iOS Testing at Scale

Beyza İnce



Who Am I

- iOS Developer at Trendyol
- Working in iOS Platform Team
- Live in İstanbul
- <u>https://medium.com/@beyza.ince</u>
- <u>beyzaince2@gmail.com</u>

teamsu







How to Ensure Rock-Solid Stability in iOS Application for every release?





4 Channels **20 Developers** Supports only Turkish

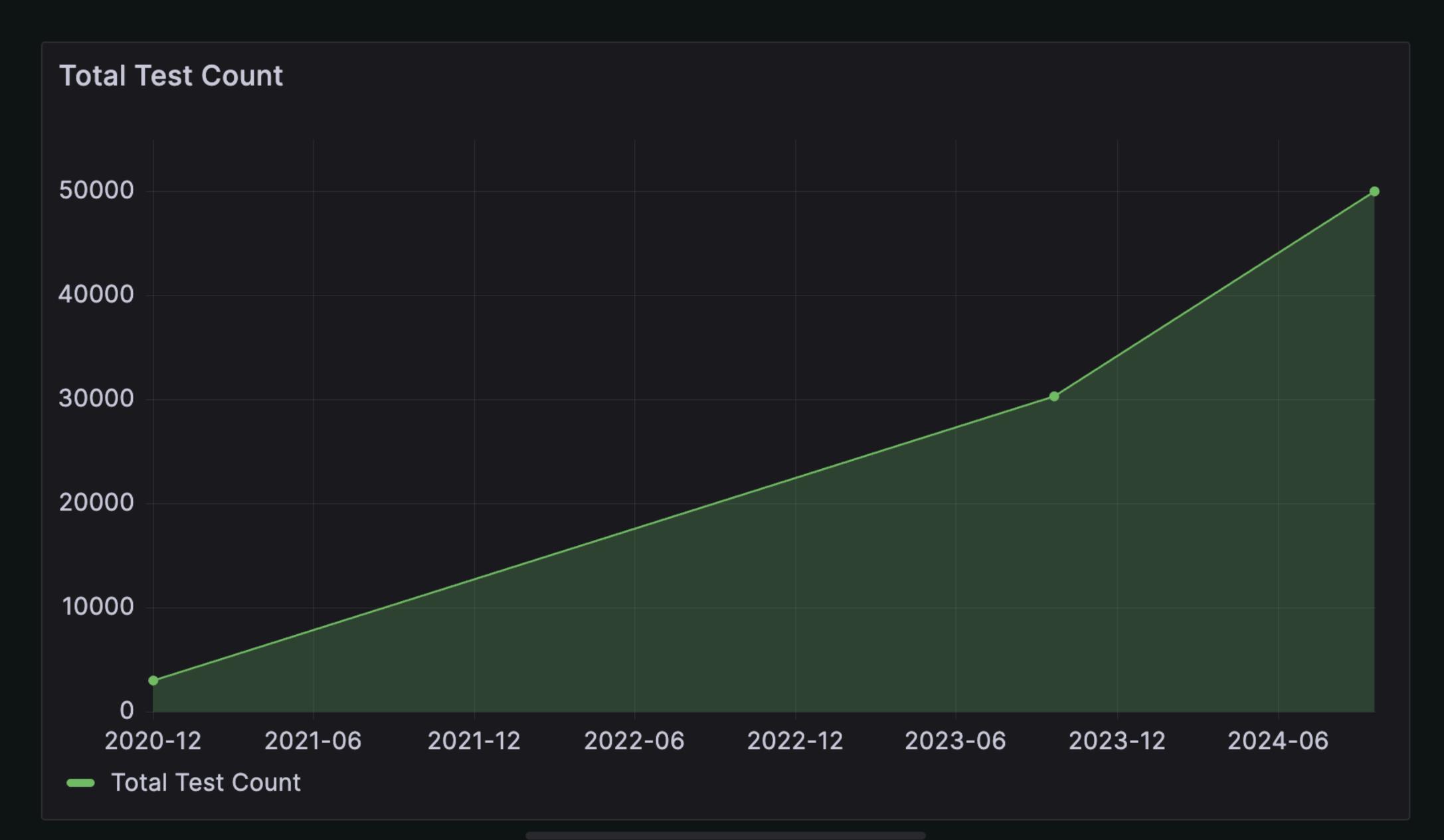


Trendyo

2023

8 Channels **60+ Developers** Supports Turkish, English, Germany, Arabic 5.3M Daily Active Users

Evolution of Test Counts



Unit Test Count

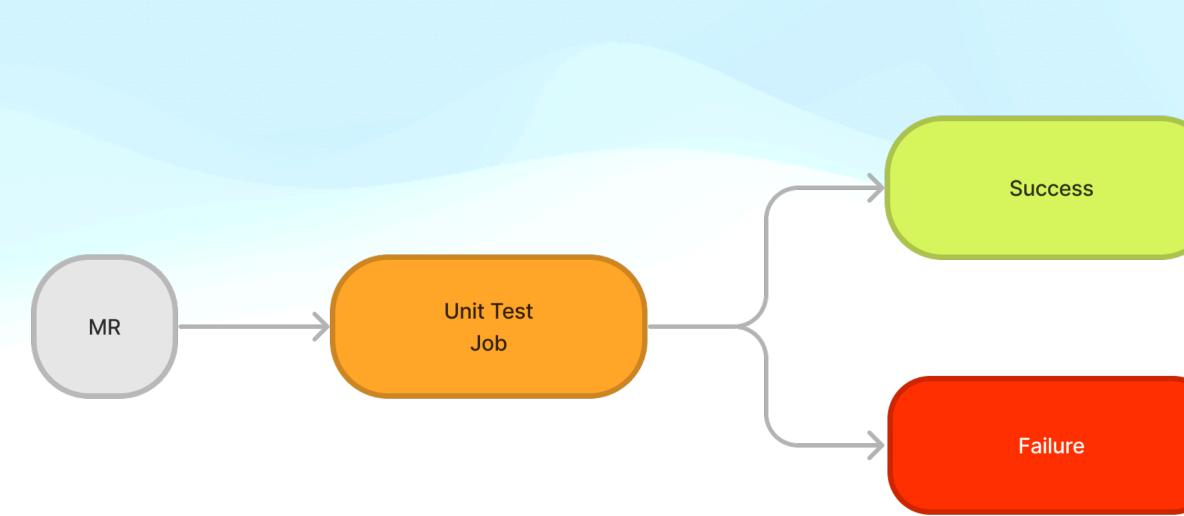
Regression Test Count

1.05K

Snapshot Test Count

Smoke Test Count

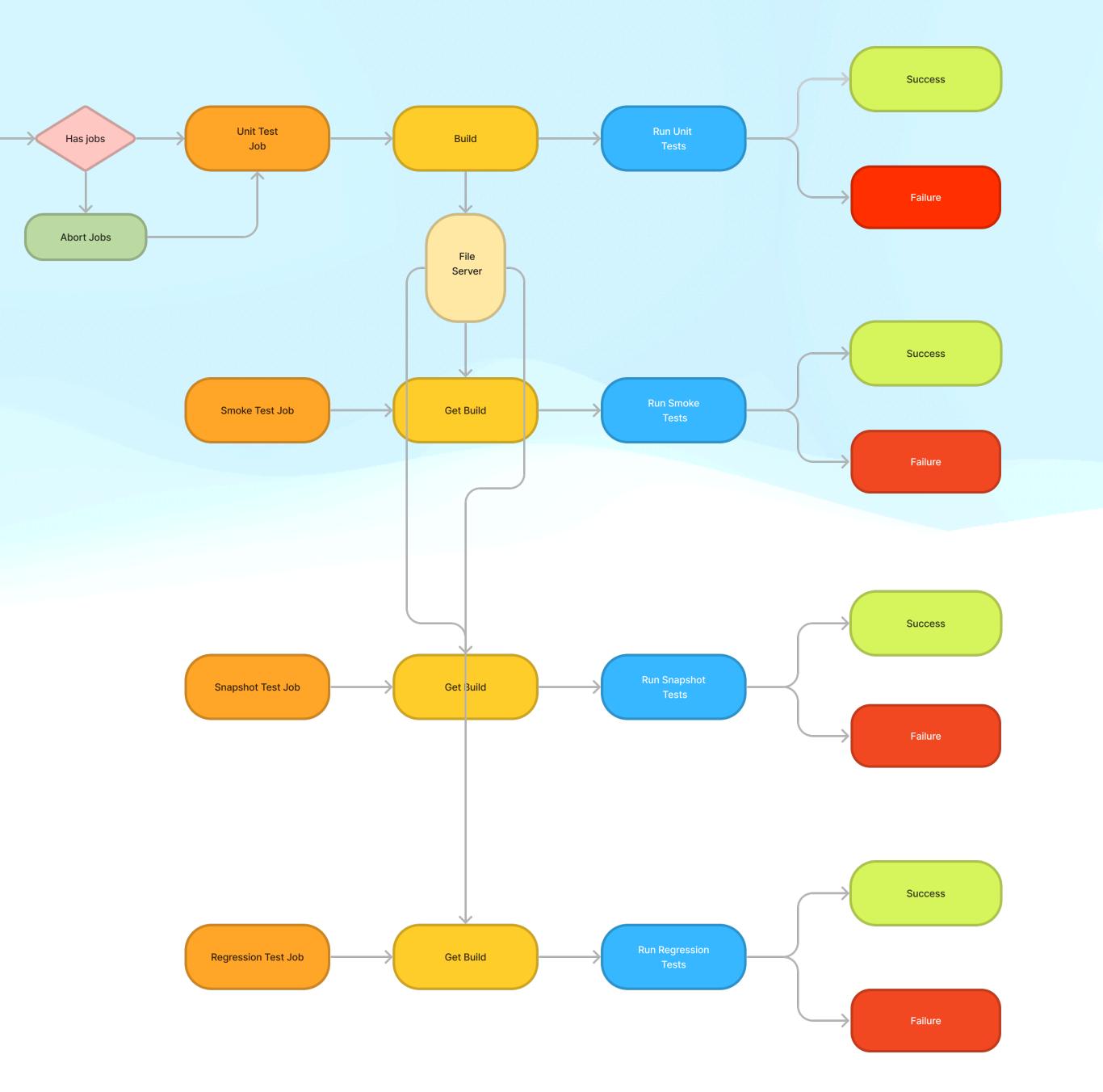
2020 Devops Process







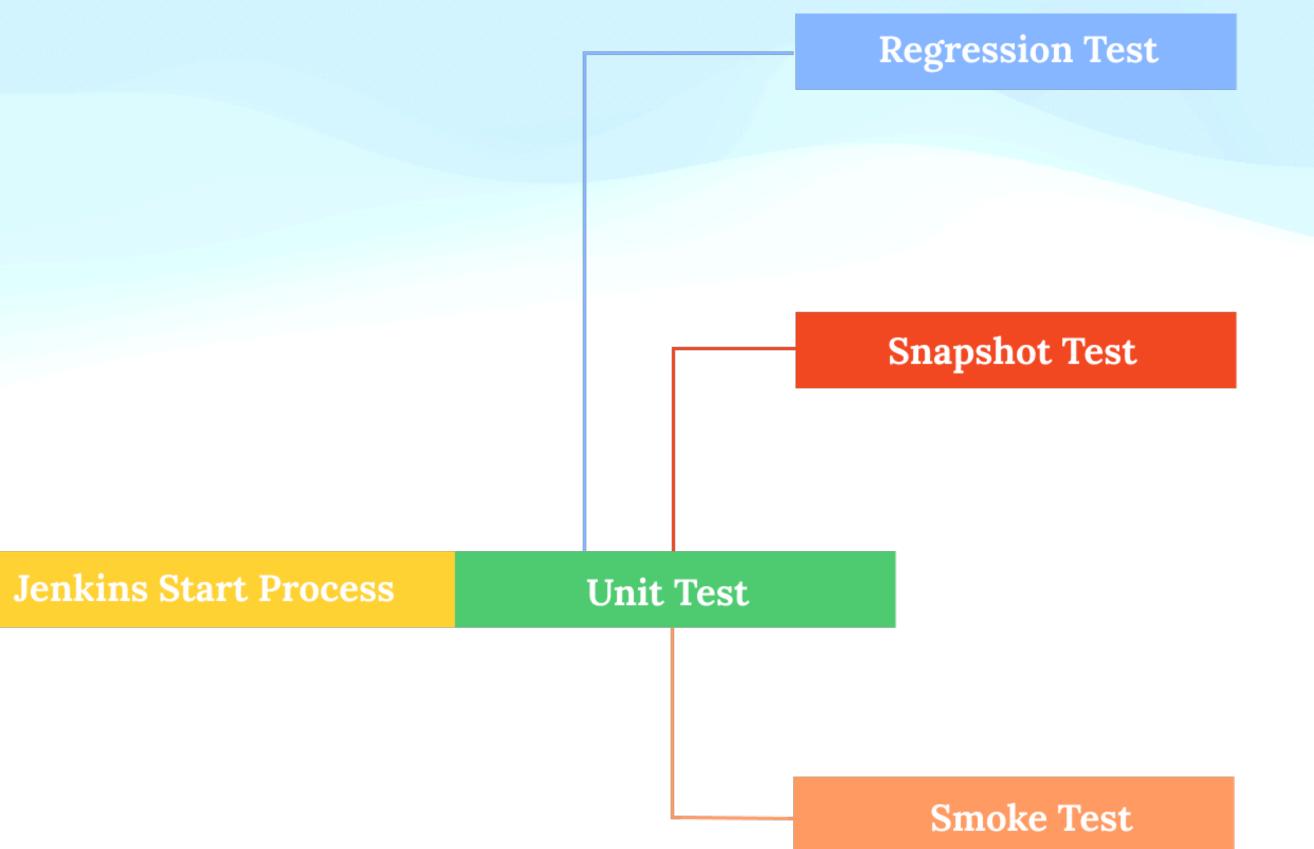
2023 Devops Process



MR CI/CD Pipeline Process



Devops Tool

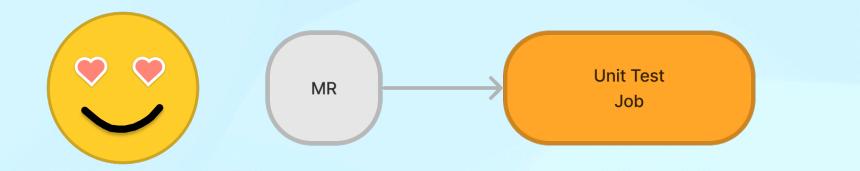


Jenkins Start Process Problem

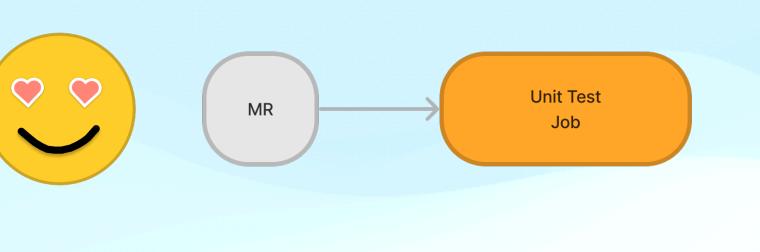




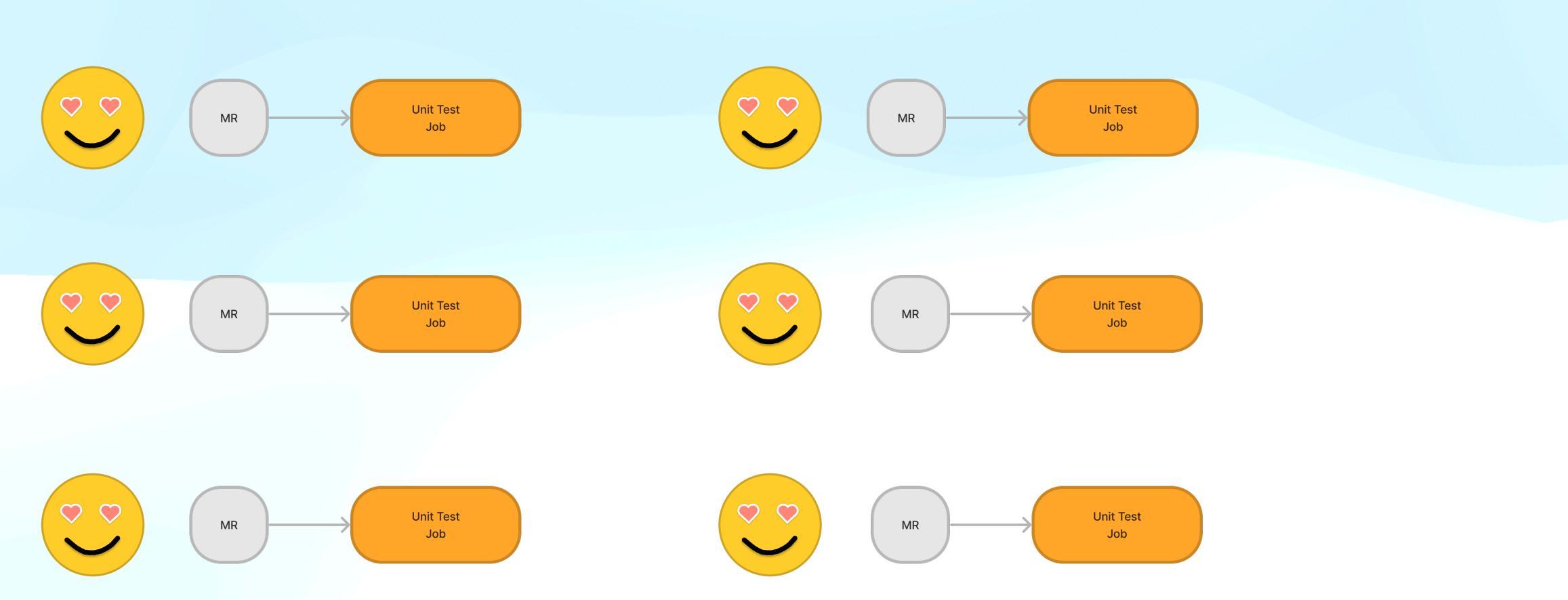
Jenkins Start Process Problem





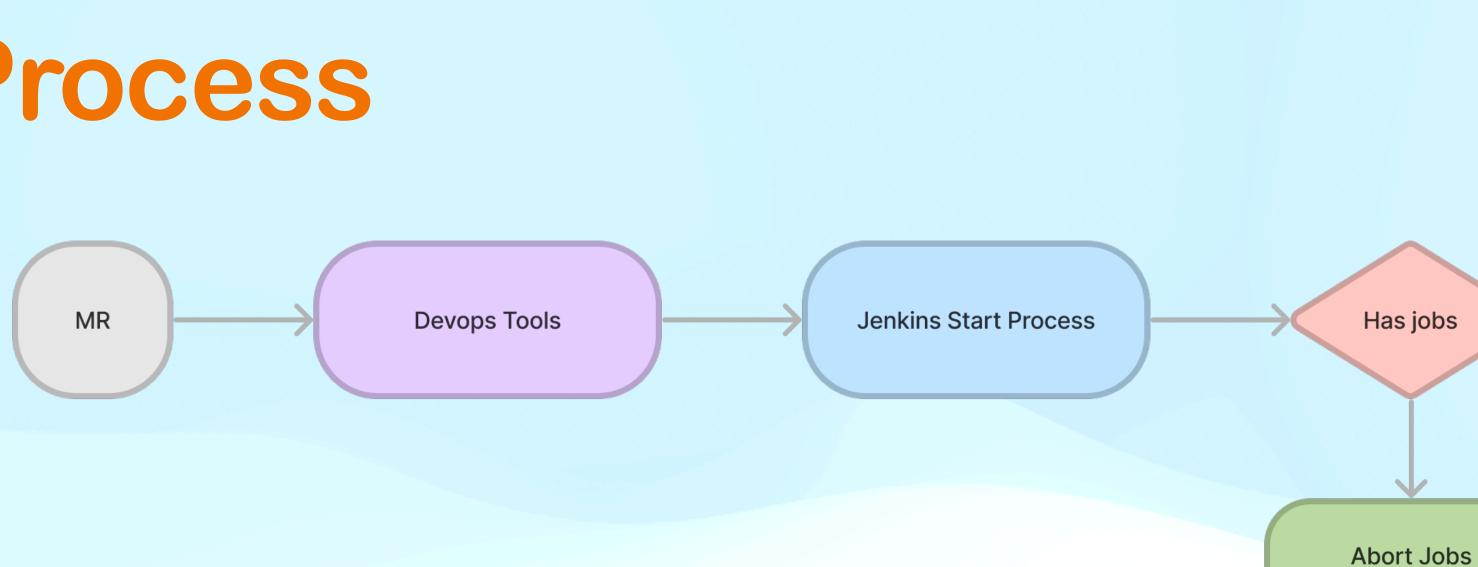


Jenkins Start Process Problem





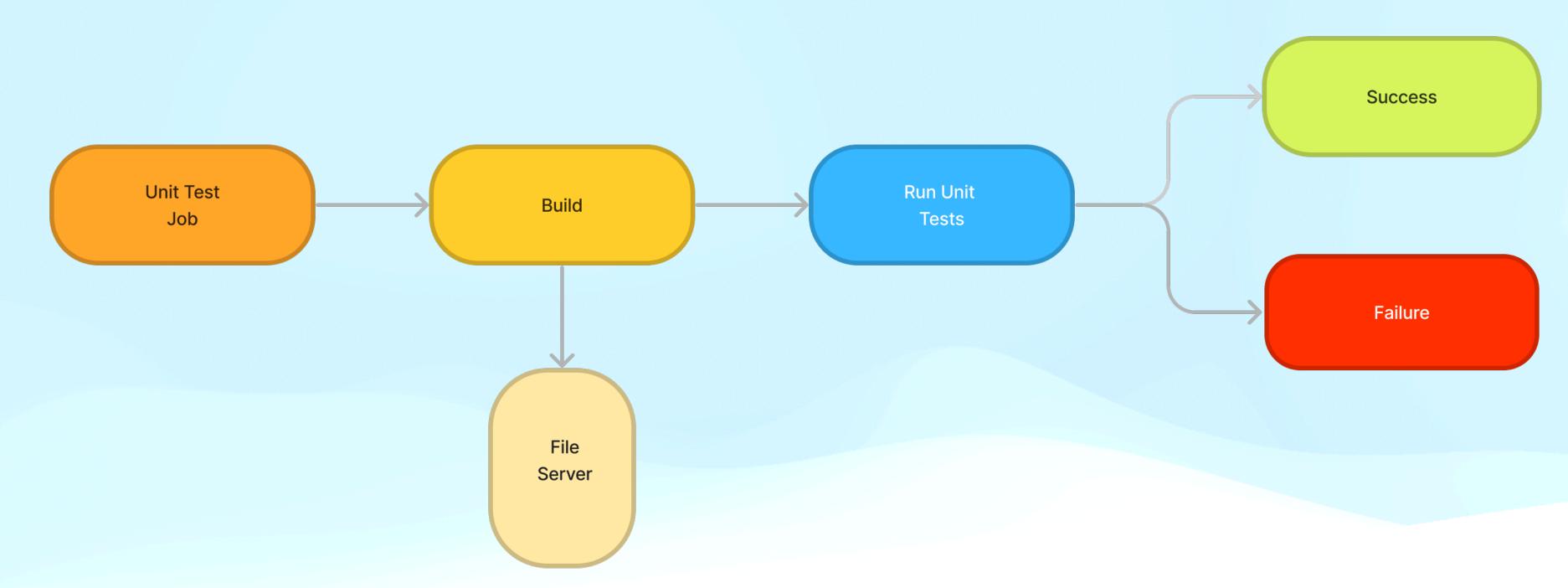
Jenkins Start Process



- Checks if there is another job running the MR and aborts it if exists
- Triggers the Unit Test job







- Blocks merging of MR if any test is failed
- Builds MR and uploads it to File Server
- Triggers Smoke, Snapshot and Regression Tests jobs

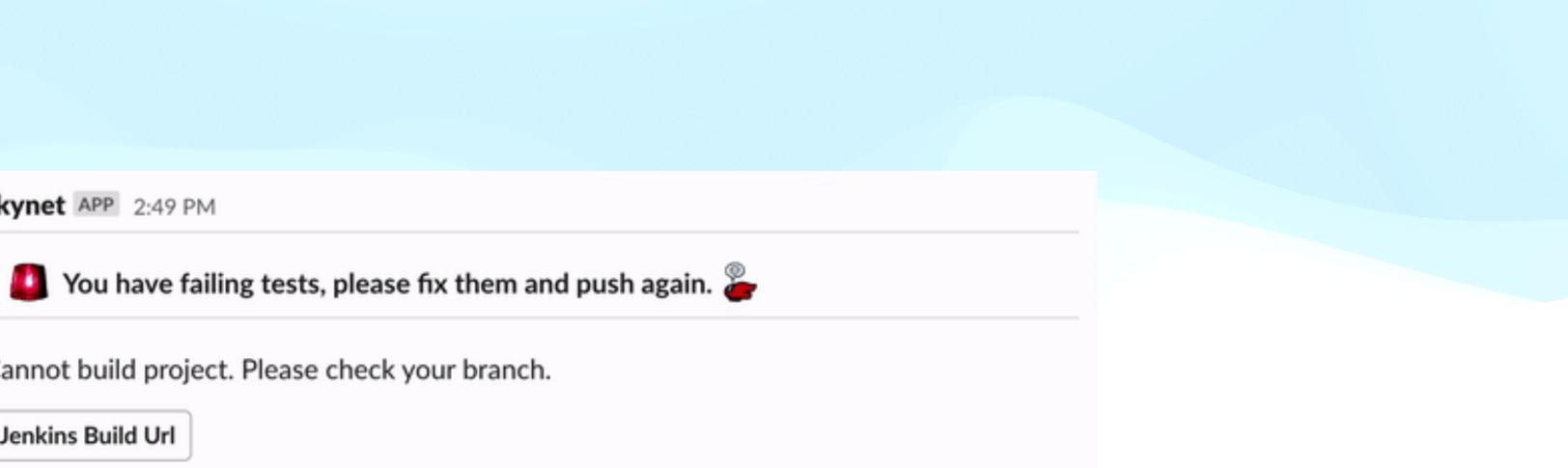
Unit Test



skynet APP 2:49 PM

Cannot build project. Please check your branch.

Jenkins Build Url



Unit Test Classic Unit Test Approach

	<pre>func test_load_InvokesViewMethods() {</pre>
× .	
37	XCTAssertFalse(view.invokedPrepareUI)
38	XCTAssertFalse(view.invokedSetPaymentInformationT
39	
40	presenter.load()
41	
42	XCTAssertTrue(view.invokedPrepareUI)
43	XCTAssertTrue(view.invokedSetPaymentInformationTi



itle)

Unit Test Classic Unit Test Approach

٠	<pre>func test_load_InvokesViewMethods() {</pre>	٠	<pre>func test_load_InvokesViewMethods() {</pre>
37	XCTAssertFalse(view.invokedPrepareUI)	37	XCTAssertFalse(view.invokedPrepareUI)
38	XCTAssertFalse(view.invokedSetPaymentInformationTitle)	38	
39		39	presenter.load()
40	presenter.load()		presenter.ioau()
41		40	
42	XCTAssertTrue(view.invokedPrepareUI)	41	XCTAssertTrue(view.invokedPrepareUI)
43	XCTAssertTrue(view.invokedSetPaymentInformationTitle)	42	}

SwityKit $\ensuremath{\mathscr{O}}$

SwityKit is an infrastructure that makes easy unit test writing and aims to increase coverage.

Used with SwityTestGenerator. This xcode source editor extension helps to mock generation.

Benefits *2*

- Senerates assertions to the debug log
- Reduces test run time by ~40%
- # It prevents us from writing incomplete tests
- 🚀 Less mock code
- \mathscr{G} Tests that it is invoked in the correct order.

https://github.com/aytugsevgi/SwityKit





Unit Test Unit Test Generation

Test Case '-[GRCCollectionsModuleTests.GRCPriceComparisonPresenterTests test_viewDidLoad_InvokesViewMethods]' started. view.assertInvokes([.showLoading, .prepareUI, .setCustomBarButton(style: (extension in TYCoreUtils):__C.UINavigationItem.CustomBarButtonStyle.image(image: "grcNavigationBackButton", bundle: Optional(GRCCollectionsModule_GRCCollectionsModule.bundle)), position: (extension in TYCoreUtils):__C.UINavigationItem.CustomBarButtonPosition.left, target: Optional(GRCCollectionsModule.GRCPriceComparisonPresenter), selector: handleBackButtonTapped), .setAccessibilityIdentifiers, .prepareCollectionViewForListingKit]) interactor.assertInvokes([.fetchPriceComparisonList(request: GRCCollectionsModule.GRCPriceComparisonRequest(productCodes: "121,121", lat: 53.4, lon: 34.3))])





٠	<pre>func test_load_InvokesViewMethods() {</pre>
45	invokedNothing()
46	
47	presenter.load()
48	
49	view.assertInvokes([.prepareUI,
50	.setAccessibilityIdentifiers,
51	.setTitleLabel("title"),
52	<pre>.setIconImageView(imagePath: "icon"),</pre>
53	<pre>.setBackgroundColor(hexCode: "backgroundCol</pre>
54	<pre>.setTitleLabelColor(hexCode: "titleColor")]</pre>
55	
56	<pre>invokedNothing(excepts: [view])</pre>
57	}





٠	<pre>func test_load_InvokesViewMethods() {</pre>
45	<pre>invokedNothing()</pre>
46	
47	presenter.load()
48	
49	view.assertInvokes([.prepareUI,
50	.setAccessibilityIdentifiers,
51	.setTitleLabel("title"),
52	<pre>.setIconImageView(imagePath: "icon"),</pre>
53	.setBackgroundColor(hexCode: "backgroundColor"),
54	<pre>.setTitleLabelColor(hexCode: "titleColor")])</pre>
55	
56	invokedNothing(excepts: [view])
57	}
•	<pre>func test_load_InvokesViewMethods() {</pre>
45	<pre>invokedNothing()</pre>
46	5
47	presenter.load()
48	prosenter.redd()
40	view.assertInvokes([.prepareUI,
50	.setAccessibilityIdentifiers,
51	.setIconImageView(imagePath: "icon"),
52	<pre>.setBackgroundColor(hexCode: "backgroundColor</pre>
53	<pre>.setTitleLabelColor(hexCode: "titleColor")])</pre>

invokedNothing(excepts: [view])

56

}

54

55





test_load_InvokesViewMethods(): failed -Add - setTitleLabel(Optional("title")) is invoked.





٠	<pre>func test_load_InvokesViewMethods() {</pre>
45	invokedNothing()
46	
47	presenter.load()
48	
49	view.assertInvokes([.prepareUI,
50	.setAccessibilityIdentifiers,
51	.setTitleLabel("title"),
52	<pre>.setIconImageView(imagePath: "icon"),</pre>
53	<pre>.setBackgroundColor(hexCode: "backgroundColor</pre>
54	<pre>.setTitleLabelColor(hexCode: "titleColor")])</pre>
55	
56	<pre>invokedNothing(excepts: [view])</pre>
57	}
-	
•	<pre>func test_load_InvokesViewMethods() {</pre>
45	invokedNothing()
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48	
49	view.assertInvokes([.prepareUI,
50	.setTitleLabel("title"),
51	.setAccessibilityIdentifiers,
52	<pre>.setIconImageView(imagePath: "icon"),</pre>
53	.setBackgroundColor(hexCode: "backgroundCol
54	.setTitleLabelColor(hexCode: "titleColor")]
55	
56	<pre>invokedNothing(excepts: [view])</pre>
57	}
U 1	•

or"),)

lor"), setAccessibilityIdentifiers,]) setTitleLabel(Optional("title")), setIconImageView(imagePath: "icon"), setBackgroundColor(hexCode: "backgroundColor"), setTitleLabelColor(hexCode: "titleColor")		setTitleLabel(Optional("title")), setIconImageView(imagePath: "icon"), setBackgroundColor(hexCode: "backgroundColor"),	ected. 🛛 🔊
---	--	--	------------





Unit Test **Old Mock Class**

17	<pre>final class MockPaymentDecider:</pre>
18	var invokedStart = false
19	<pre>var invokedStartCount = 0</pre>
20	<pre>var stubbedStartResult: Pay</pre>
21	
22	func start() -> PaymentArgu
23	invokedStart = true
24	invokedStartCount += 1
25	return stubbedStartResu
26	}
27	
28	<pre>var invokedOtpCodeEntered =</pre>
29	<pre>var invokedOtpCodeEnteredCo</pre>
30	<pre>var invokedOtpCodeEnteredPa</pre>
31	<pre>var invokedOtpCodeEnteredPa</pre>
32	
33	<pre>func otpCodeEntered(code: S</pre>
34	invokedOtpCodeEntered =
35	invokedOtpCodeEnteredCo
36	invokedOtpCodeEnteredPa
37	invokedOtpCodeEnteredPa
38	}
39	}

https://medium.com/trendyol-tech/mock-generator-development-with-using-mockolo-library-c8c273f77d1b

PaymentDeciderInterface {

ymentArguments!

uments {

ult

```
false
ount = 0
arameters: (code: String, Void)?
arametersList = [(code: String, Void)]()
String) {
 true
ount += 1
arameters = (code, ())
arametersList.append((code, ()))
```





Unit Test **Mockolo Mock Generation**

17	final class MockPaymentDecider:
18	typealias MockIdentifier =
19	<pre>var invokedList: [MockPayme</pre>
20	
21	<pre>init() { }</pre>
22	
23	<pre>var stubbedStartResult: Pay</pre>
24	
25	
26	func start() async -> Payme
27	invokedList.append(.sta
28	return stubbedStartResu
29	}
30	
31	<pre>func otpCodeEntered(code: \$</pre>
32	invokedList.append(.otp
33	}
34	}
35	
36	enum MockPaymentDeciderInterfac
37	<pre>case otpCodeEntered(code: \$</pre>
38	case start
39	}

https://medium.com/trendyol-tech/mock-generator-development-with-using-mockolo-library-c8c273f77d1b

: PaymentDeciderInterface, MockAssertable { MockPaymentDeciderInterfaceElements ientDeciderInterfaceElements] = []

ymentArguments!

entArguments{ art) ult

String) { pCodeEntered(code: code))

ceElements: MockEquatable { String)



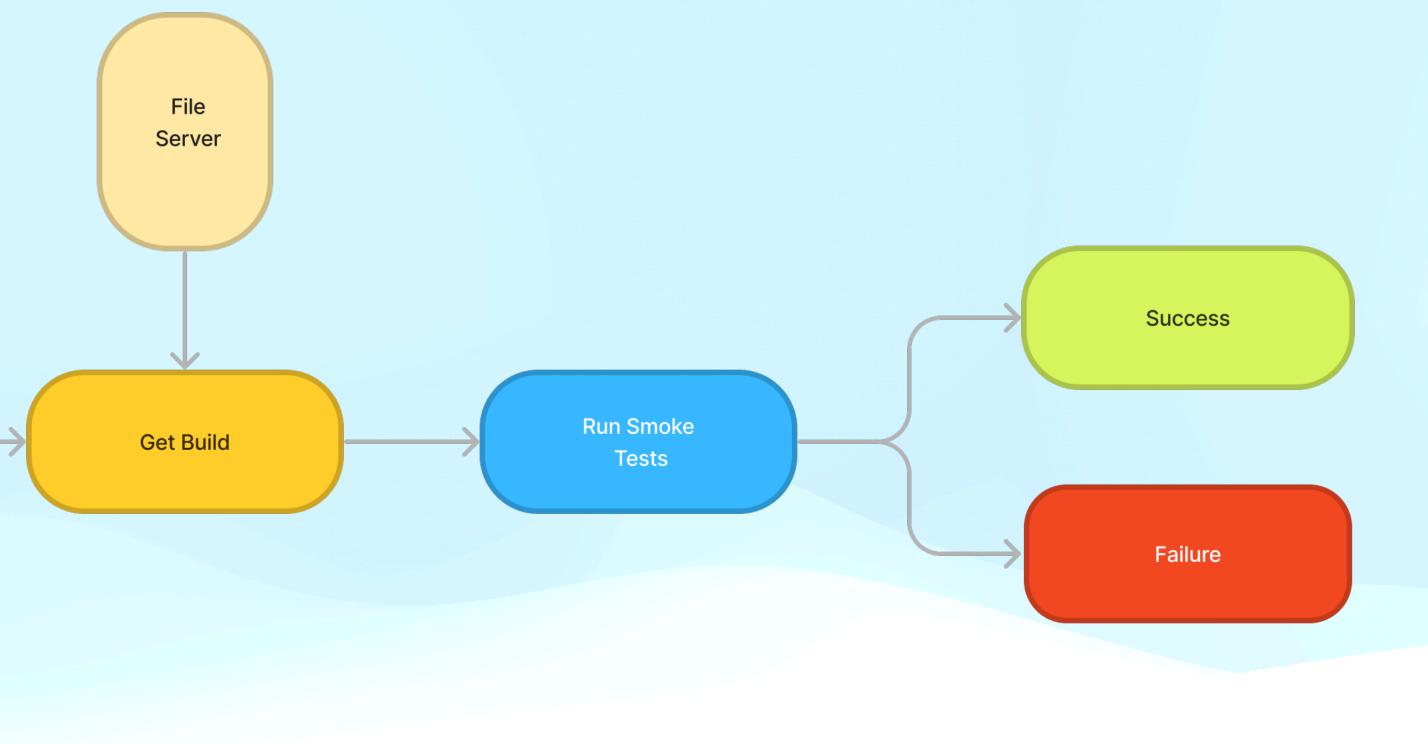




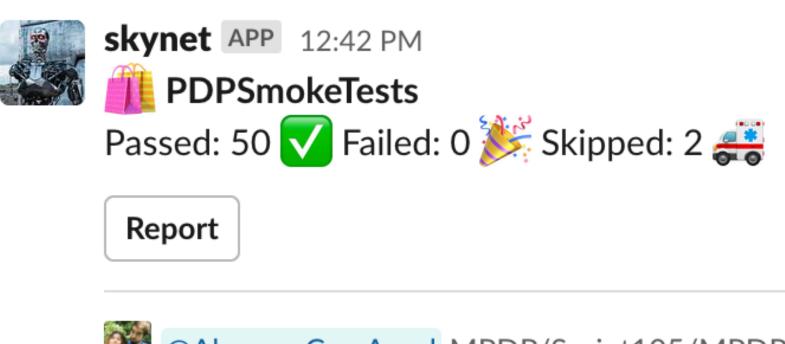
Smoke Test



- Test with each commit
- MRs require passing tests
- Mocked environment
- One test per screen
- Confirms elements on screen via app navigation



Smoke Test



@Alperen Can Aysel MPDP/Sprint105/MPDP-4325-FixLocationSelectionPopupEvents



Swifter

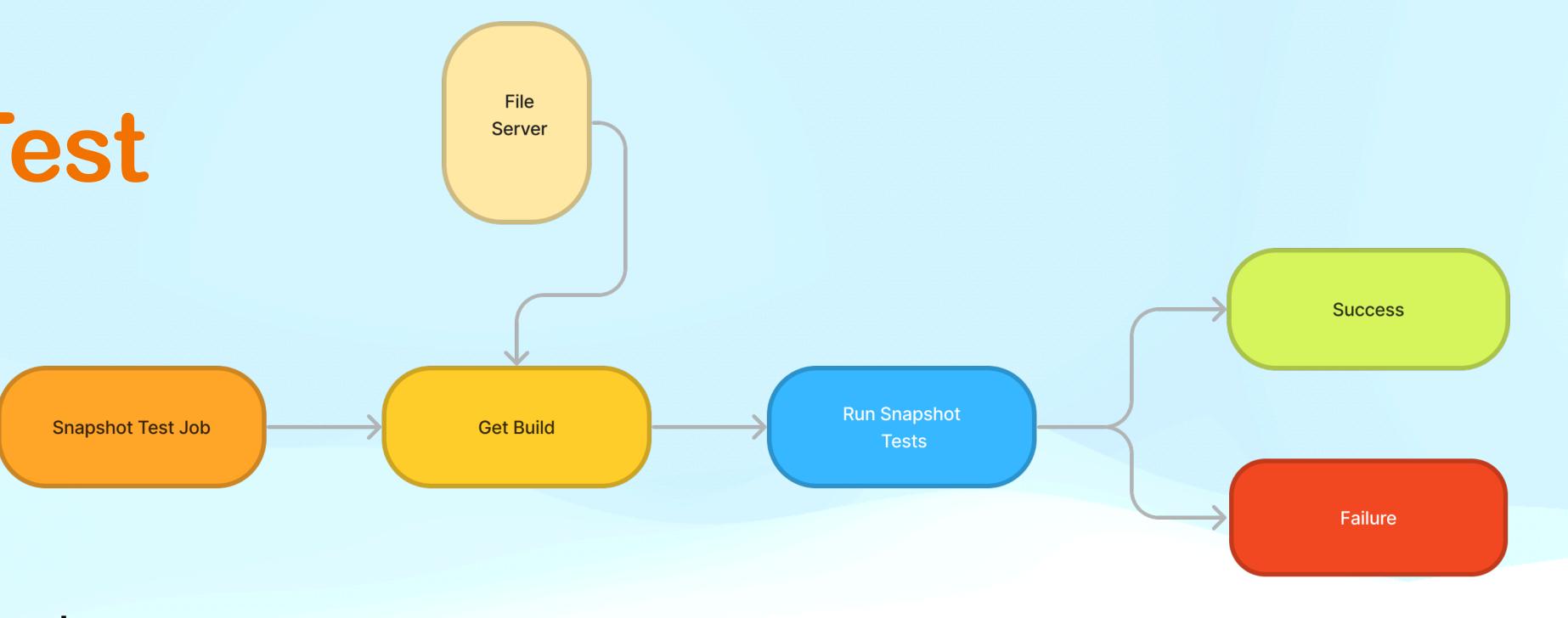
- Long start process
- Not cover header parameters
- Dynamic ID problems in query
- 3rd party Dependency



Mock Server

Native MacOS tool **Developed with SwiftUl** Start seasily **Covers header parameters** Creates different mock scenario for every test Adds new features easily



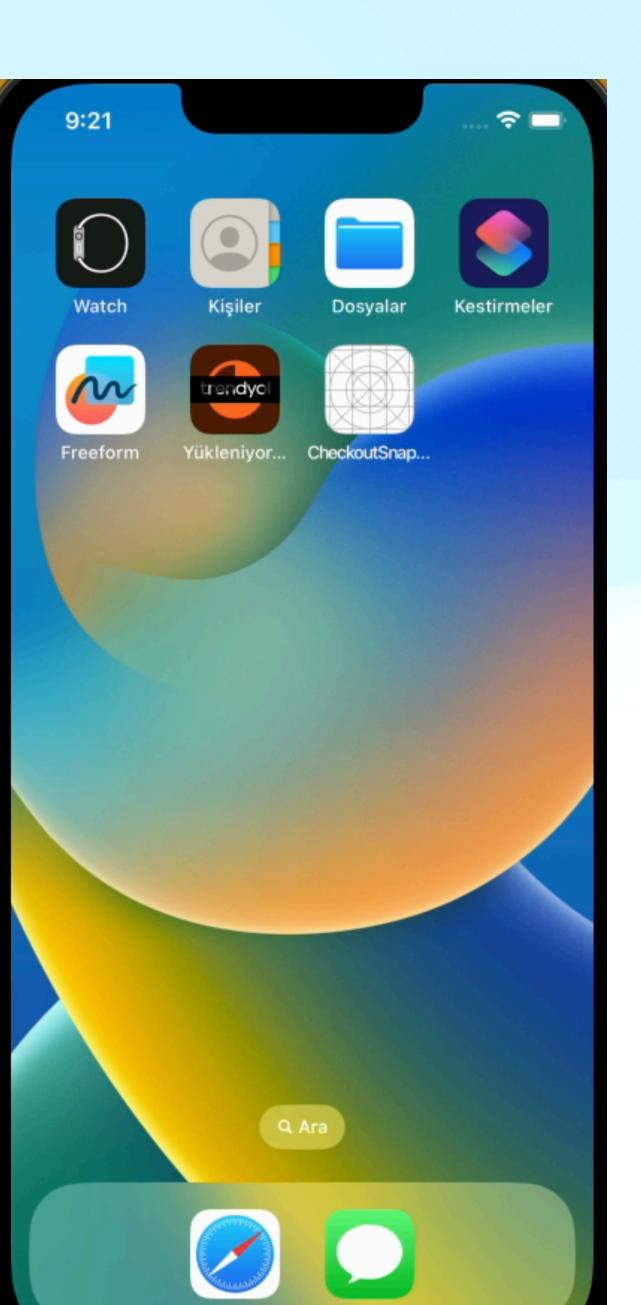


- Environment: Mocked
- Implements at least one test for each state of the page
- Challanges: Scroll Problem, Deeplink
- Slack and DevOps integration





Snapshot TestDeeplink









skynet APP 1 day ago username=deniz.gelir

14 replies



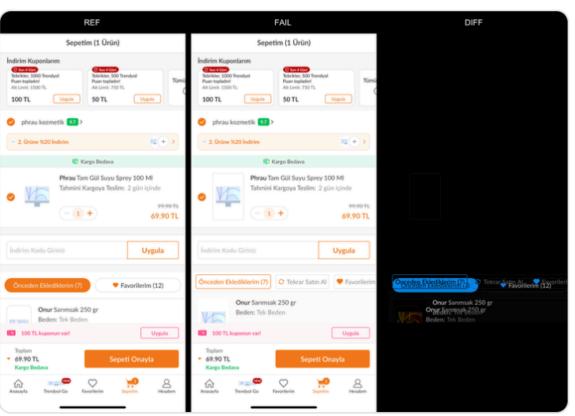
skynet APP 1 day ago 🚀 Hasta la vista, baby. I'll be back.



skynet APP 1 day ago

./CheckoutBasketSnapshotTests/test_snap_Checkout_Basket_VisibleSellerCampaignHe ader.1.iPhone11.png

test snap Checkout Basket VisibleSellerCampaignHeader 🔻

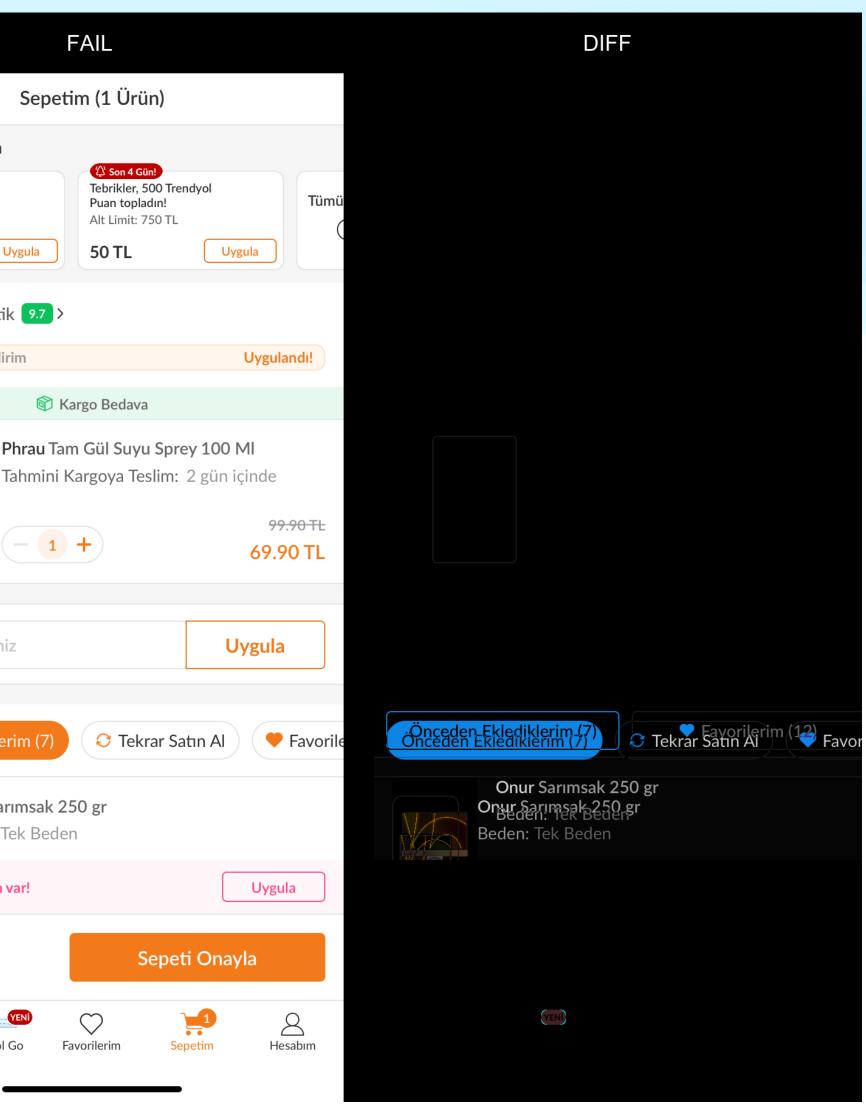


skynet snapshot-test-new MACCOUNT/MACCOUNT-661-FixNewErrorableTextInput





	REF	
	Sepetim (1 Ürün)	:
	Indirim Kuponlarım Image: Son 4 Gün! Tebrikler, 1000 Trendyol Puan topladın! Alt Limit: 1500 TL 100 TL Uygula	İndirim Kuponlarım ⁽²⁾ Son 4 Gün! Tebrikler, 1000 Trendyol Puan topladın! Alt Limit: 1500 TL 100 TL Uyg
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		Philipping
	İndirim Kodu Giriniz Uygula	İndirim Kodu Giriniz
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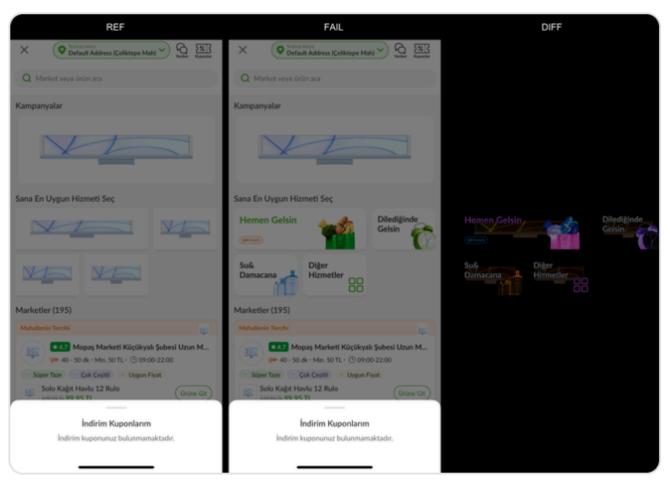
skynet APP 3 days ago Daily Snapshot Results - 22/09

7 replies



skynet APP 3 days ago /GrocerySnapshotTests/test_snap_Grocery_Home_Empty_ CouponBottomSheet.1.iPhone11.png

test snap Grocery Home Empty CouponBottomSheet 🔻





skynet APP 3 days ago //GrocerySnapshotTests/test_snap_Grocery_Home_Empty _CouponBottomSheet.1.iPhone11.png

Update

Create JIRA Task

Show Reference Picture

Rerun Test



REF	
Sepetim (5)	
Mopaş Marketi Küçükyalı Şubesi Uzun Market İsmi (Küçükyalı) Min: 50 TL • (© 09:00-22:00 = 🖽 40 - 50 dk	Mopaş I İsmi (Kü Min: 50 TL
Happy Patates 1 kg	Happy Pa 5.95 TL 3.
Happy Patlıcan Bostan 1 kg 18.45 TL 5.59 TL	Happy Pa 18.45 TL
Happy Domates Lux 500 gr	Happy D 6.23 TL 3.
Happy Çengelköy Salatalık 500 gr 4.23 TL 2.24 TL	Happy Çe 4.23 TL 2.
 Minimum sepet tutarına ulaştın. Ücretsiz teslimat için sepetine 96.25 TL daha ekle. 	Minimum sepet tÜcretsiz teslimat
Toplam • 19.61 TL 14.71 TL Sepeti Onayla	Toplam • 19.61 TL 14.71 TL
Anasayfa $\sum_{Favorilerim}$ $\frac{14.71 \text{ TL}}{14.71 \text{ TL}}$ Siparişlerim Kampanyalar	Anasayfa Liste

FAIL		DIFF	
Sepetim (5)			
aş Marketi Küçükyalı Şube (Küçükyalı) © TL • ⊙ 09:00-22:00 च⊄ 40 - 5		Mopaş Marketi Küçükyalı Ş همه (زناب المحمد) Küçükyalı Ş همه (زناب المحمد) Küçükyalı Ş همه (زناب المحمد) Küçükyalı Ş همه (زناب المحمد) Küçükyalı Ş همه (زناب المحمد) Küçükyalı Ş همه (زناب المحمد) Küçükyalı Ş همه (زناب المحمد) Küçükyalı Ş همه (زناب المحمد) Küçükyalı Ş همه (زناب المحمد) Küçükyalı Ş هم (زناب المحمد) Küçükyalı Ş هم (زناب المحمد) Küçükyalı Ş هم (زناب المحمد) Küçükyalı Ş هم (زناب المحمد) Küçükyalı Ş هم (زناب المحمد) Küçükyalı Ş هم (زناب المحمد) Küçükyalı Ş هم (زناب المحمد) Küçükyalı Ş هم (زناب المحمد) Küçükyalı Ş مم (زناب المحمد) Küçükyalı Ş	ubesi Uzun Market 10 - 50 dk
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y Patlıcan Bostan 1 kg ∓⊧ 5.59 TL	- 2 +	Happy Patlican Bostan 1 kg Happy Patlican Bostan 1 kg 18.45 TL 5.59 TL 18.45 TL 5.59 TL	- 2 + - 2 +
y Domates Lux 500 gr ÷ 3.55 TL	1+	Happy Domates Lux 500 gr Happy Domates Lux 500 gr 6.23 TL 3.55 TL 6.23 TL 3.55 TL	1 + 1 +
y Çengelköy Salatalık 500 gr ₩ 2.24 TL	1+	Happy Çengelköy Salatalık 500 Happy Çengelköy Salatalık 500 4.23 TL 2.24 TL 4.23 TL 2.24 TL	
pet tutarına ulaştın. imat için sepetine 96.25 TL daha el	de.		
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skynet APP 9:28 AM //CheckoutBasketSnapshotTests/test_snap_Checkout_Basket_VisibleSellerCampaignHeade rWithAppliedInfo.1.iPhone11.png is updated

//CheckoutSnapshotTests/test_snap_Checkout_OrderDetail.1.iPhone11.png is updated 🎉







skynet APP 10:02 PM You can access //GRCBasketSnapshotTests/test_snap_Grocery_FilledBasket_WithoutCoupon task here



Mobile Grocery / GROC-4509 Snapshot Bug - //GRCBasketSnapshotTests/test_snap_Grocery_FilledBasket_With

🖋 Edit	Q Add cor	nment	Assign	More 🗸	To Do	In Progress	Workflow 🗸	
 Details 								
Туре:		🖸 Bug	9			Status:		OPEN (View Workflow)
Priority:		🛩 Lov	v			Resoluti	on:	Unresolved
Affects Version/s:		None			Fix Version/s:		None	
Labels:		iOS-A	Automation	-Detected				

Description

//GRCBasketSnapshotTests/test_snap_Grocery_FilledBasket_WithoutCoupon

> TestRail: Results

Smart Checklist

Attachments

Searchine (N)	Separite IN 😭	
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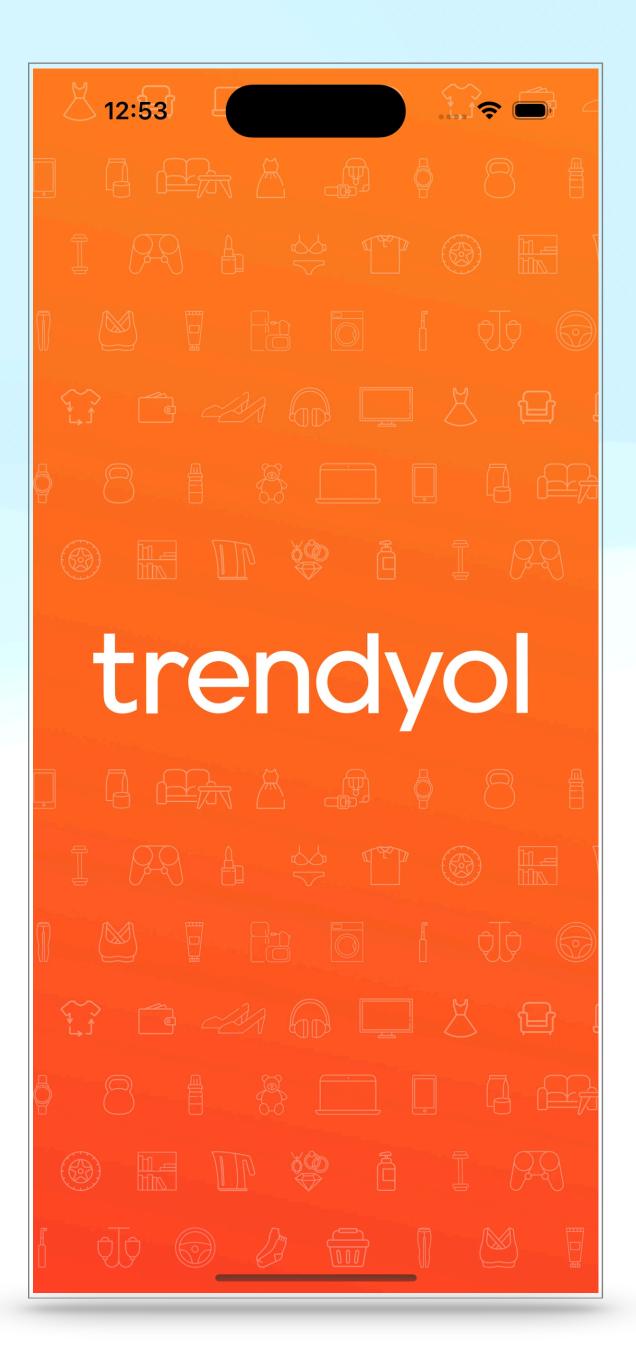
...

Snapshot Test Problem

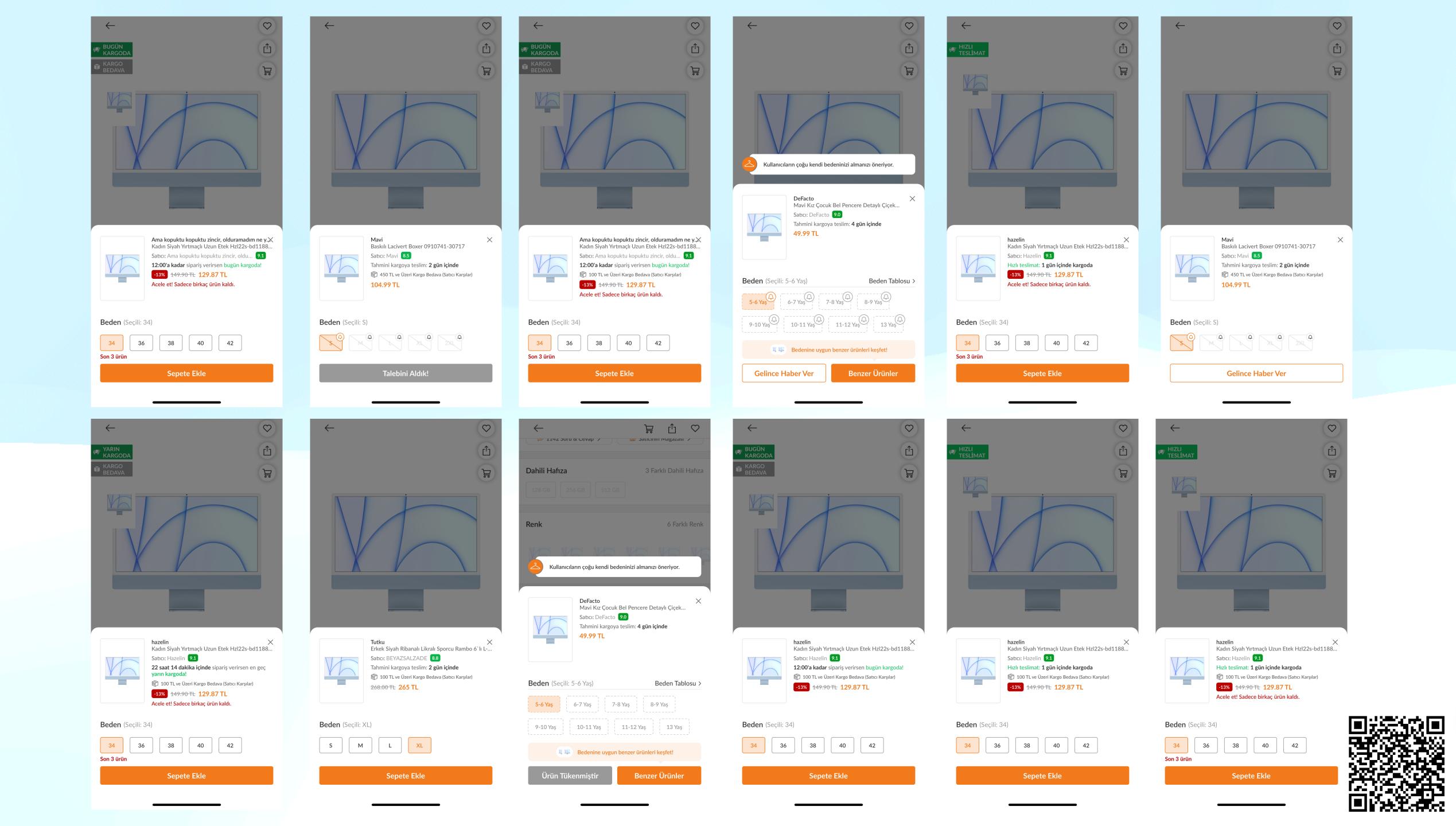




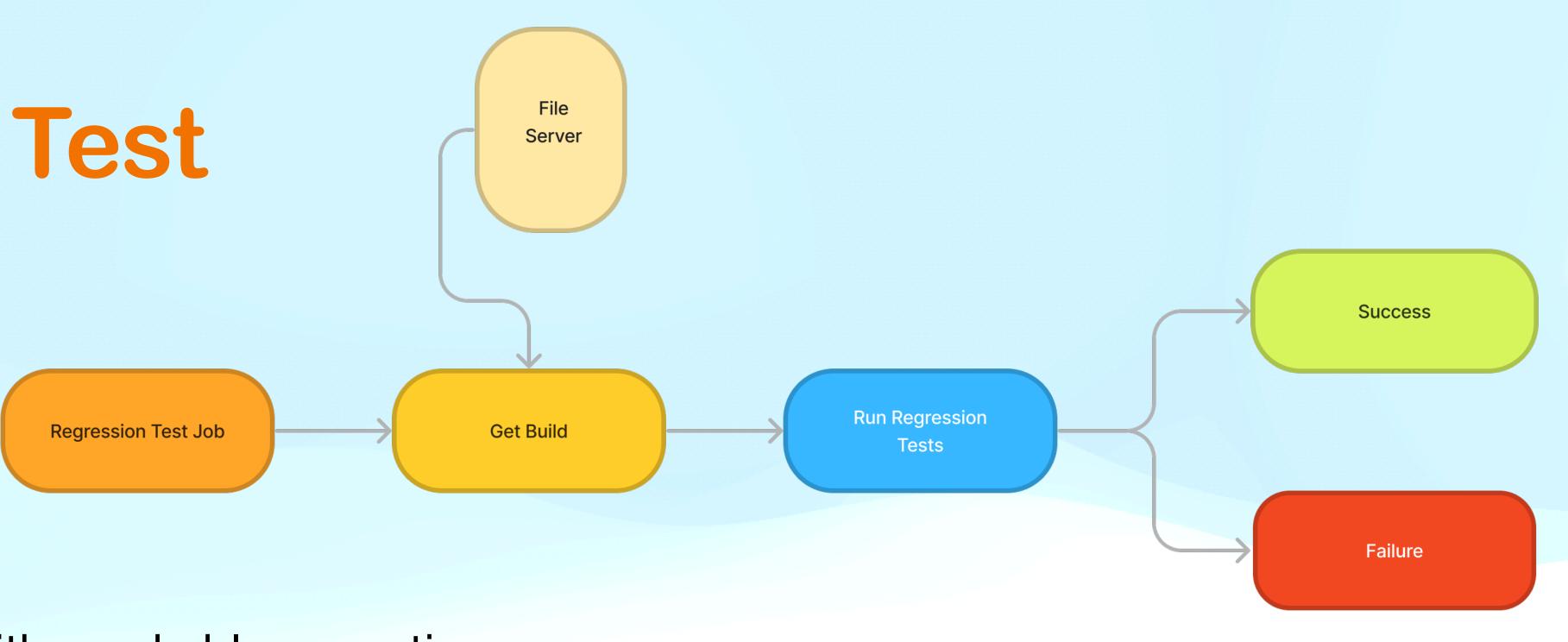
Snapshot Test Component Scroll Helper







Regression Test



- Runs in production with mockable exceptions
- Created as functional tests for user-accessed pages
- Runs daily and after RC creation
- Tests merge requests (muted)
- QA reviews daily results

Regression Test

XCTestPlanner

A tool for managing Xcode Test Plans from command line.

Why? *∂*

Test plans are a valuable tool for organizing and managing your tests in Xcode projects. However, manually editing large number of test plans can be time-consuming and tedious (sometimes crashy).

And also, It's not possible to selectively run or skip specific test classes with a test plan.

Features *P*

XCTestPlanner simplifies to edit test plans by providing command-line interface for adding or removing tests, setting language and region options, and adjusting the rerun numbers.

- Handle your test plans from command line interface instead of Xcode.
- Easily adjust the number of test repetitions for different environments.
- Control the Localizations by passing parameters.
- Conveniently set environment variables/ arguments for your CI pipelines.

• Simplify your CI setups by creating a single test plan that can be customized for various configurations.

https://github.com/atakankarsli/xctestplanner



Regression Test Mute

skynet APP 9:19 AM Daily Develop Results Pass: 169 Fail: 19 Rerun: 3 Skip: 5					
<pre>HTML Report</pre> ♦ develop	Download Report				
skynetAPP11:3Image: Skip: 169Image: Skip: 5Skip: 5Image: Skip: 5HTML Report	31 AM sult Muted: 19 🔊 Download Report				

93

@Said Çankıran MBROWSING/Sprint32/MBROWSING-1020-NonUsing-Lite-Mode-Config-Delete

https://github.com/atakankarsli/xctestplanner



Merge Request



Regression Test

Unmuted

Muted

https://github.com/atakankarsli/xctestplanner

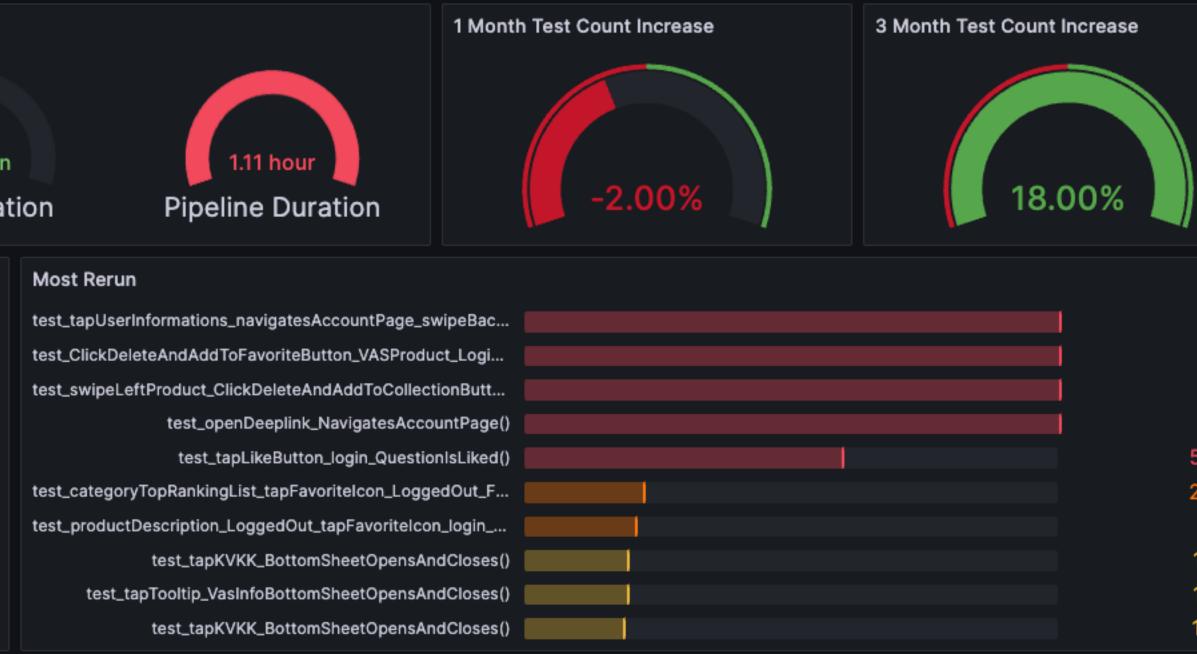




Analyzing UI Test Results

~ Regression Tests

Test Counts	Percentages	÷	Durations	
Total Passed Failed Rerun 280 261 8 4	Skipped 12	2.86	1.43	40.7 min
1 1 minute			Flaky Percentage	Test Durat
Most Failed				
test_tapAddressList_navigatesEmptyAddressListPage	100%			
test_tapAddressDetail_navigatesEmptyAddressDetailP	100%			
test_mergeBasket_With_LogoutUser()	100%			
test_tapAddressList_navigatesEmptyAddressListPage	100%			
test_addProduct_in_BrowsingRecommendedProducts	100%			
test_tapAddressList_navigatesEmptyAddressListPage	100%			
test_tapDiscoverServices_navigatesGSMTopupPage()	100%			
test_tapAddressList_navigatesEmptyAddressListPage	100%			
test_tapAddressList_navigatesEmptyAddressListPage	100%			
test_tapDiscoverServices_navigatesGSMTopupPage_s	100%			



100% 100% 100% 100% 59.5% 22.6% 21.1% 19.7% 19.7% 19.7%

Automation Level



Weekly Level - PDP WORKFLOW 5 days ago skynet show-level pdp @ios-pdp

Automation Level



skynet APP 5 days app Pdp Automation

Pdp Automation Le

Effectiveness: 4 (% Next level: 🤚 ncrease autom

Learn: 2 (%53.8) Next level: (75.0) 🎯 Cover all RC bu

Mock: 2 (50 days ag Next level: (45 days 🋠 Update mock JS

Regression: 2 (%71 Next level: (75.0) / Increase regres

Skip Rate: 3 (%4.2) **Next level:** (2.5) Lower skipped

Fail Rate: 3 (%5.2) Next level: (5.0) **V** Reduce failed to

Snapshot: 4 (404) Next level: 🤚 📸 Have more un-i

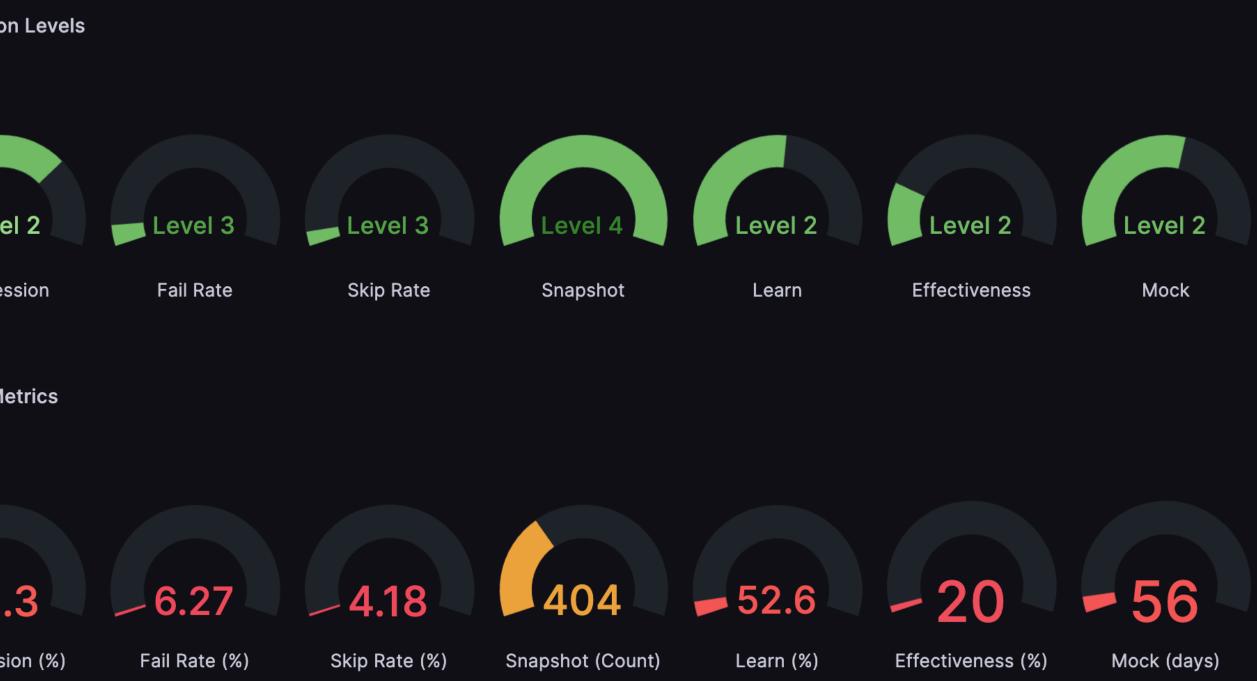
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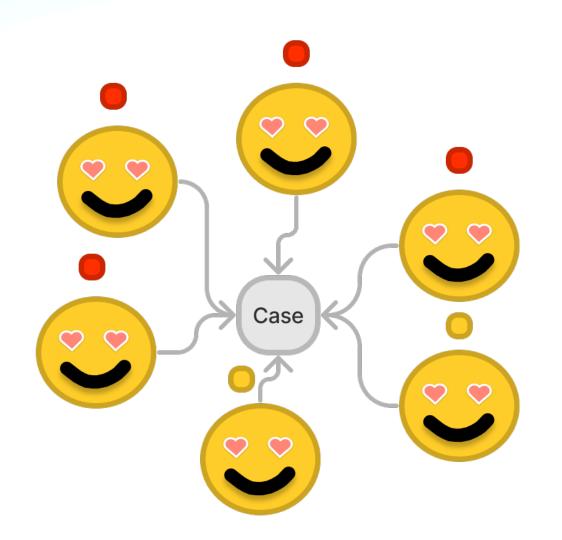
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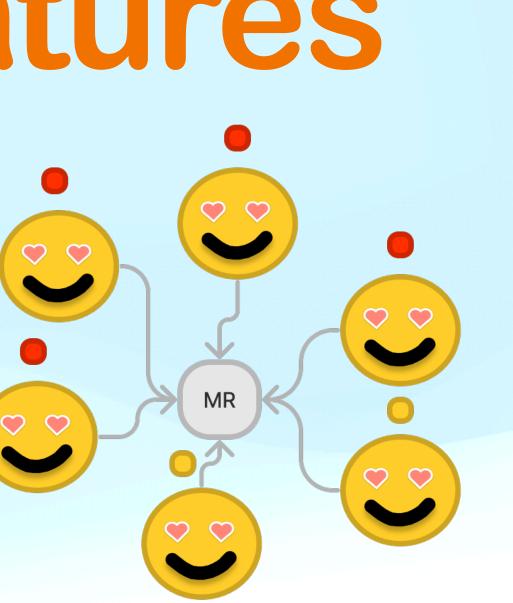
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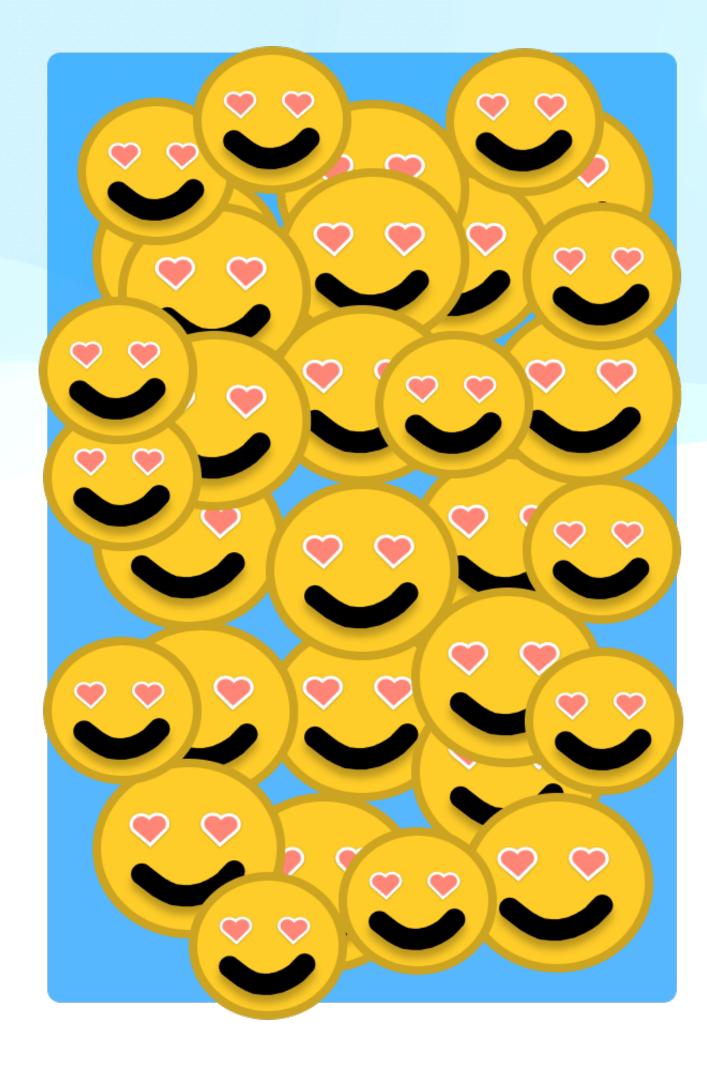




- MR Reviewers Selection
- Case Reviewers Selection







- Adhoc
- IPA Size Checking
- TestFlight Automation
- Auto Pull for MRs
- Daily MR Reminder



📕 Emre Can Akgül 🌴 4 days ago skynet export MCHECKOUT/Sprint32/MCHECKOUT-1238-fix-installmentpostponing-bugs

8 replies



skynet APP 4 days ago 🌃 🚀 Hasta la vista, baby. I'll be back.

skynet APP 4 days ago



🗯 IPA Size Information 📹

Hi, @Emre Can Akgül Trendyol 7.2.4 (498) is 97.11 MB.

Your Package is 97.13 MB.

Please consider that -0.02 MB size difference.

Skynet Jr. APP 4 days ago

MCHECKOUT/Sprint32/MCHECKOUT-1238-fix-installmentpostponing-bugs

Trendyol

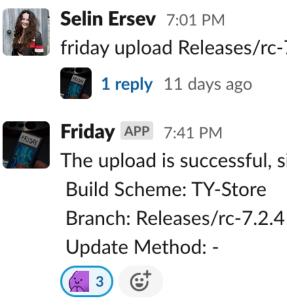
Your package is here baby. @Emre Can Akgül

Your M1 package is here baby.





- Adhoc
- IPA Size Checking
- TestFlight Automation
- Auto Pull for MRs
- Daily MR Reminder





Emre Can Akgül 芥 4 days ago skynet export MCHECKOUT/Sprint32/MCHECKOUT-1238-fix-installmentpostponing-bugs

8 replies



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Your Package is 97.13 MB.

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Trendyol

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The upload is successful, sir. I uploaded the app with this configuration:

Your package is here baby. @Emre Can Akgül

Your M1 package is here baby.



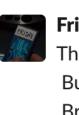


- Adhoc
- IPA Size Checking
- TestFlight Automation
- Auto Pull for MRs
- Daily MR Reminder



Selin Ersev 7:01 PM friday upload Releases/rc-7.2.4 -

1 reply 11 days ago



Friday APP 7:41 PM The upload is successful, sir. I uploaded the app with this configuration: Build Scheme: TY-Store Branch: Releases/rc-7.2.4 Update Method: -(··· 3) ÷



Emre Can Akgül 🌴 4 days ago skynet export MCHECKOUT/Sprint32/MCHECKOUT-1238-fix-installmentpostponing-bugs

8 replies



🚀 Hasta la vista, baby. I'll be back.



skynet APP 4 days ago



Hi, @Emre Can Akgül Trendyol 7.2.4 (498) is 97.11 MB.

Your Package is 97.13 MB.

Please consider that -0.02 MB size difference

Skynet Jr. APP 4 days ago

MCHECKOUT/Sprint32/MCHECKOUT-1238-fix-installmentpostponing-bugs

Trendyol

Your package is here baby. @Emre Can Akgül

Your M1 package is here baby.



skynet APP 4:30 PM

Hi @Beyza İnce There are pull requests that you do not approve. Would you like to take a look? 🌉 🌆 MBROWSING/Sprint32/MBROSING-898-Home-Page-Widgets-Smoke-Test-Part-3 MSEARCH/Sprint30/MSEARCH-863-SellerProfilePageLogoutReportTests DOLAPLITE/Sprint10/DIOS-132-FixRegressionTests Sprint94/MINT-4623-search-filter-category-tree-devprocess PLATFORM/Sprint34/IOSPLAT-989-SetupUITestTargetsTYGoApp











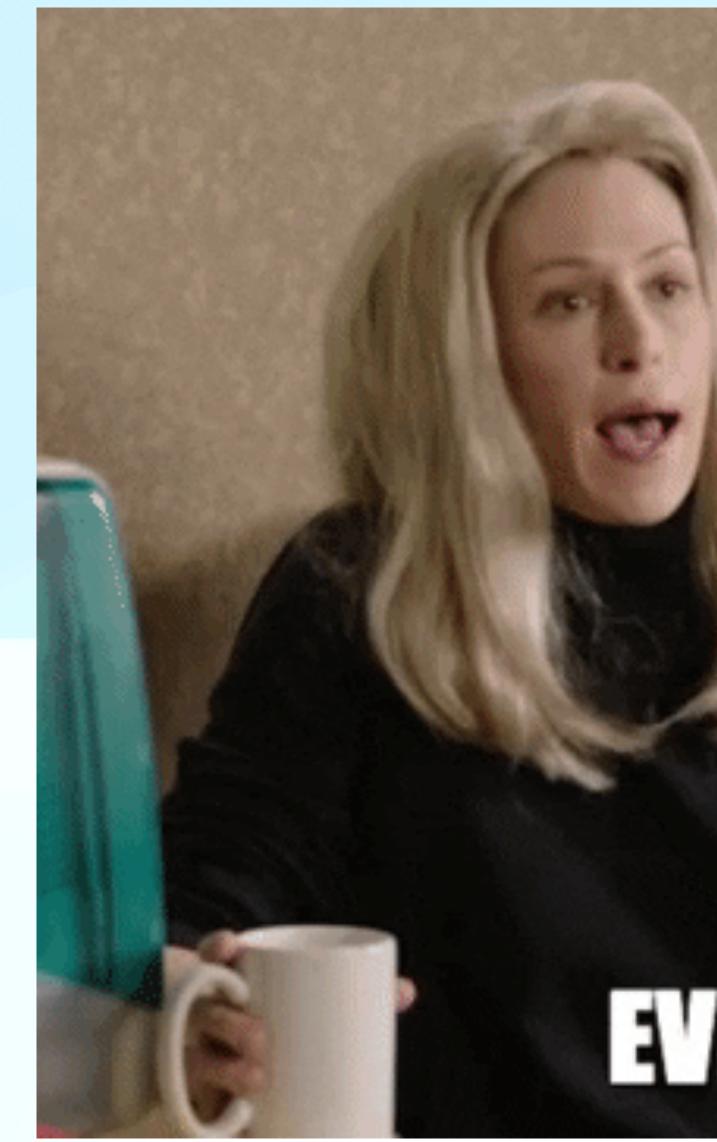
Generic Processes Increased Automation

New Tools









EVERYTHINGS FINE