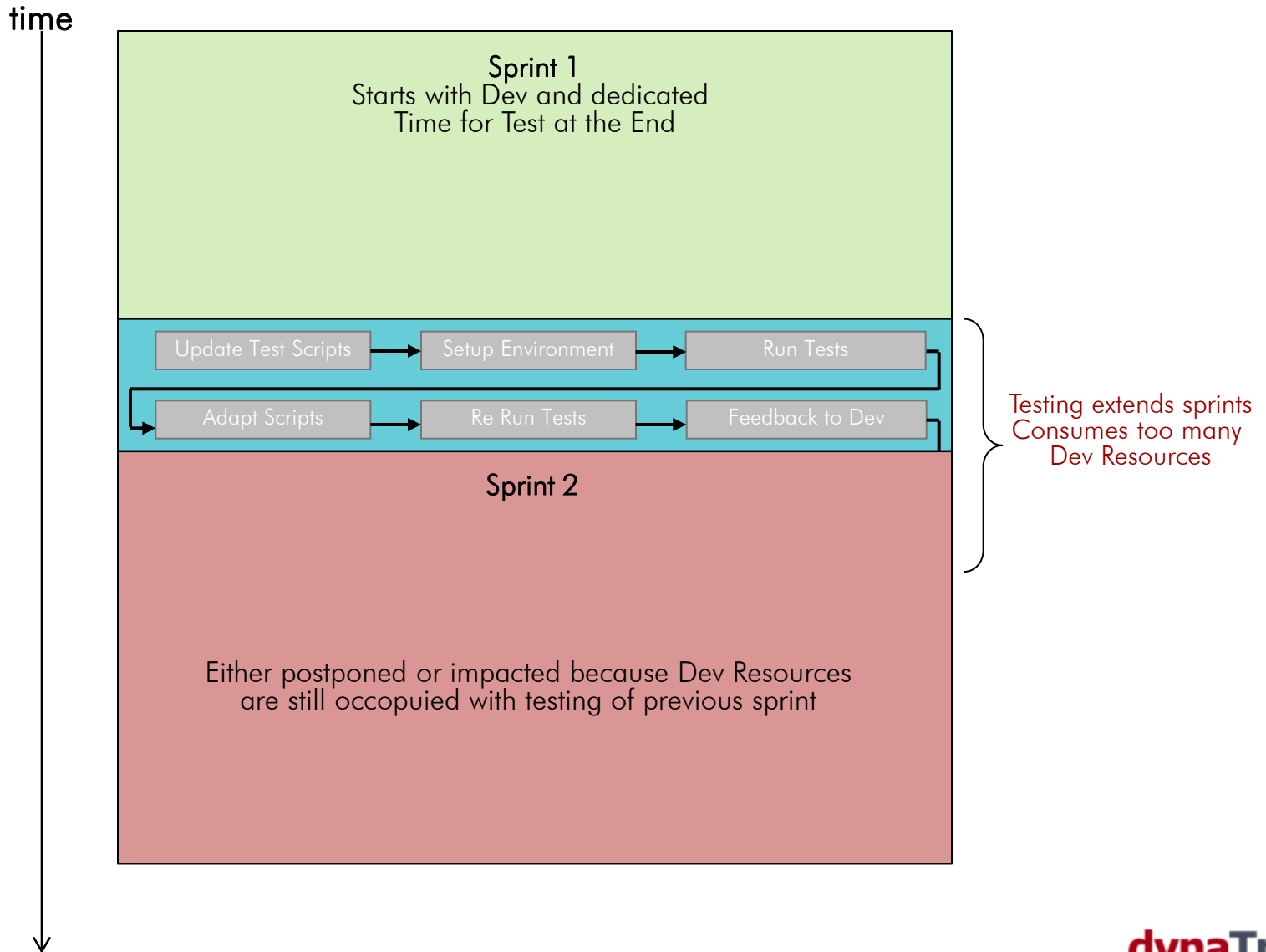
Learn how foreign code works

- Get insight into whats going on „under the hood“
 - Understand internals of the frameworks you use
 - Choose the right usage for your use case

Method	Class	Argument
loadData()	com.dynatrace.sam...	
openSession()	org.hibernate.impl.S...	
beginTransaction()	org.hibernate.impl.S...	
createQuery(java.lang.String queryString)	org.hibernate.impl.S...	from Person p where p.id=1
list()	org.hibernate.impl...	
list(java.lang.String query, org.hibernate.enx...	org.hibernate.impl.S...	
isTransactionInProgress()	org.hibernate.impl.S...	
prepareStatement(java.lang.String)	org.apache.derby.d...	select person0_ID as ID0_ person0_firstName as firstName...
executeQuery()	org.apache.derby.d...	select person0_ID as ID0_ person0_firstName as firstName...
createQuery(java.lang.String queryString)	org.hibernate.impl.S...	from Person p where p.id=1
list()	org.hibernate.impl...	
list(java.lang.String query, org.hibernate.enx...	org.hibernate.impl.S...	
isTransactionInProgress()	org.hibernate.impl...	
prepareStatement(java.lang.String)	org.apache.derby.d...	
executeQuery()	org.apache.derby.d...	
managedFlush()	org.hibernate.impl...	

Method	Class	Argument
loadDataByClass()	com.dynatrace.sam...	
openSession()	org.hibernate.impl.S...	
beginTransaction()	org.hibernate.impl.S...	
load(java.lang.Class entityClass, java.io.Serializ...	org.hibernate.impl.S...	
load(java.lang.String entityName, java.io.Sei...	org.hibernate.impl.S...	com.dynatrace.samples.hibernate.dataobjects.Person
getFirstName()	com.dynatrace.sam...	
immediateLoad(java.lang.String entityName,...	org.hibernate.impl.S...	
prepareStatement(java.lang.String)	org.apache.derby.d...	select person0_ID as ID0_1_ person0_firstName as fir...
executeQuery()	org.apache.derby.d...	select person0_ID as ID0_1_ person0_firstName as fir...
load(java.lang.Class entityClass, java.io.Serializ...	org.hibernate.impl.S...	
load(java.lang.String entityName, java.io.Sei...	org.hibernate.impl.S...	com.dynatrace.samples.hibernate.dataobjects.Person
getHibernateLazyInitializer()	com.dynatrace.sam...	
getFirstName()	com.dynatrace.sam...	
managedFlush()	org.hibernate.impl.S...	
flush()	org.hibernate.impl.S...	
getHibernateLazyInitializer()	com.dynatrace.sam...	

Traditional Load Testing takes too long in an agile process





Common Mistakes

Only use **Sample Data**

No **Server Side** Data

Wrong **Think Times**

Overloaded Load Agents

No **Error Detection**

Infrastructure Issues

Load Testing needs to be „real“

Real **Size** and **Content**

Real Third Party **Code**

Real **Infrastructure** Setup

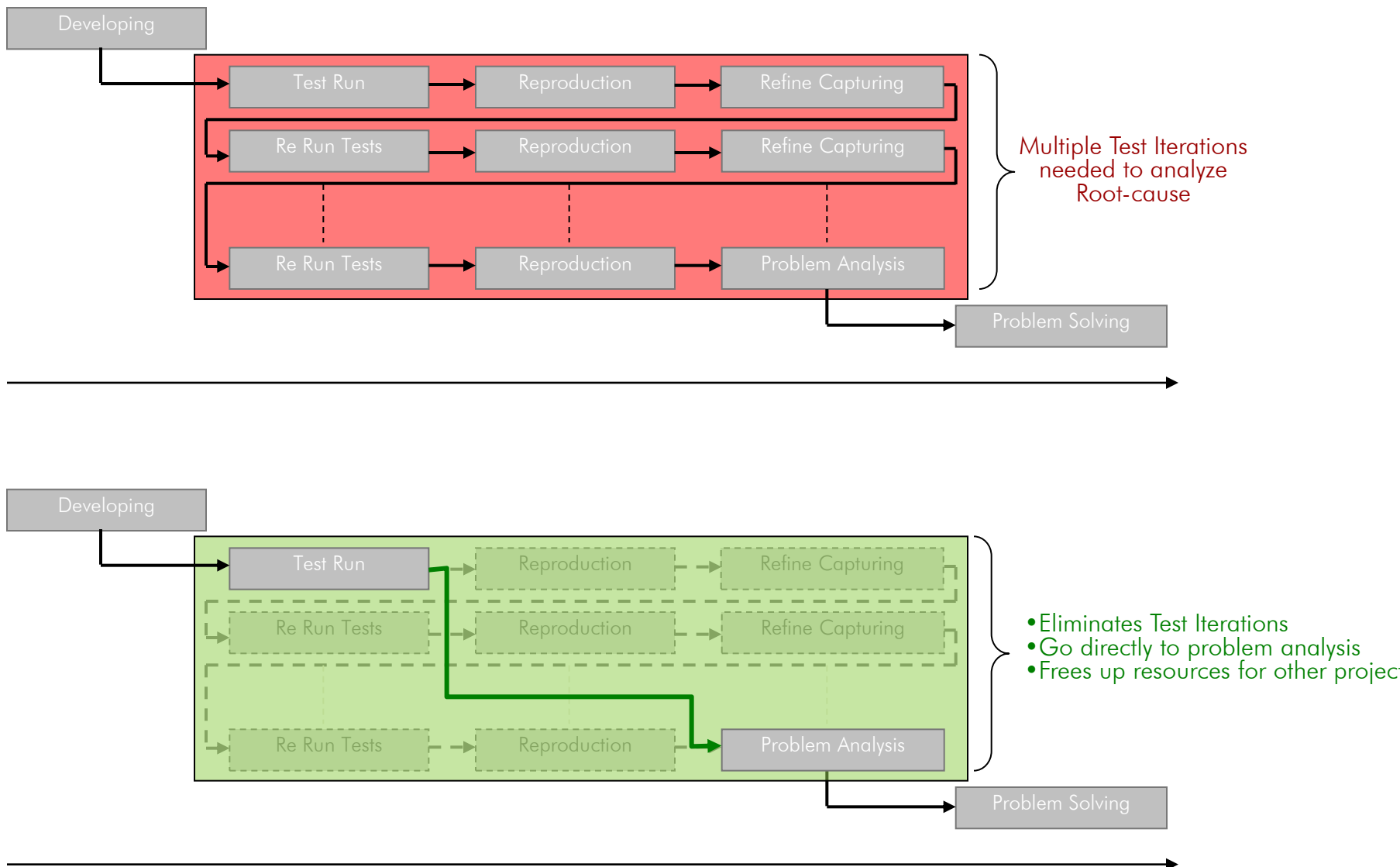
No Guarantees!

Real **Load**

Real **Number** of Users

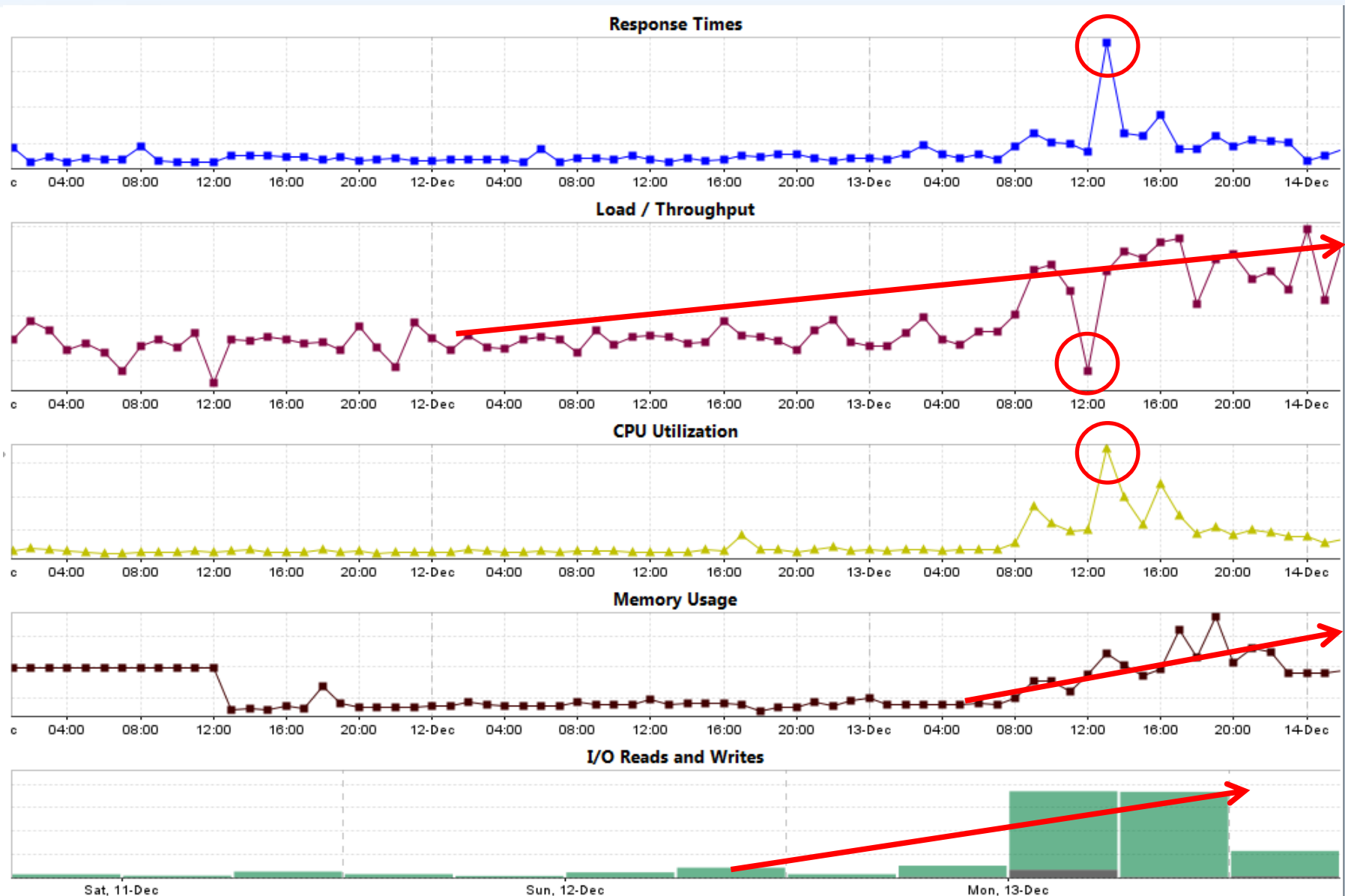


Minimize and automate real Load Tests

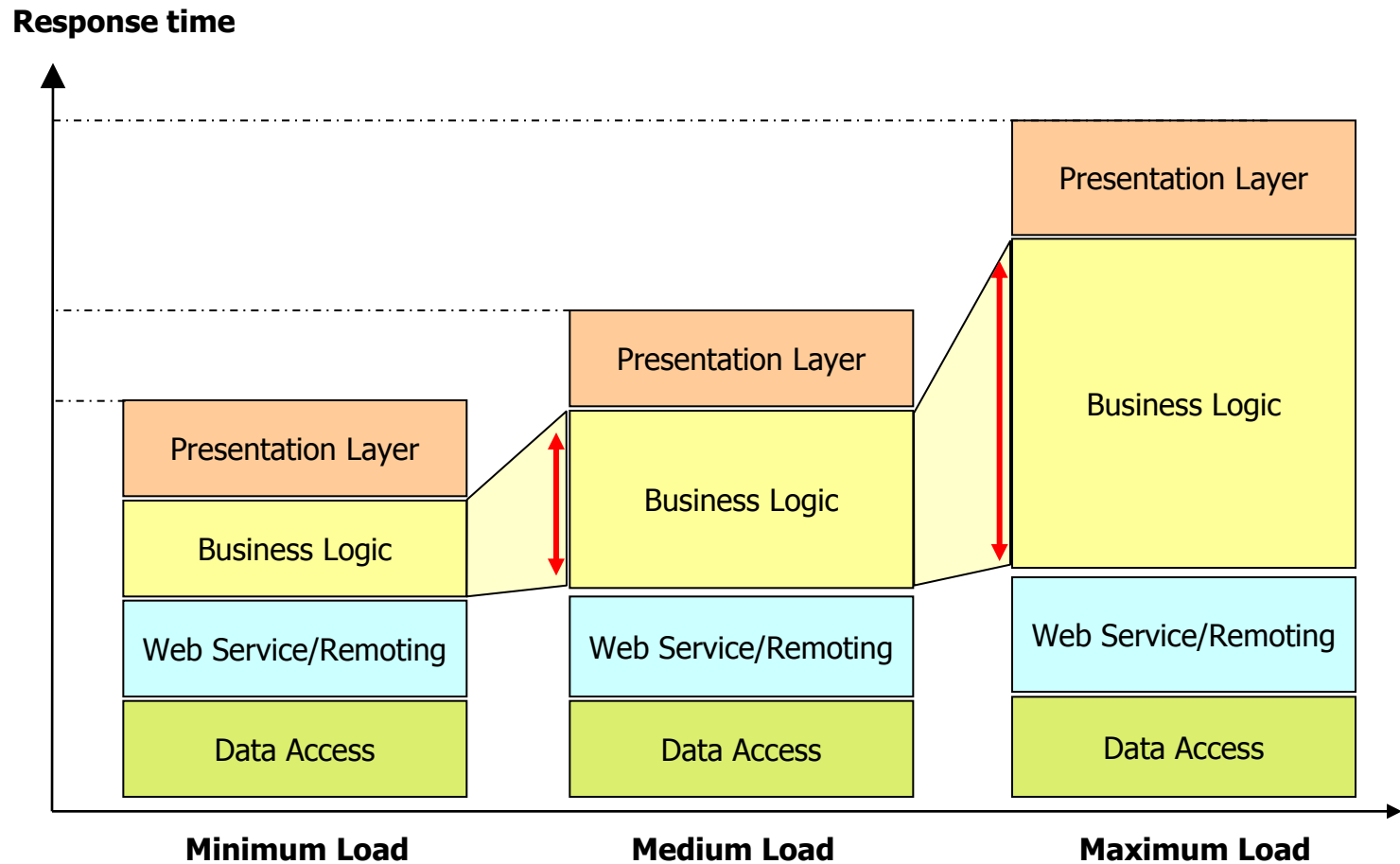




Tip: Measure more than Response Time



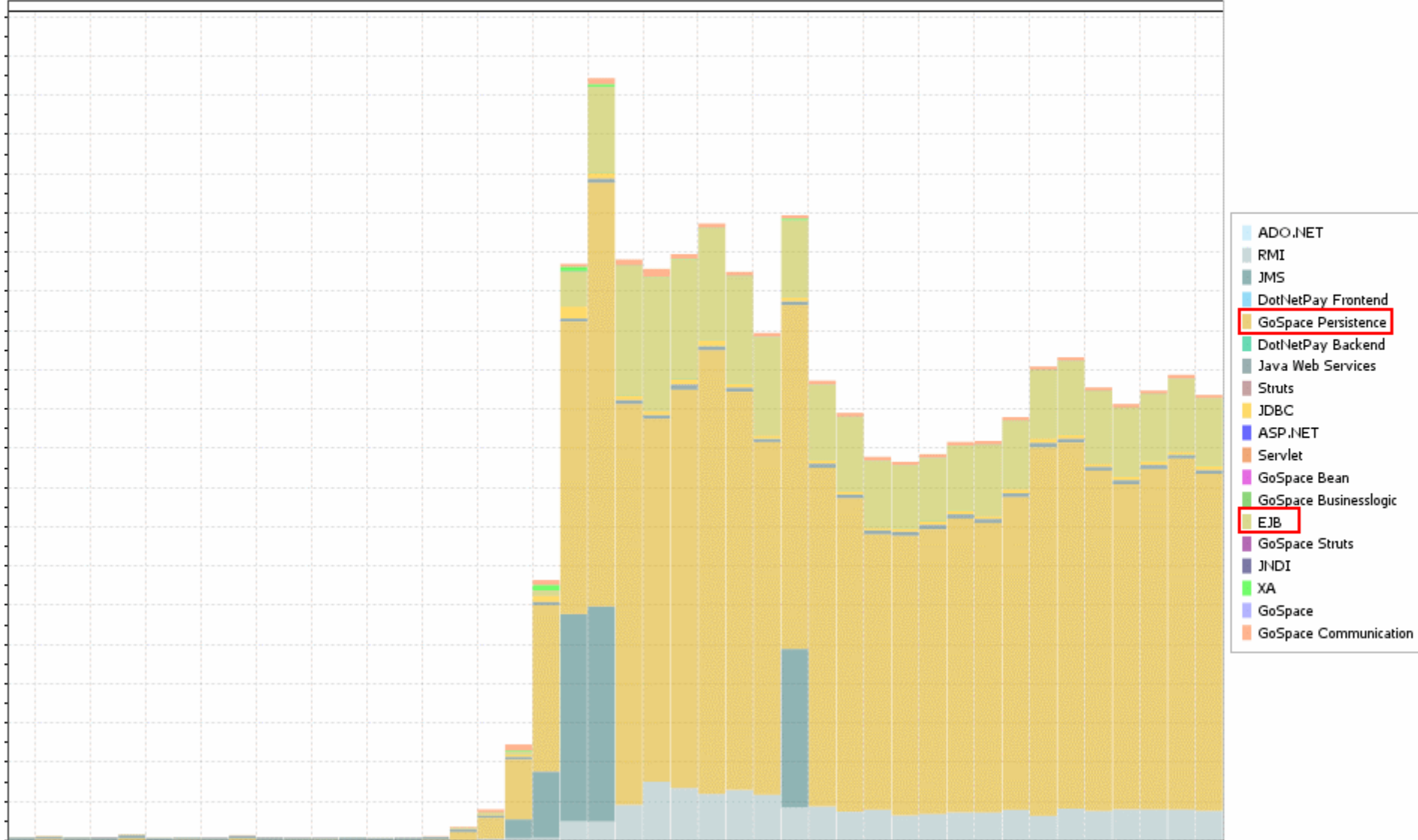
Tip: Identify Scalability Problems





Increasing Load Test is your friend

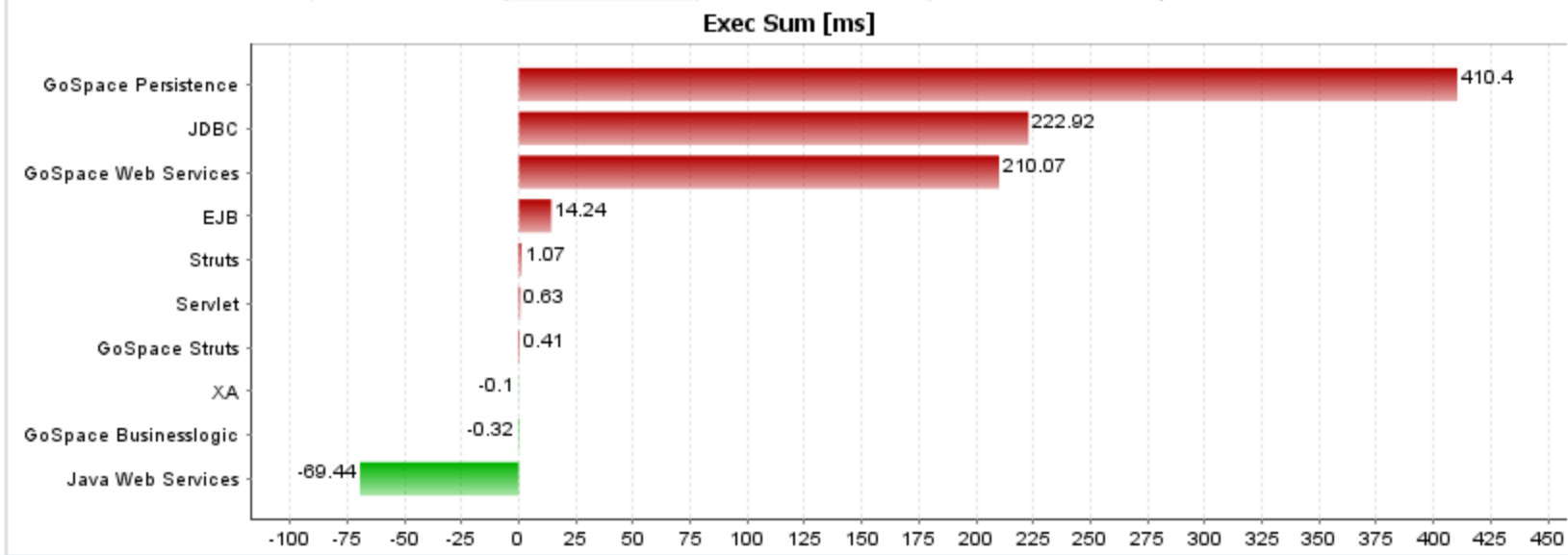
Performance Breakdown in Application Layers





Tip: Identify Regressions on Code Level

API	Exec Avg [ms]	Exec Sum [ms]	CPU Exec Avg [ms]	CPU Exec Total [ms]
GoSpace Persistence	410.40 (56 %)	410.40 (56 %)	47.52 (196 %)	47.52 (196 %)
JDBC	222.92 (220 %)	222.92 (220 %)	64.20 (33506 %)	64.20 (33506 %)
GoSpace Web Services	210.07 (54 %)	210.07 (54 %)	168.91 (53 %)	168.91 (53 %)
EJB	14.24 (241 %)	14.24 (241 %)	0.00 (- %)	0.00 (- %)
Struts	1.07 (22 %)	1.07 (22 %)	0.18 (28 %)	0.18 (28 %)
Servlet	0.63 (1 %)	0.63 (1 %)	0.21 (2 %)	0.21 (2 %)
GoSpace Struts	0.41 (35 %)	0.41 (35 %)	0.41 (37 %)	0.41 (37 %)
XA	-0.10 (-47 %)	-0.10 (-47 %)	0.00 (0 %)	0.00 (0 %)
GoSpace Businesslogic	-0.32 (-35 %)	-0.32 (-35 %)	-0.33 (-39 %)	-0.33 (-39 %)
Java Web Services	-69.44 (-10 %)	-69.44 (-10 %)	-69.44 (-10 %)	-69.44 (-10 %)



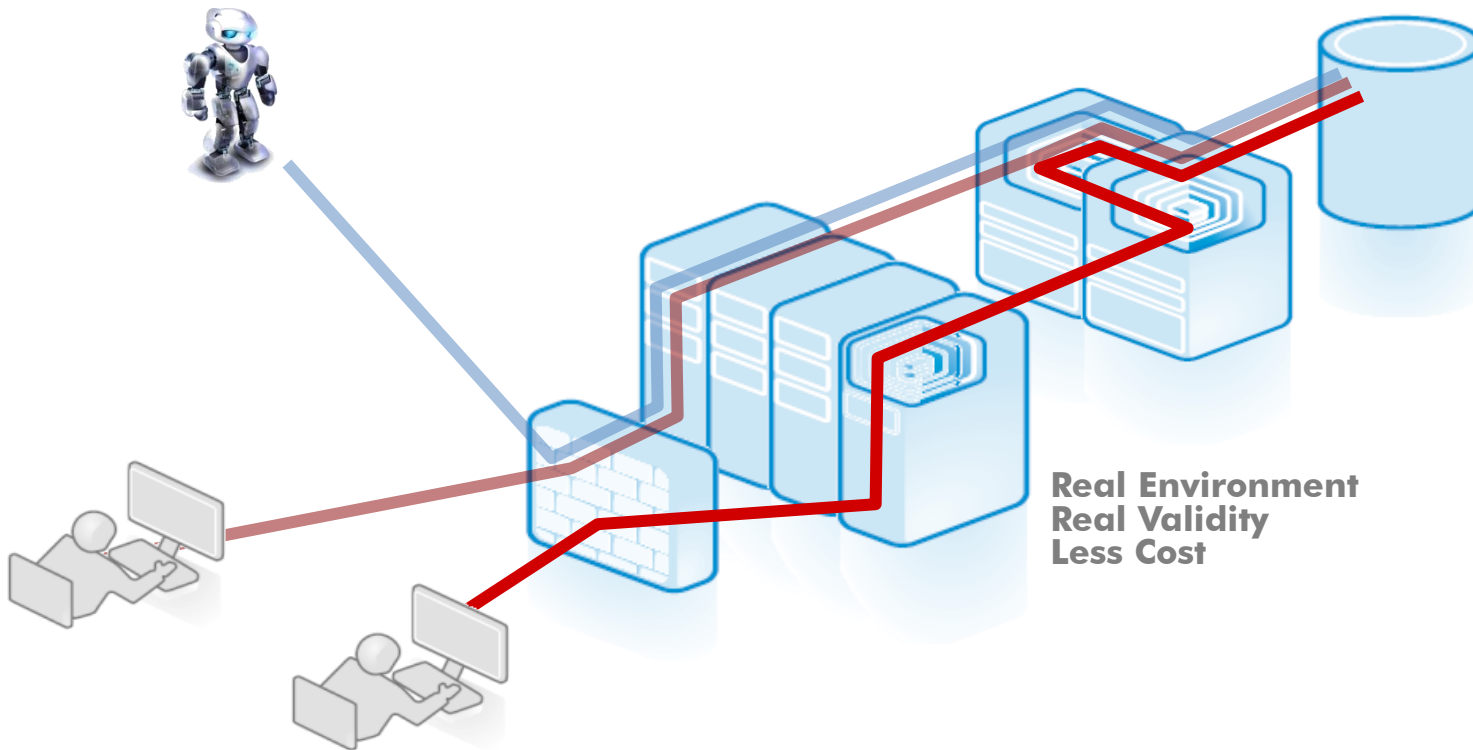


Tip: Get as granular data as possible

Method	Argument	Total [ms]	Exec [ms]
doFilter(ServletRequest request, ServletResponse response)		32545.98	0.12
doPost(HttpServletRequest request, HttpServletResponse response)		32545.87	0.22
selectModule(HttpServletRequest request, ServletContext context)		0.08	0.08
process(HttpServletRequest request, HttpServletResponse response)		32545.57	0.81
findActionConfig(String path)		0.04	0.04
createActionForm(HttpServletRequest request, ActionMapping mapping)		0.18	0.14
reset(ActionMapping mapping, HttpServletRequest request)		0.13	0.13
populate(Object bean, String prefix, String suffix, HttpServletRequest request)		0.22	0.22
validate(ActionMapping mapping, HttpServletRequest request)		0.04	0.04
execute(ActionMapping mapping, ActionForm form)		32490.65	0.85
init(HttpServletRequest req)		0.00	0.00
lookup(String)		30.10	1.55
create()		1244.38	1135.54
isLoginValid(String username, String password)		31215.31	0.10
askForUser(String username, String password)		31215.21	0.34
getUser(String, String)		31214.87	645.29
Synchronous Path (RMI)		-	-
invoke(InvocationRequest)		30569.58	34.75
setSessionContext(SessionContext)		21.50	21.50
ejbCreate()		20.31	20.31
getUser(String username, String password)		30485.60	11.48
ejbRemove()		7.42	7.42
exception	org.jboss.util.NestedSQLException: No Ma...	-	-
log4j [ERROR]	TransactionRolledbackException in metho...	-	-
exception	org.jboss.util.NestedSQLException: No Ma...	-	-
findException(Class type)		0.27	0.10
applicationInstance(String className)		0.07	0.07
execute(Exception ex, ExceptionConfig ae, Action		0.19	0.07

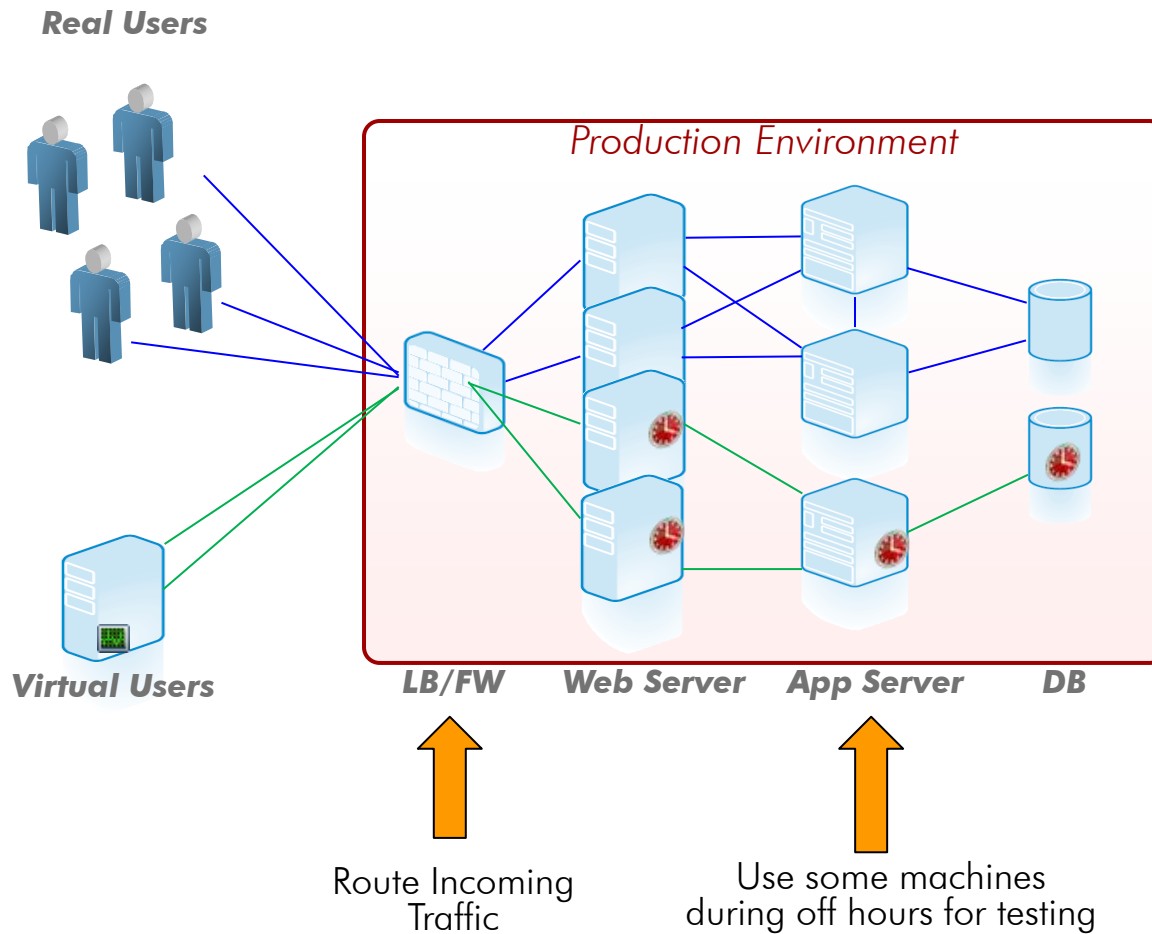


Test in your Production Environment

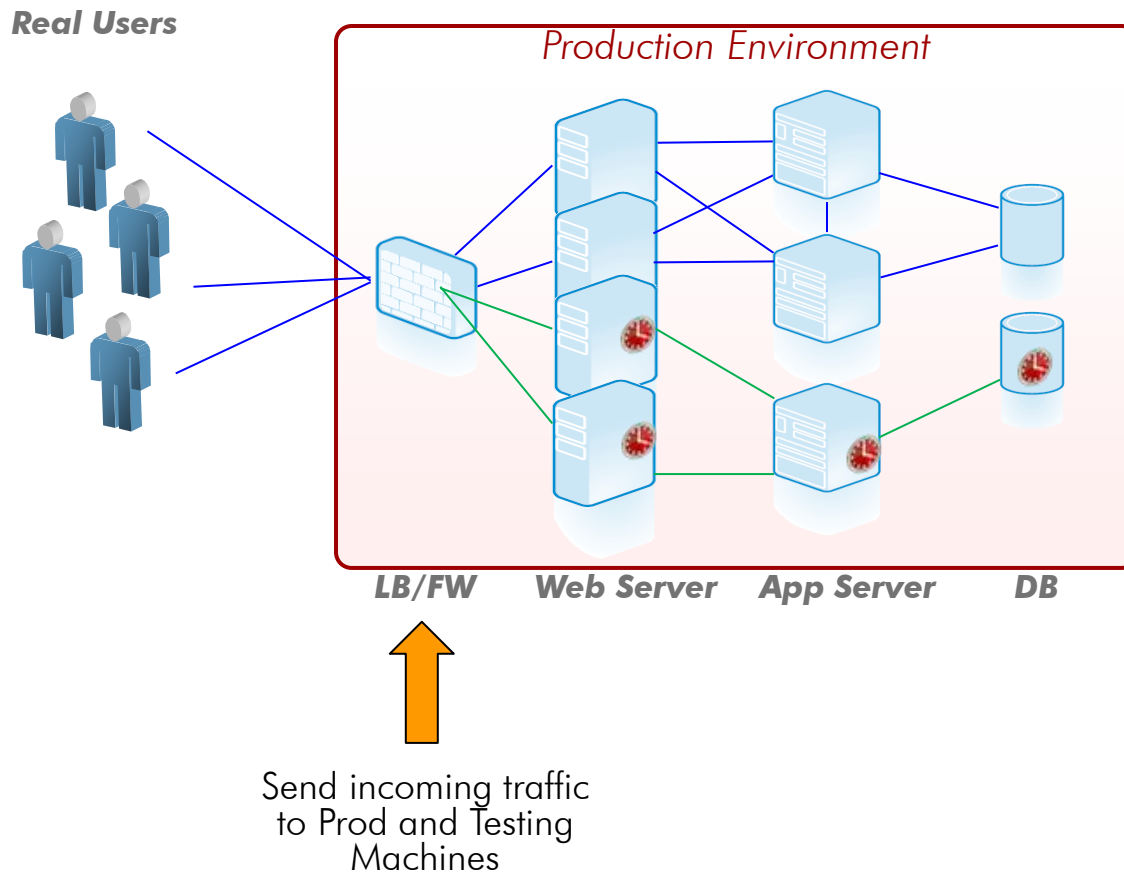




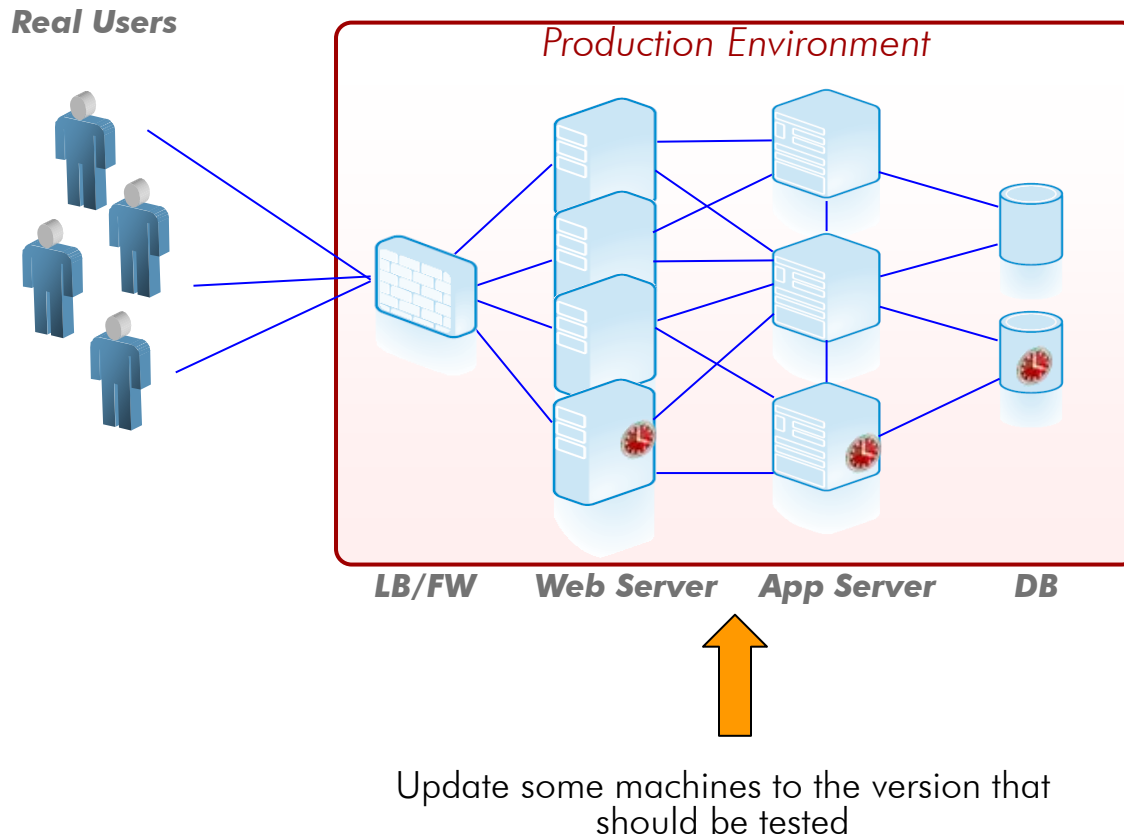
Scenario 1: Use Production Hardware



Scenario 2: Duplicate Traffic



Scenario 3: Partial Update





Use Cloud based Testing Services

Real End User Time

CDN

***High
Volume***

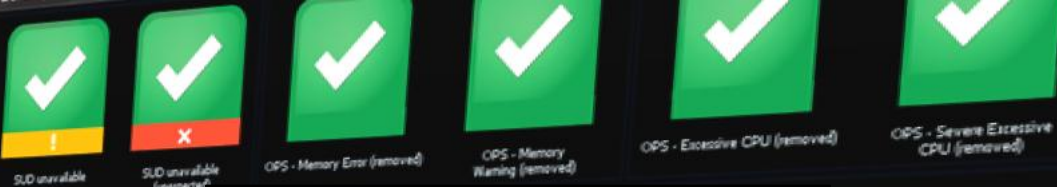


Proxies

***Control
Costs***

Last Mile

Load Balancers



S/D unavailable
 S/D unavailable (inspect)
 OPS - Memory Error (removed)
 OPS - Memory Warning (removed)
 OPS - Excessive CPU (removed)
 OPS - Severe Excessive CPU (removed)

Real Life Feedback

PurePath: 5/21/10 1:18 PM - 5/21/10 2:01 PM



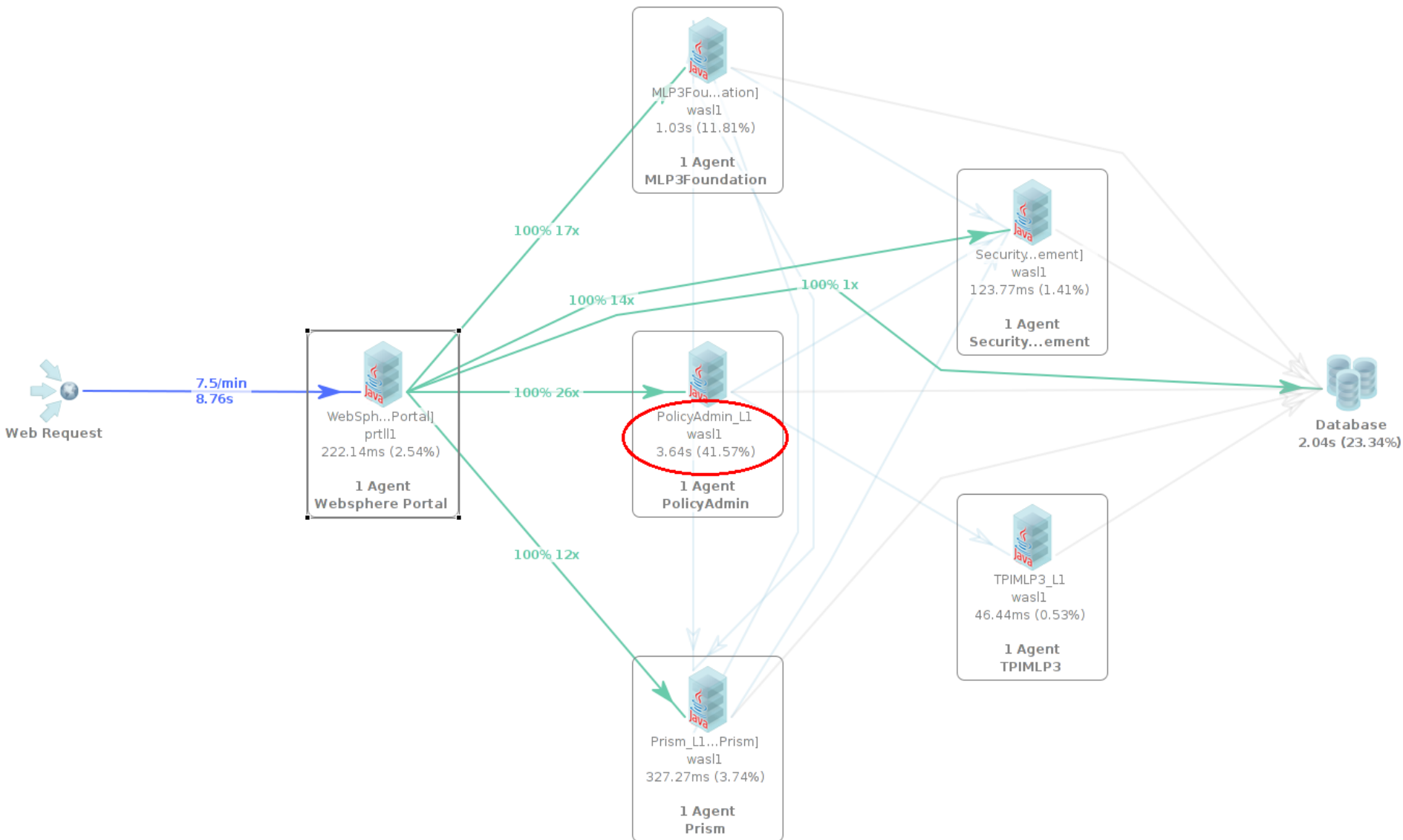
Monitor	PurePath Dur...	PurePath CPU D...	WR Count	Server Respons...	PurePath Durati...
dTWebsite	73248.73 [ms]	15.62 [ms]	106.00	169.36 [s]	73248.73 [ms]
InternalConfluence	5972.04 [ms]	3000.00 [ms]	105.00	58.54 [s]	5972.04 [ms]
InternalIra	4465.90 [ms]	2276.63 [ms]	4754.00	653.09 [s]	4465.90 [ms]
ExternalConfluence	4099.84 [ms]	1078.12 [ms]	1106.00	113.80 [s]	4099.84 [ms]
ExternalIra	1814.80 [ms]	218.75 [ms]	256.00	13.01 [s]	1801.21 [ms]
AL TestAgents	958.00 [ms]	453.12 [ms]	7.00	2.84 [s]	951.03 [ms]
Secretserver	242.21 [ms]	203.12 [ms]	10.00	0.96 [s]	242.21 [ms]

Host	System Profile	Agent Mapping	Agent Group
name2009@dname2009-7220	dynaTrace Monitoring	IIS	Webserver
site[ASP.NET V2.0]@dname2009-	dynaTrace Monitoring	dTWebsite	dTWebsite
server[DefaultAppPool]@dname2009-	dynaTrace Monitoring	dTWebsite	dTWebsite
server[DefaultAppPool]@inserv-110	dynaTrace Monitoring	Secretserver	Secretserver
Frontend@LEFLEM-4712	dynaTrace Monitoring	New Agent	New Agent
Backend@LEFLEM-5304	dynaTrace Monitoring	New Agent	New Agent
Confluence@dname2009-7732	dynaTrace Monitoring	ExternalCon...	ExternalCon...
Dea@dname2009-9120	dynaTrace Monitoring		
ra@dname2009-4144	dynaTrace Monitoring		
ra@inserv-576	dynaTrace Monitoring		
Confluence@inserv-6648	dynaTrace Monitoring		



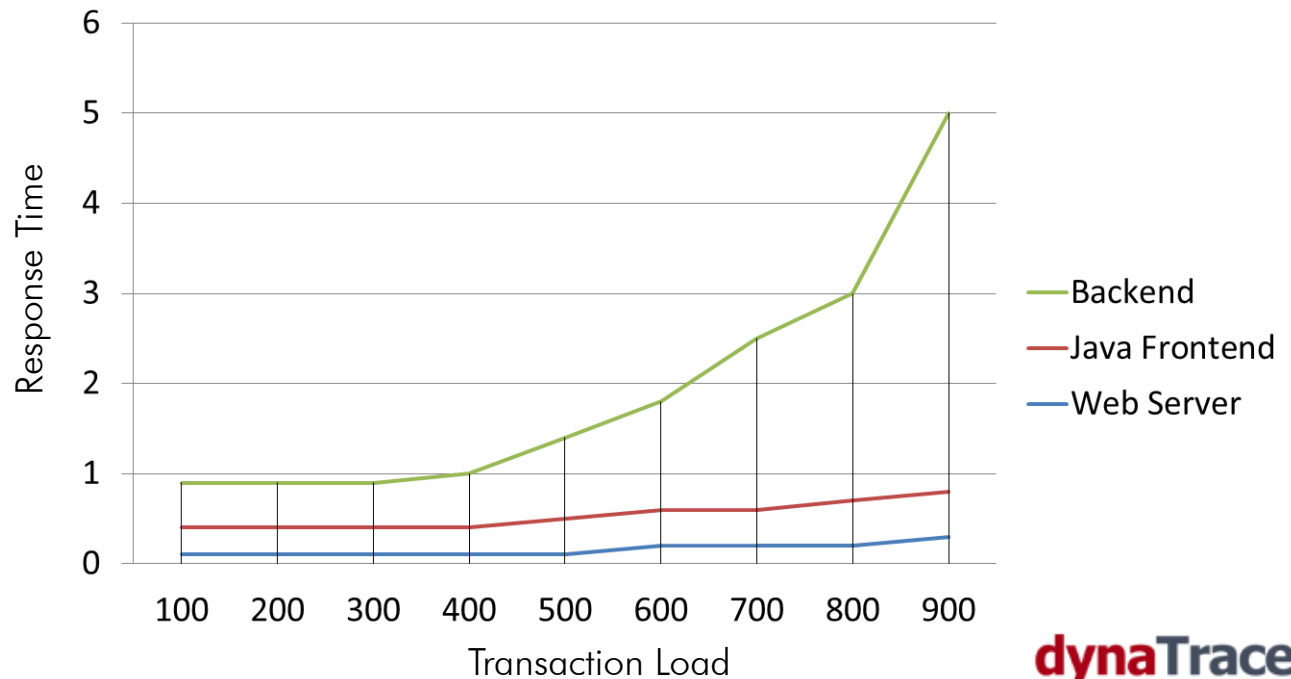
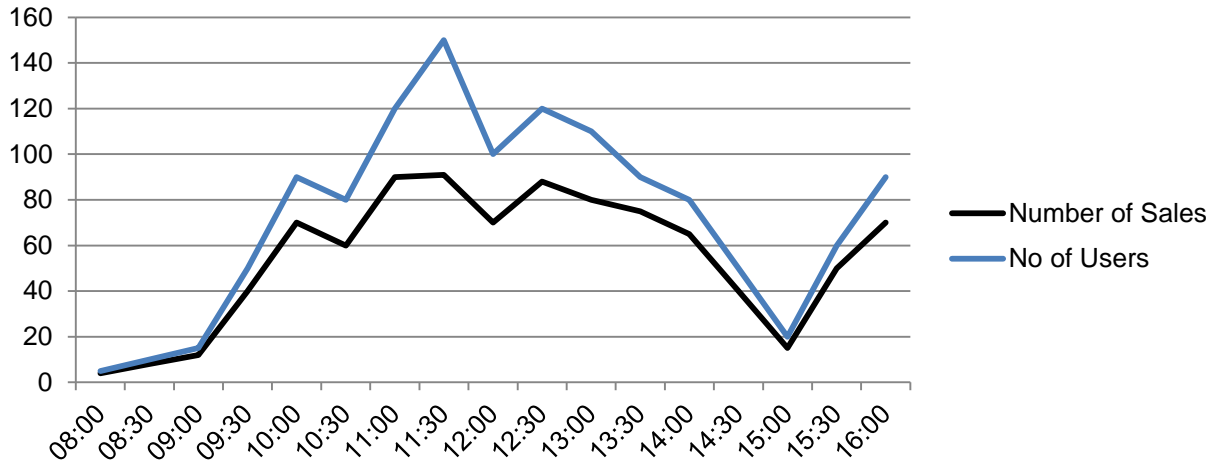


Understand your production environment





Focus on areas with biggest impact





ONE set of Tools

Communication



Collaboration



Brave new World

WE ARE NEVER DONE...



...WE CONSTANTLY IMPROVE

Michael Kopp

michael.kopp@dynaTrace.com

<http://blog.dynatrace.com>

@mikopp