Continuous Testing

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ArenaNet

GAME DEVELOPERS CONFERENCE®
MOSCONE CENTER · SAN FRANCISCO, CA
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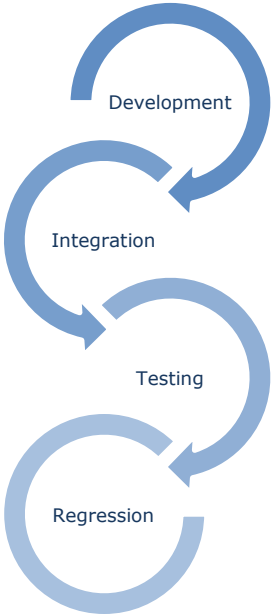
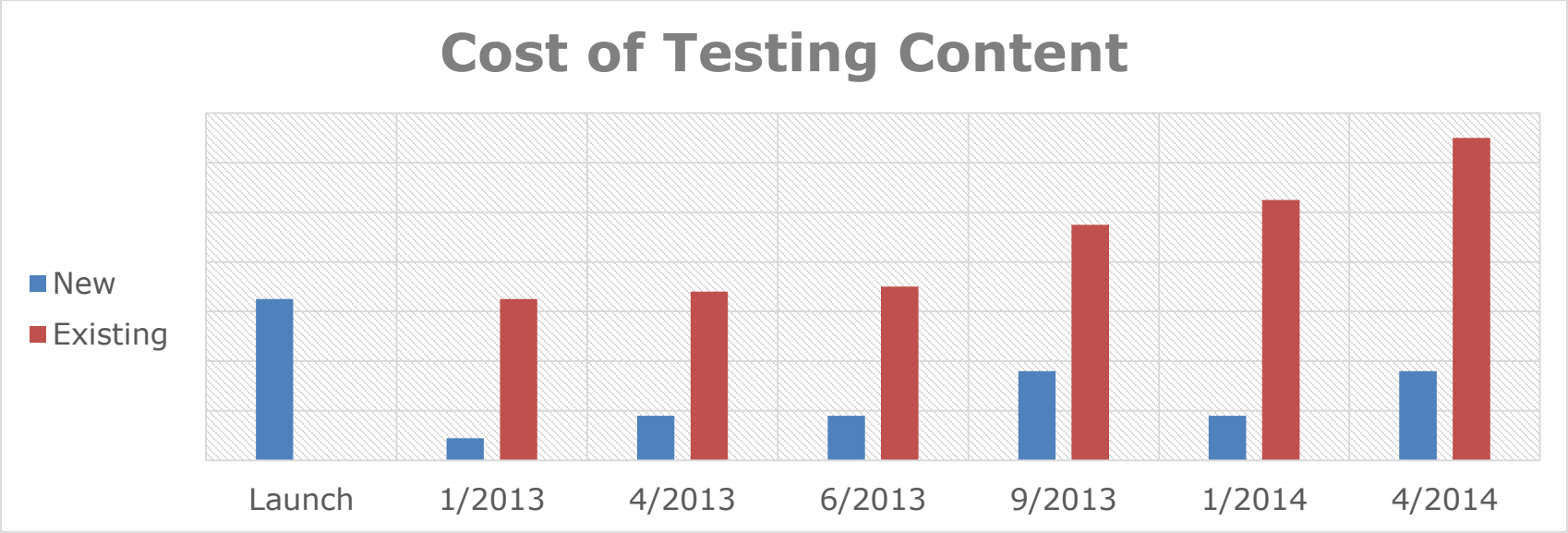
Why Automate?

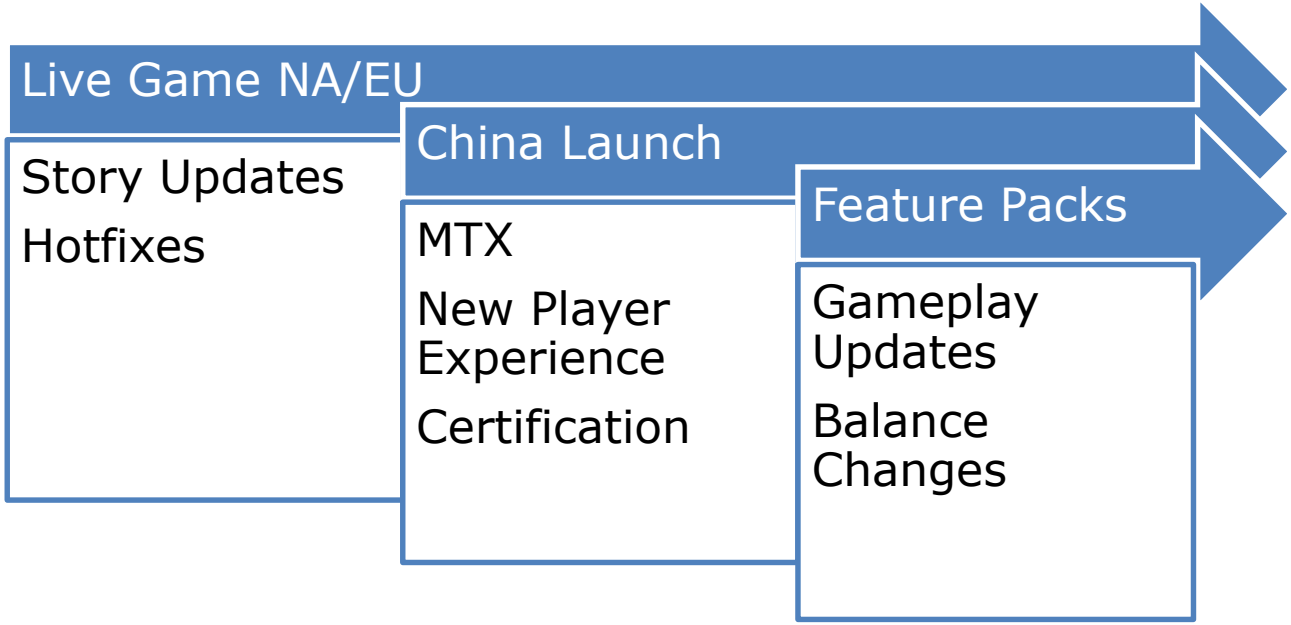


- Every 2 Weeks
- Multiple Branches
- ~3000 Clock Hours

Why Automate?



Why Automate?



Enabling Testability

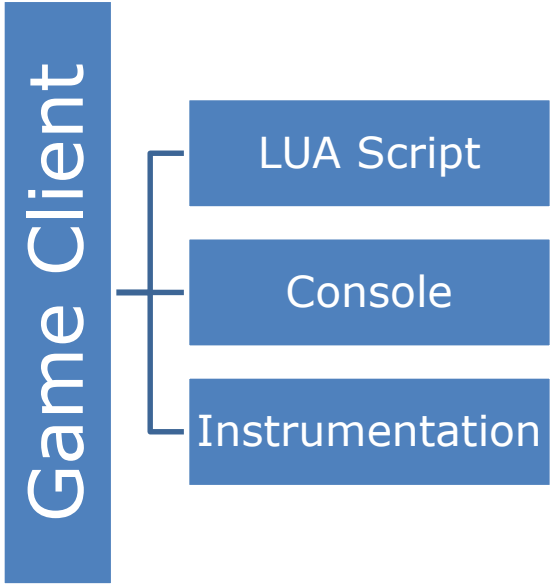
Supporting Parallelism

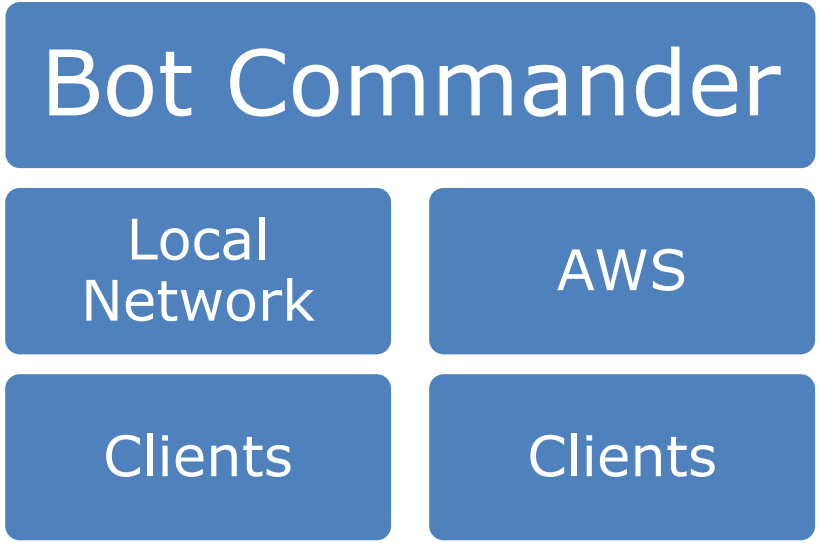
Democratizing Results

Enabling Testability Overview

- Available Tools / Resources
- Motivations for Change
- Testability Requirements
- Functional Interaction
- Frameworks

Available Tools / Resources





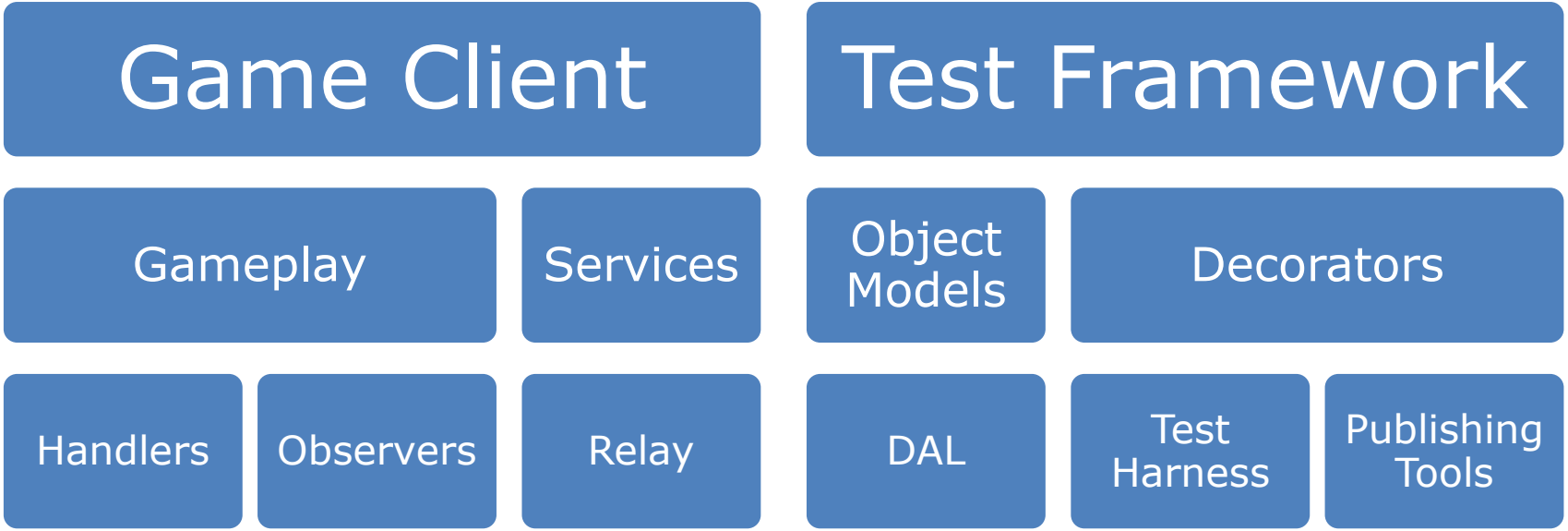
Motivations for Change

- Performance Impact
- Flexibility
  - Core module support
  - Marshalling
  - Knowledge
- Platform and Game Independence
  - Multiple Platforms
  - Multiple Titles

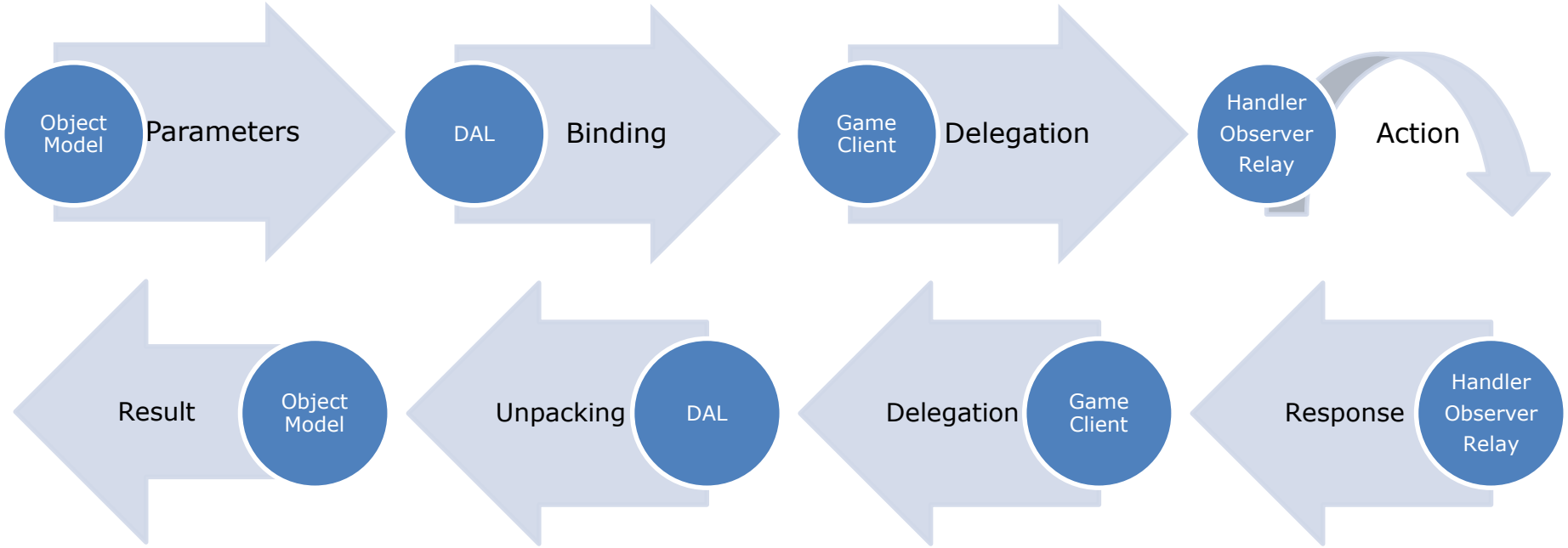
Testability Requirements

- Client and Character Isolation
- No Graphics Cards
- Content Streaming
- Client Distribution
- Instrumentation

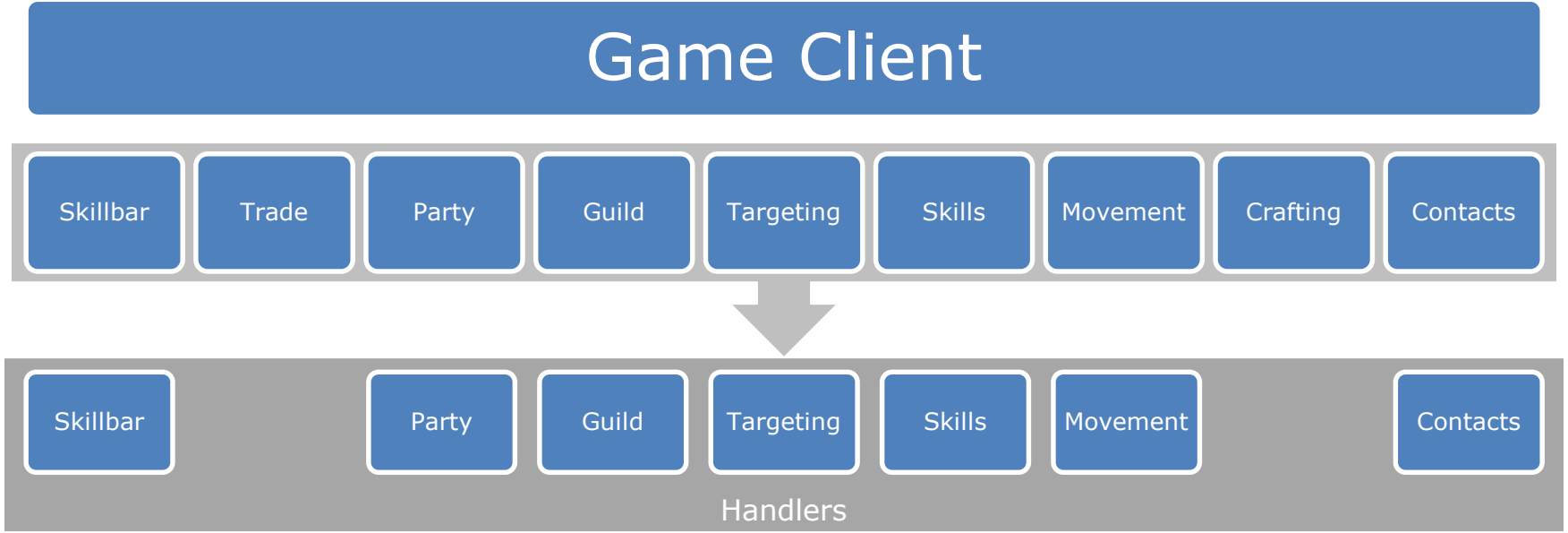
Functional Interaction



Functional Interaction



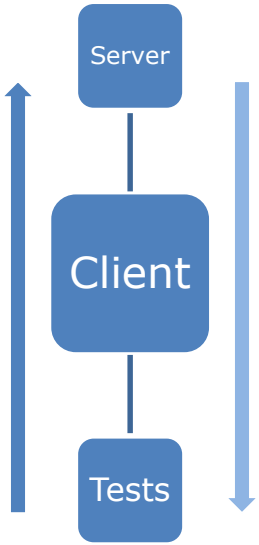
Handlers


Game Client
Skillbar
Trade
Party
Guild
Targeting
Skills
Movement
Crafting
Contacts
Skillbar
Party
Guild
Targeting
Skills
Movement
Contacts
Handlers

Observers

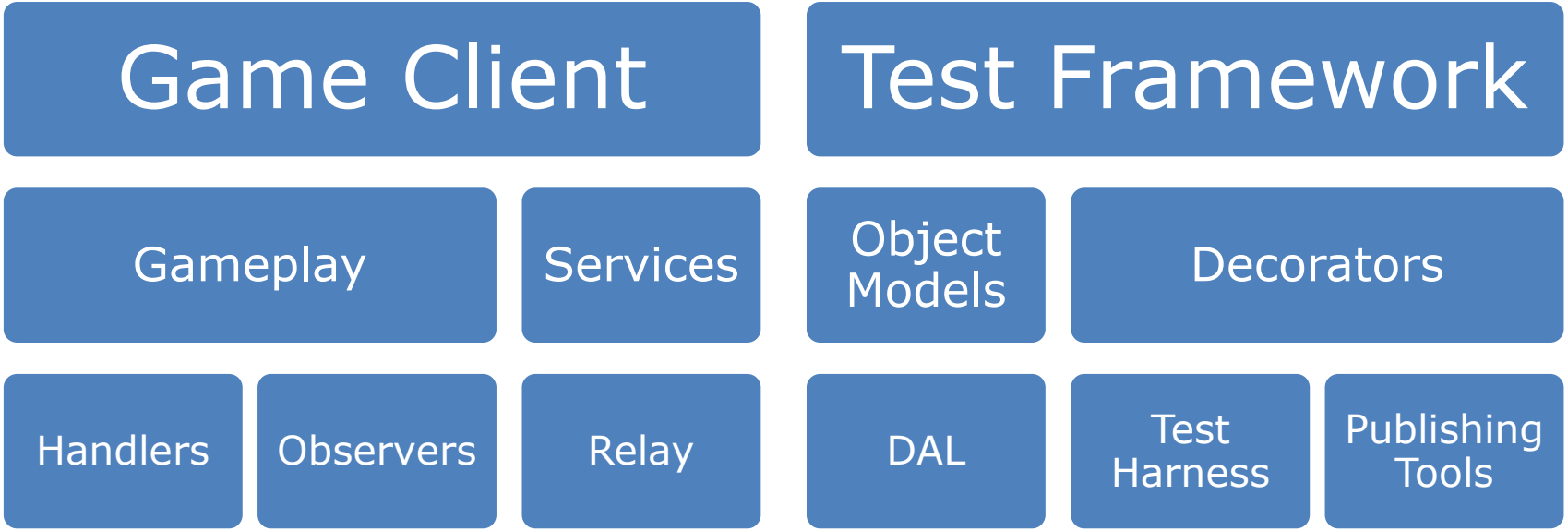
- Time sensitive observability
- Limited Scope

Relays



- Direct Access to Server APIs
- Bypass UI Interactions
- Test is the Driver

Frameworks


Game Client
Gameplay
Services
Handlers
Observers
Relay
Test Framework
Object Models
Decorators
DAL
Test Harness
Publishing Tools

Frameworks

Data Access Layer

Connector

Dynamic Binding

Socket

Protocol

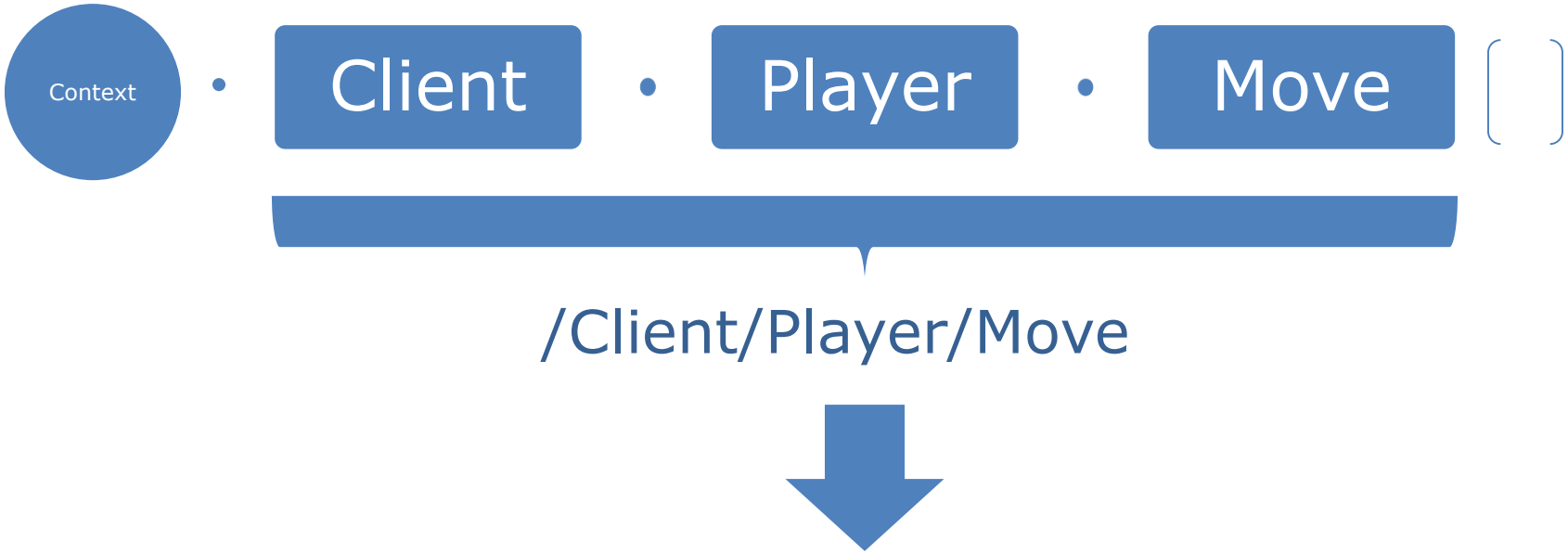
JSON

XML

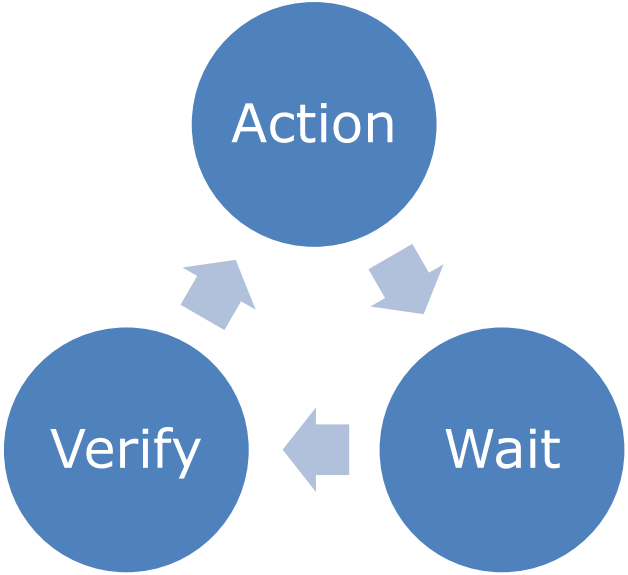
Python Magic

WHAT?

Frameworks



Frameworks




```
player    = game.player
position  = player.position
direction = position + Vector3.FORWARD

movement = player.move(direction)
movement.wait()

assert player.position != position
```

Summary

- Instrumentation based on test scenarios
- Focus on business value
- Build what you need
- Be mindful of your dependencies
- Think about tools as well as tests

Enabling Testability

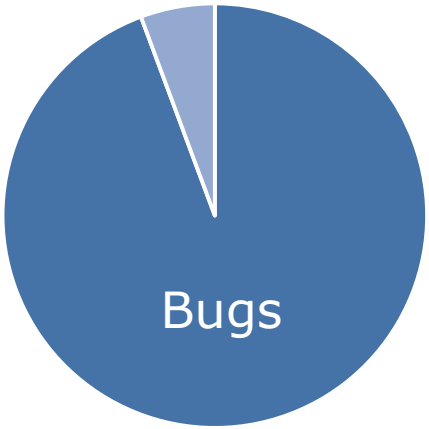
Supporting Parallelism

Democratizing Results

Supporting Parallelism Overview

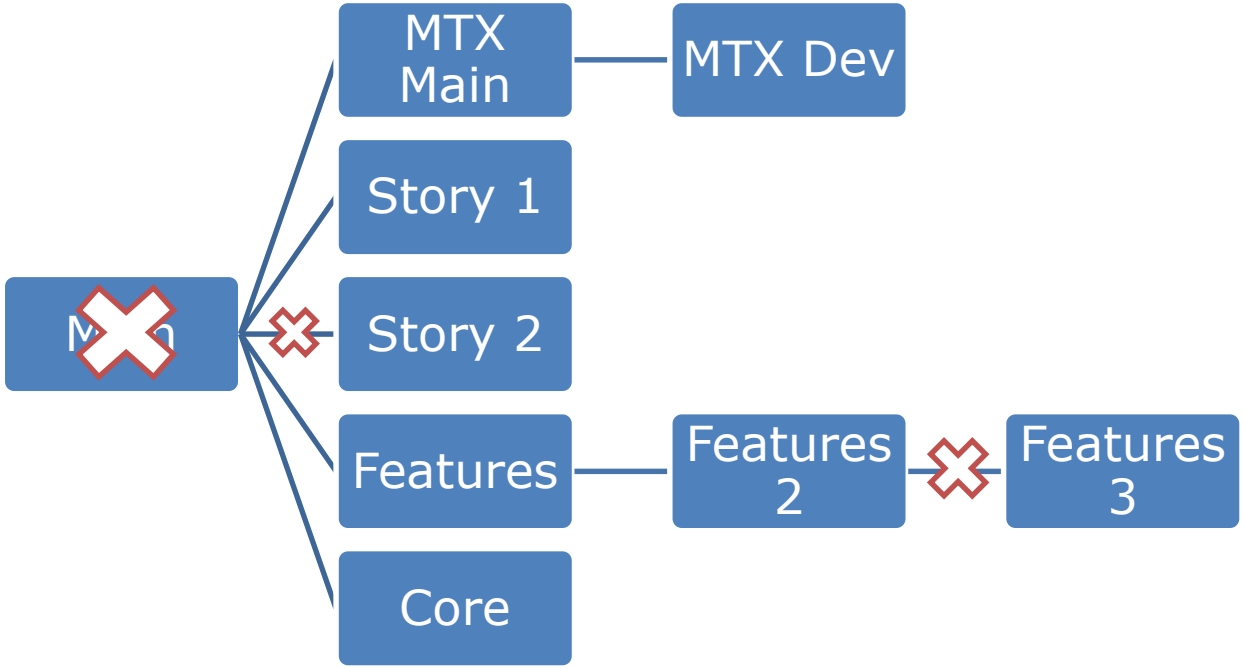
- Why Parallel Execution?
- Defining Testable Chunks
- Modeling Concurrent Testing
- Refining the Model
- Metrics

Why Parallel Execution?



- New
- Existing

Why Parallel Execution?



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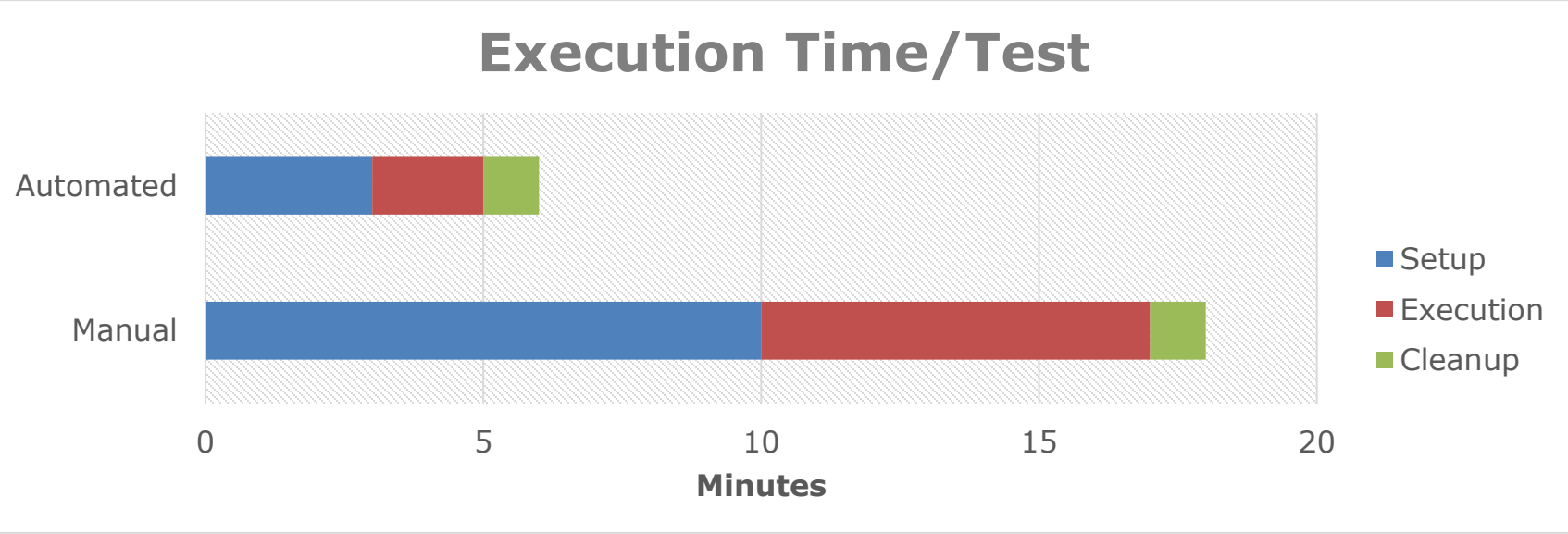
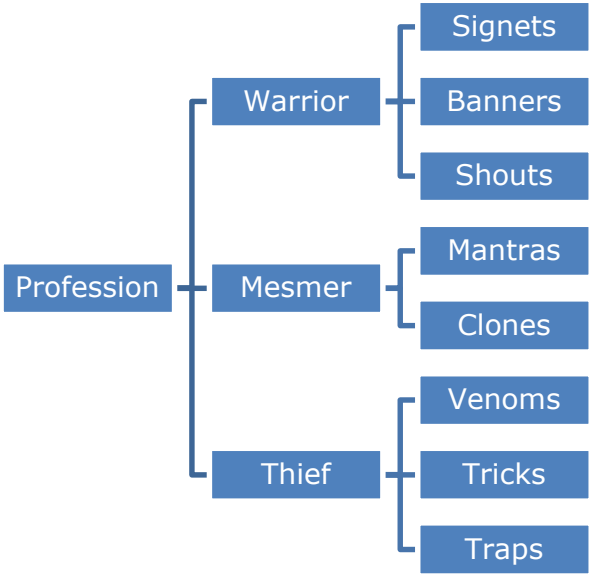
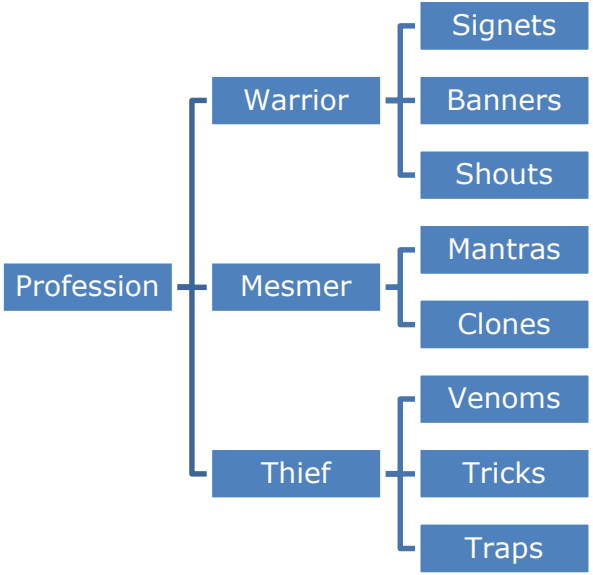


Defining Testable Chunks



- Isolated Content
- Same Suite of Tests
- Many Variants

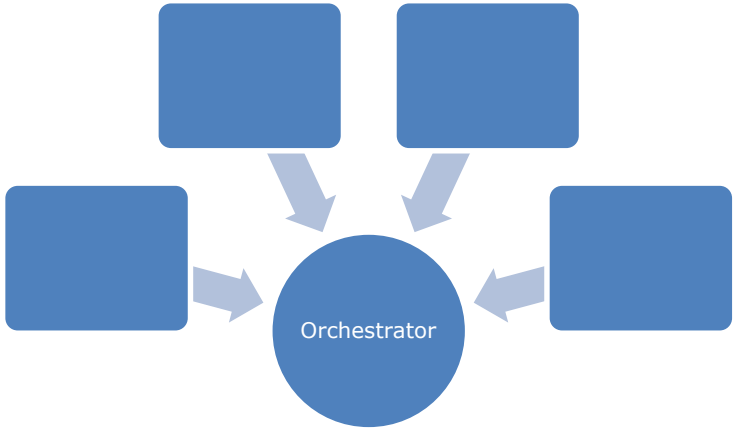
Defining Testable Chunks



- Organization
- Specialized Metadata
- Inheritance
- Constraints

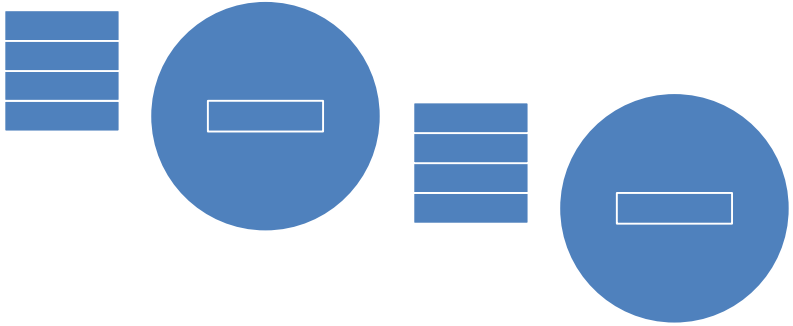
Modeling Concurrent Testing

- Fragile Interactions
- Unreliable Messaging
- Complex Services
- Multiple Contracts



Modeling Concurrent Testing

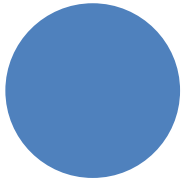
- Stateless Services
- Processing Queues
- Single Responsibility
- Transformative

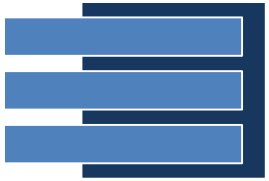


Modeling Concurrent Testing

- Aggregation
- Transforms
- Reclamation
- Provisioning
- Results

Refining the Model





Metrics

• Test Throughput	2	seconds / test
• Test Pass Cadences	5+	runs / day
• Resource Utilization	40	clients / server
• Queue Duration	1	min / test
• Completion Time	50	min / run

Summary

- Use Test Markup To Define Constraints
- Model Execution Requirements
- Avoid “Not Invented Here” Solutions
- Eliminate Bottlenecks
- Keep It Simple

Enabling Testability

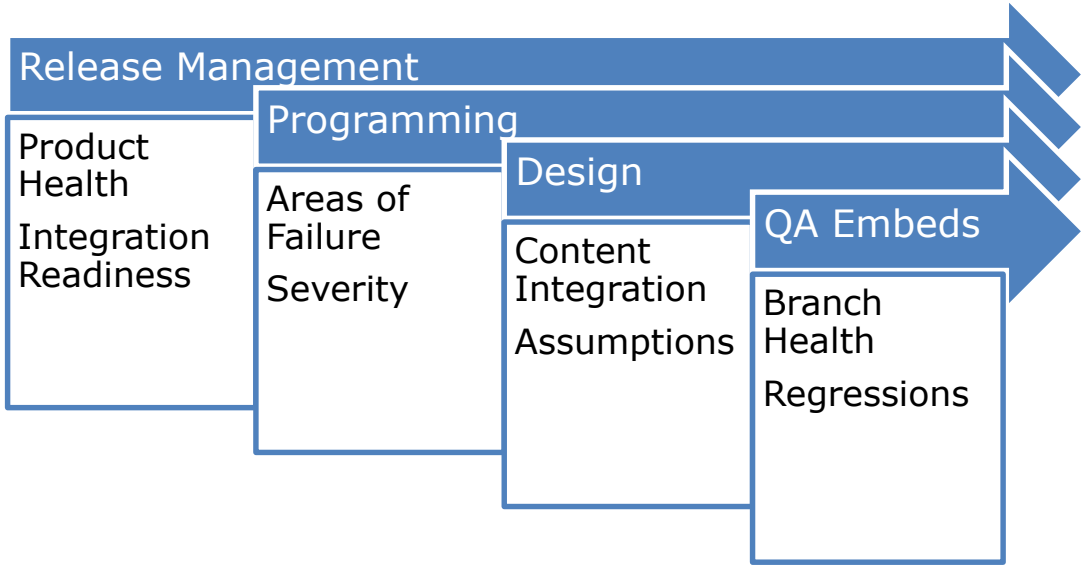
Supporting Parallelism

Democratizing Results

Democratizing Results Overview

- Customers of Test Automation
- Reaching Your Audience
- Different Perspectives
- Keeping It Simple

Customers of Test Automation

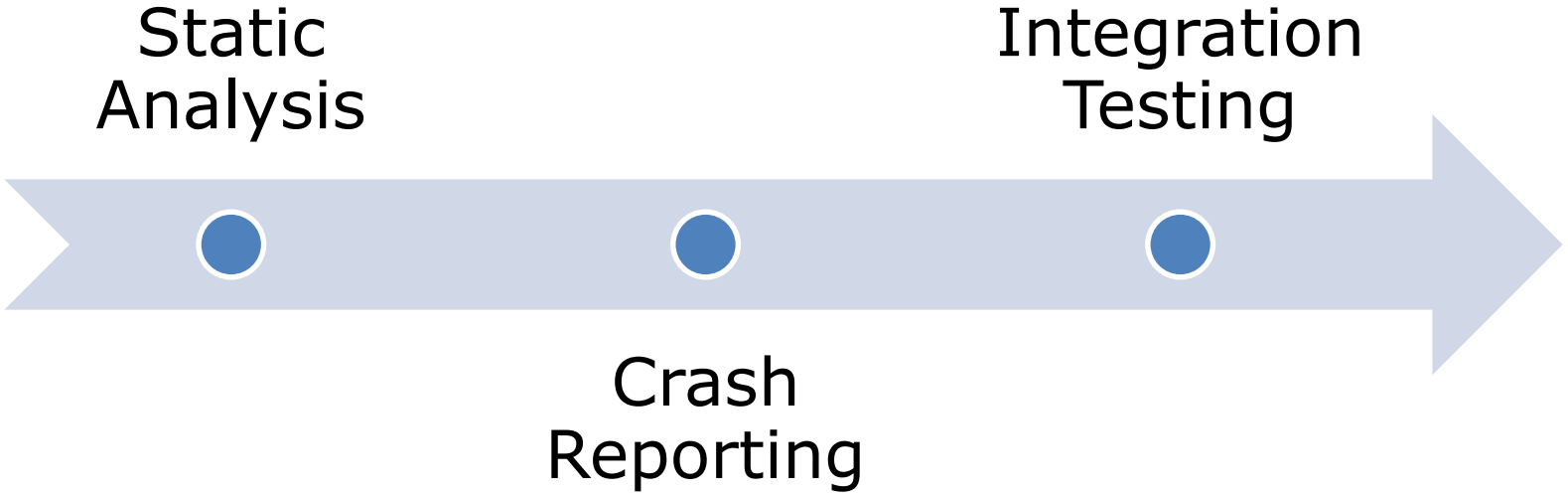


Reaching Your Audience(s)

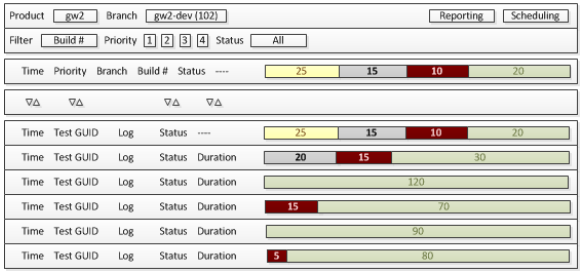
- Interdependent Customers
- Unique Goals

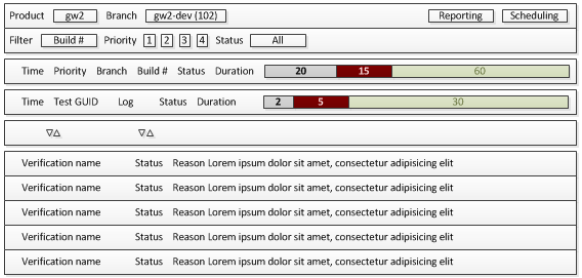
Actionable Information

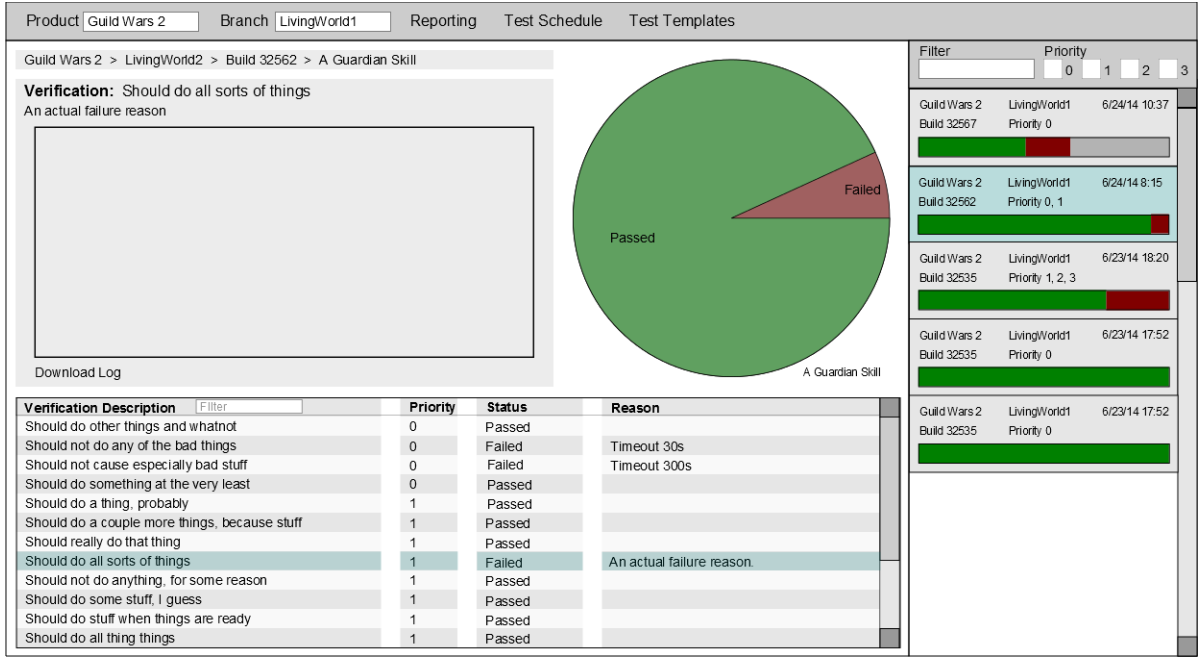
Different Perspectives



Keeping It Simple







Verification Description (Filter)	Priority	Status	Reason
Should do other things and whatnot	0	Passed	
Should not do any of the bad things	0	Failed	Timeout 30s
Should not cause especially bad stuff	0	Failed	Timeout 300s
Should do something at the very least	0	Passed	
Should do a thing, probably	1	Passed	
Should do a couple more things, because stuff	1	Passed	
Should really do that thing	1	Passed	
Should do all sorts of things	1	Failed	An actual failure reason.
Should not do anything, for some reason	1	Passed	
Should do some stuff, I guess	1	Passed	
Should do stuff when things are ready	1	Passed	
Should do all thing things	1	Passed	

Keeping It Simple

Branch Money (Commerce) Reporting Scheduling

	Build	Time	Status	Priorities	Pass Rate	Test Cases
+	42070	11/17/2014 16:22	Complete	0	98%	970
-	42070	11/17/2014 16:21	Complete	0	98%	970

Status	Name	Reason
Fail	Iron Marches Map Should Load Successfully	Unable To Transition To Map: 3227aadc-81f5-4e62-811a-C36b3c49366f
Fail	Whisper Should Forward Messages Between Different Maps	Message Was Not Received
Fail	Whisper Should Forward Messages Between Players	Message Was Not Received
Blocked	Alpine Iceburg Story Dungeon Should Be Enterable At Expected Level	[42:0:0:189]
Blocked	Armorsmith Bronze Ingot Recipe Should Not Give Items When There Are No Ingredients	[42:0:0:189]
Blocked	Diessa Plateau Map Should Load Successfully	Timeout 300s
Blocked	Dragon Repeat Map Should Load Successfully	Timeout 300s
Blocked	Huntsman Bronze Ingot Recipe Should Give Correct Rewards On Use	[42:0:0:189]
Blocked	Karma Boosts Should Increase Karma Gained By 50% From Event	[42:0:0:189]
Blocked	Leatherworker Bolt Of Jute Recipe Should Consume Ingredients On Use	[42:0:0:189]
Blocked	Malchors Leap Map Should Load Successfully	Timeout 300s
Blocked	Player Should Be Able To Use Huntsman Discipline At Level	[42:0:0:189]
Blocked	Player Should Be Able To Use Tailor Discipline At Level	[42:0:0:189]
Blocked	Risen Dragon Story Dungeon Should Be Enterable At Expected Level	[42:0:0:189]

DEV
DEV BRANCH [102]
BUILDGW2

CHANGE BRANCH

Scripts
- analytics
- buildmon
- buildserver
- duo
- gw2
- misc

OPTIONS
- Notifications
- Display All BuildGw2 Builds

SCHEDULER

#	Time	Status	Branch	Script	Owner	Parameters
13558	12/8/14 18:06	Complete	Dev	gw2.servers		
13557	12/8/14 18:02	Complete	Dev	gw2.game		
13556	12/8/14 17:22	Complete	Dev	gw2.audio.buildaudio		
13555	12/8/14 17:09	Complete	Dev	gw2.audio.integratevoice		
13554	12/8/14 17:05	Complete	Dev	gw2.voiceloc.updateloc		
13553	12/8/14 17:04	Complete	Dev	gw2.game		
13552	12/8/14 16:22	Complete	Dev	gw2.audio.buildaudio		
13551	12/8/14 16:13	Complete	Dev	gw2.audio.integratevoice		
13550	12/8/14 16:08	Complete	Dev	gw2.game		
13549	12/8/14 15:26	Complete	Dev	gw2.audio.buildaudio		
13548	12/8/14 15:23	Complete	Dev	gw2.game		
13547	12/8/14 14:41	Complete	Dev	gw2.game		
13546	12/8/14 13:45	Complete	Dev	gw2.audio.buildaudio		
13545	12/8/14 13:17	Complete	Dev	gw2.commerce.data		
13543	12/8/14 12:55	Complete	Dev	gw2.assets.composite		
13541	12/8/14 12:54	Complete	Dev	gw2.game		
13542	12/8/14 12:33	Canceled	dev	gw2.commerce.data		
13544	12/8/14 12:27	Canceled	Dev	gw2.assets.composite		
13540	12/8/14 12:12	Complete	Dev	gw2.game		
13539	12/8/14 11:27	Canceled	Dev	gw2.game		
13538	12/8/14 11:19	Complete	Dev	gw2.audio.integratevoice		
13537	12/8/14 10:35	Complete	Dev	gw2.voiceloc.updateloc		

Keeping It Simple

Development 510 Available Tests

	Build	Time	Status	Failures	Blocked
+	44575	01/30/2015 17:54	99%	1	287
+	44575	01/30/2015 15:51	Complete	2	159
	44575	01/30/2015 15:23	Complete	0	0
	44575	01/30/2015 14:06	Complete	0	0
+	44575	01/30/2015 12:03	Complete	1	0
	44575	01/30/2015 11:41	Cancelled	0	0
	44575	01/30/2015 11:39	Cancelled	0	0
+	44575	01/30/2015 11:39	Cancelled	0	84
+	44575	01/30/2015 11:30	Complete	2	36
+	44575	01/30/2015 10:05	Complete	0	232
+	44575	01/30/2015 08:03	Complete	0	343
+	44575	01/30/2015 06:01	Complete	5	332
+	44575	01/30/2015 03:59	Complete	0	33
+	44575	01/30/2015 01:57	Complete	0	338
+	44575	01/29/2015 23:57	Complete	0	1
	44575	01/29/2015 21:55	Complete	0	0
+	44564	01/29/2015 19:41	Complete	1	204
+	44564	01/29/2015 18:57	Complete	3	1
+	44564	01/29/2015 18:41	Complete	2	0
+	44564	01/29/2015 18:08	Complete	2	1
+	44540	01/29/2015 12:39	Complete	2	0

Summary

- Know What Your Customers Want
- Reports Need To Be Actionable
- Focus on Interesting Results
- Augment Existing Customer Workflows
- Build Trustworthy Experiences

Questions?

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