



Testing Solutions for Hyper-Connected Apps

Don't let functionality cause testing chaos

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Your Speaker:



Andrew Morgan

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- ✓ 10 years of experience in Fortune 1000 companies.
- ✓ Experienced leader in strategic analysis, opportunity assessment and roadmap execution.
- ✓ Instrumental in leading strategic engagements at Infostretch which has resulted in significant value for our clients.
- ✓ Enable QA organizations become more efficient in Test Automation using innovative ideas.



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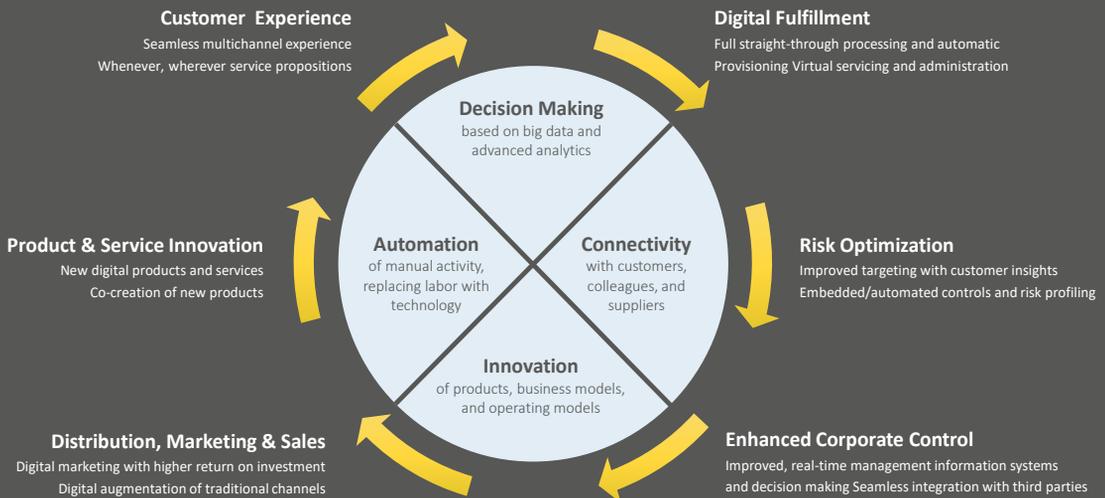
Agenda

1. Digital Platform Today & Digital Innovations
2. Mobile Testing Approach & Strategy
3. Mobile Testing – Device Interfaces & Success Stories
 - Requirements
 - Challenges & Potential Solutions
 - Case Studies
4. Take Away
5. Q & A

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The Digital Ecosystem



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The Digital Ecosystem is Rapidly Evolving

Exploding number of device fragmentation



More complex mobile applications



New unique mobile capabilities



Check Scan



Biometrics



Location Services



Push Notification

The Digital Consumer owns on average **3.2 devices** ([globalwebindex](#)) :: Businesses that adopt omni-channel strategies achieve **91% greater** YoY customer retention than those that don't ([Aspect Software](#))



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How is Digital Evolution Creating Complex & New Testing Scenarios?



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Digital Test Strategy in Today's World

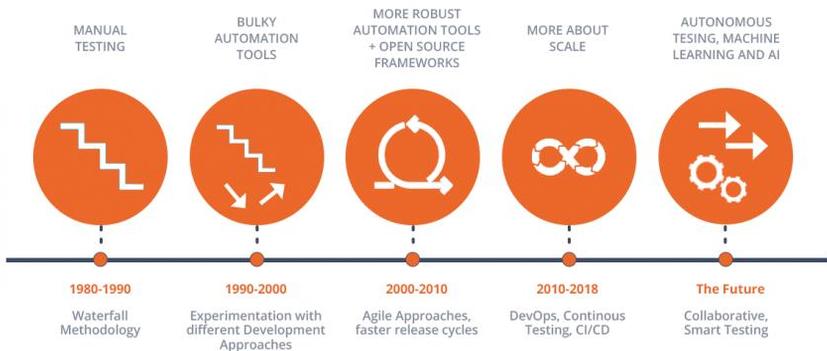
- Device Interfaces



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QE Evolution

EVOLUTION OF TESTING



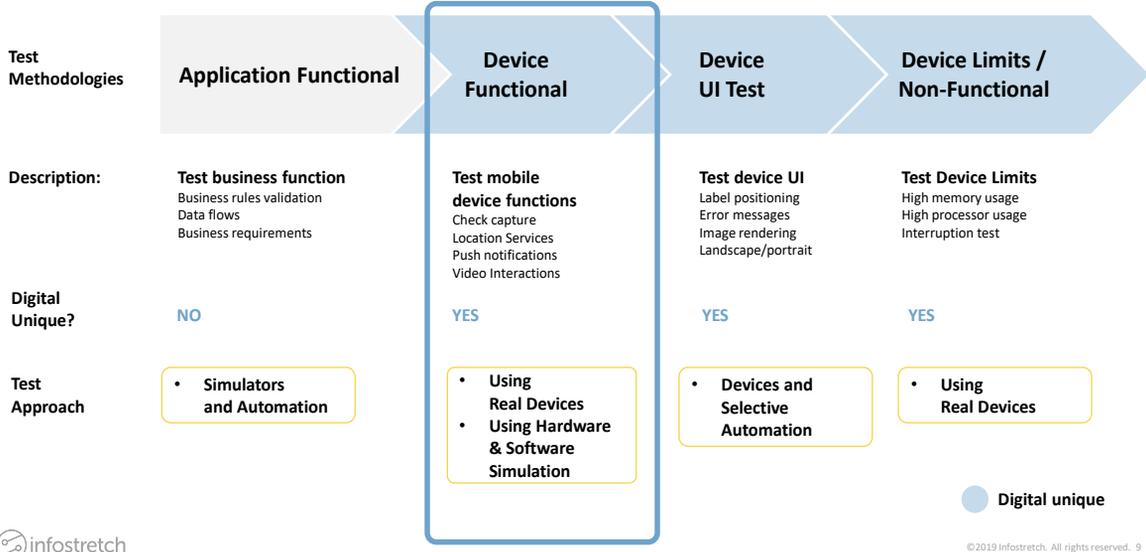
Source: <http://blog.qatestlab.com/2018/11/06/testing-trends-2019/>



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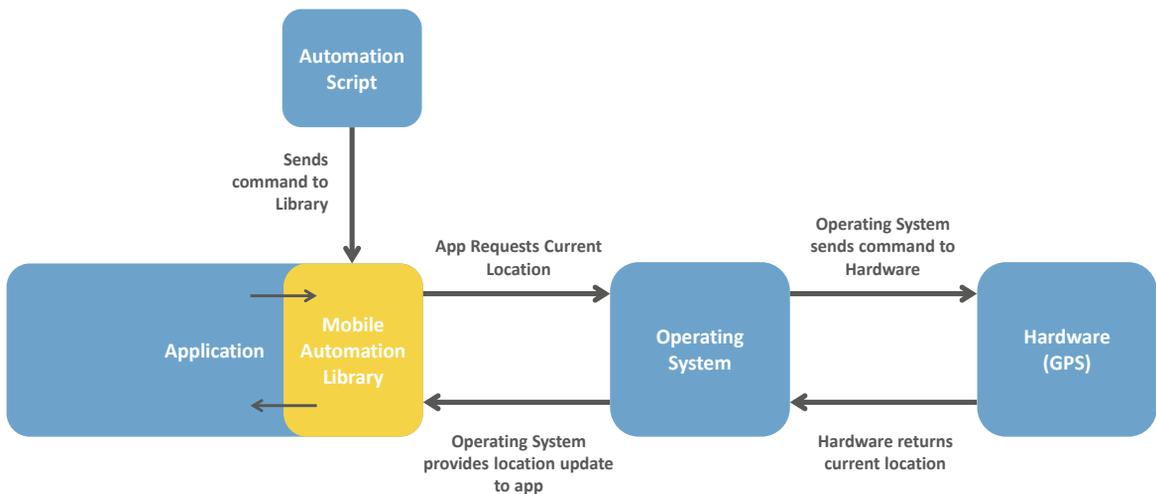
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Multiple Failure Modes Drive Multiple Test Methodologies



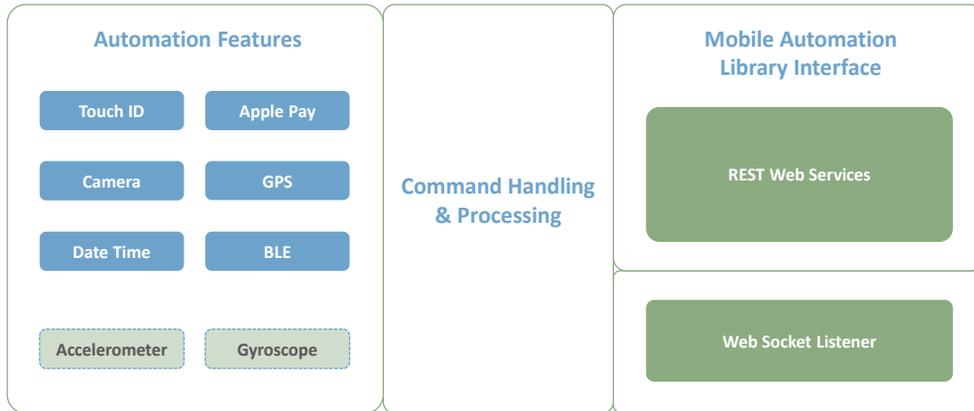
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Digital App Automation Library - Overview



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Mobile Automation Library



Critical Use Case – Successfully Increased Test Automation Coverage



Check Deposit for mobile banking - Customer logs in, Selects Account, Scans Check, Confirms Deposit, Logs out



Simulate System Date / Time including time zone to test application behavior – verify promotions in retail, banking apps



Bar code scanning for retail, banking, healthcare apps



Location based scenarios – feature is available when user reaches specific location



Fitness applications – Bluetooth connectivity scenarios, verify app behavior in case of abnormal Heart Rate / Temperature values etc.



Route functionality – field service personal travels to customer location, starts job, uploads picture, adds comment & completes job



Biometrics used for authentication in banking & wallet apps



Payment functionality in apps using Apple Pay & Google Wallet

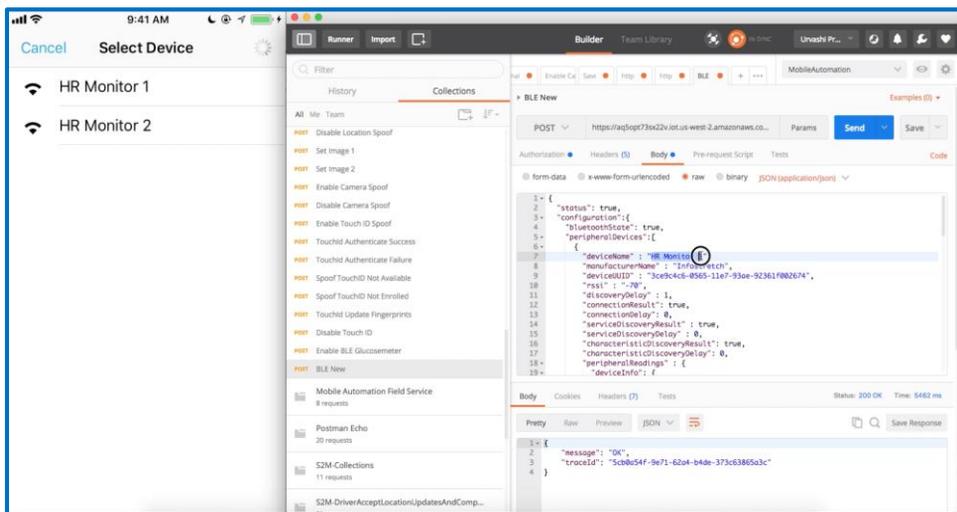
Simulator-Based Solution for Digital Hardware Interfaces & System Interfaces



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Digital App Automation Library – Portal Interface



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Digital Test Strategy in Today's World

- Requirements & Challenges
- Demos
- Case Studies

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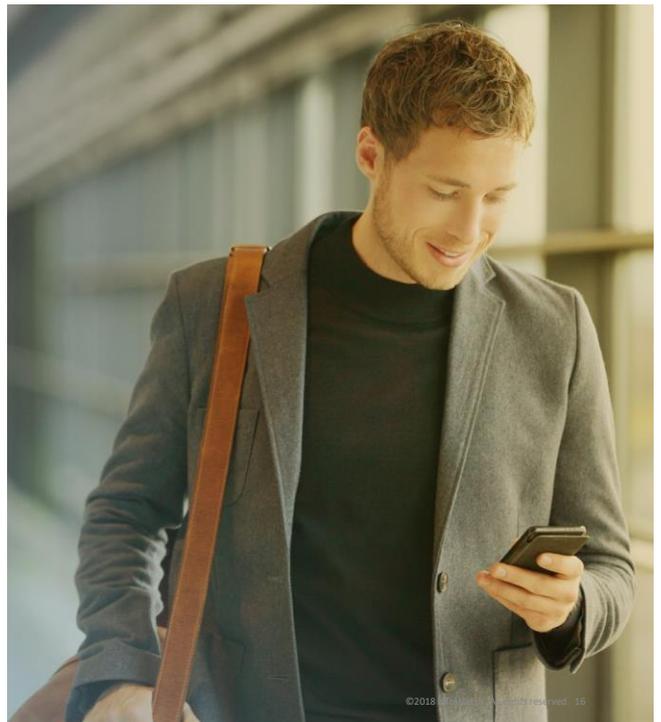
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Apps Using Location Services

Simulate Location Services

- ✓ Simulate particular location
- ✓ Simulation of location with different GPS signal accuracy
- ✓ Simulation of driving scenario on different routes
- ✓ Simulate GPS signal drop during driving scenario

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Digital App Automation Library – Location Services



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Improving payment experience through BLE and NFC enabled wearable bands

Agile

Smart

- Extend wearables capability to Consumer Card Platform and Pre-Paid Card Issuing Platform
- Support Simple wearables (passive bands)
- Support Smart wearables (active bands)

- Extended mobile payment platform offerings to a new segment of wearable devices
- Demonstrate thought leadership in mobile payments, wearables and the IoT
- Secure data flow between wearables and mobile
- Wearable mapping with card accounts
- Managing multiple payment cards and switching between cards
- Enable contactless payment
- Interactive Games to enhance customer engagement
- Location-Based Offers/Alerts/Actions Leveraging Beacons
- Integration of Loyalty Programs



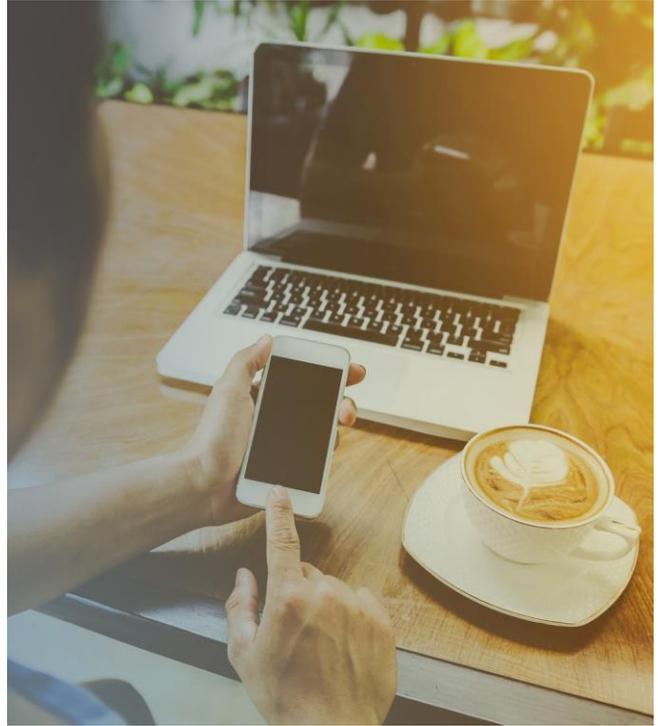
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Apps interacting with Peripherals through BLE

Connecting with BLE peripherals

- ✓ Simulate Bluetooth states (On/Off) and peripheral advertising
- ✓ Simulate connectivity scenarios such as pairing success, failure, timeout, etc.
- ✓ Simulate multiple peripheral device with different Name, Serial number, signal strength, etc.
- ✓ Simulate Data transfer scenarios varying parameters like interval, data type, sensor readings, etc.



BLE with Beacons

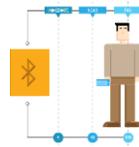
Testing Focus



Detection and Response



Detection of Appropriate Beacon



Correct Range Detection



Beacon Placement & Tuning

Test Parameters



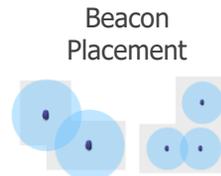
Range



Battery Drainage



Connectivity



Beacon Placement



Digital App Automation Library – Bluetooth (BLE)

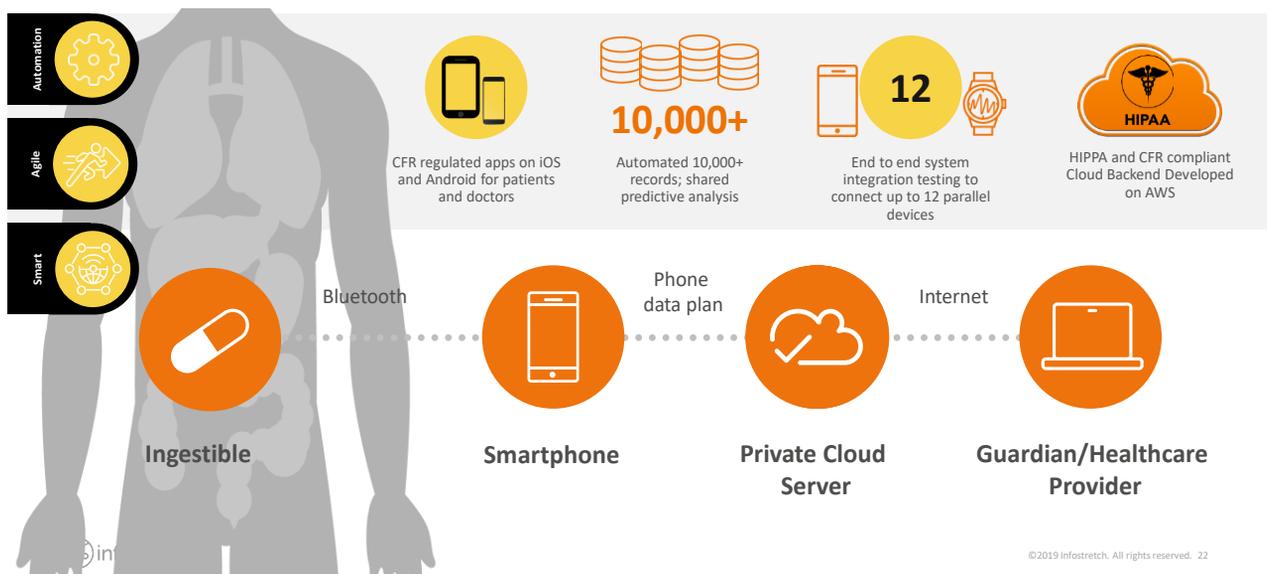


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Going beyond wearable with an ingestible sensor



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Apps Using Camera

Simulate Camera

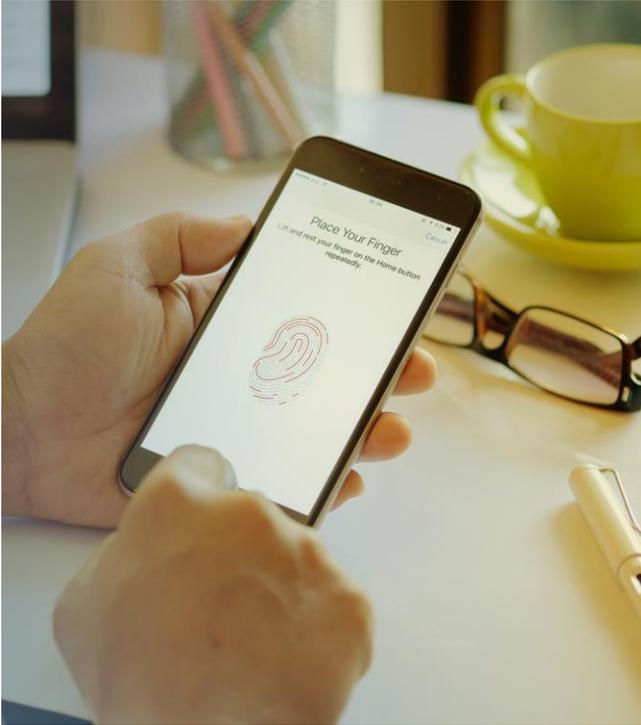
- ✓ Simulate image captured from camera
- ✓ Use cases:
 - Check scanning
 - Barcode / QR Code scanning
 - Document Scanner Apps

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Digital App Automation Library – Camera

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Apps using Fingerprint based Authentication

Simulate Fingerprint for Authentication

- ✓ Simulate success/failure scenarios for fingerprint authentication
- ✓ Scenarios allowing new fingerprints to be enrolled or existing fingerprints to be removed
- ✓ Scenarios involving no fingerprint sensor available on device, no fingerprint enrolled

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Optimizing mobile presence with comprehensive approach to QA and test automation



Challenges

- Mobile device proliferation.
- Rapid deployment of new apps and architecture; with complex functionalities and use cases.
- Need to optimize device testing costs and manage selective test automation.

Engagement Benefits

- Four week regression cycles reduced to one week using selective automation methodology.
- A stable mobile banking application platform as a result of optimal QA test strategy and implementation plan.
- Client's mobile banking solutions deployed on Apple, Android, Amazon, and Windows App Stores.
- Client team trained on best practices for isolating problems
- Provided test automation framework that could also be leveraged by development groups to "shift left"

Infostretch Approach

- Used our own risk-based device selection methodology to address device proliferation challenges.
- Set up a complete test environment to manage every build and release across all channels including desktop, mobile, Native, Hybrid, and mobile Web
- Utilized multiple test methodologies to provide optimal coverage for both functional and non-functional device testing
- Maximized the use of simulators for functional testing and real devices to test unique mobile functions.

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Take Away

#1 Work with Mobile Application Developers

- Mobile OS specific tools
- Application Hooks
- Invest in building utilities tools

#2 Leverage Service Providers

- Readymade framework
- Implementation Knowledge
- Custom Solutions

#3 Consider Cloud Infrastructure Providers

- Perfecto Mobile (Perforce)
- Headspin
- Sauce Labs



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