



The bridge to possible

# Real User Experience Monitoring

In the Context of Full Stack Observability

Martin Divis, TSA, Cisco Systems

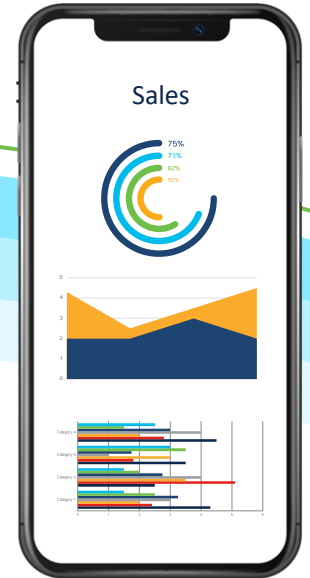
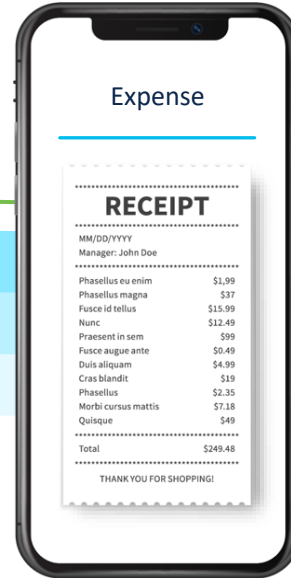
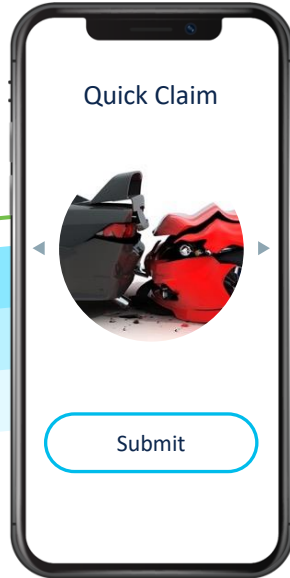
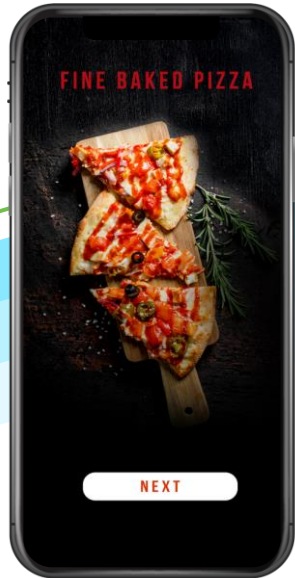




# Agenda

- Introduction to Cisco FSO
- Digital User Experience
  - AppDynamics RUM
  - AppDynamics Synthetic Testing
  - Investing in Future
  - ThousandEyes and RUM

# Applications are the front door



# The Impact of Poor Performance

**40%**

of users abandon a page if it did not load within **3 seconds**



**LOSS OF REVENUE**

**30**

lost customers can be the result from **one negative review**



**REPUTATIONAL DAMAGE**

**85%**

of organizations engage **more than 6 people** to resolve known issues



**HIGHER HELP DESK COSTS**

**78%**

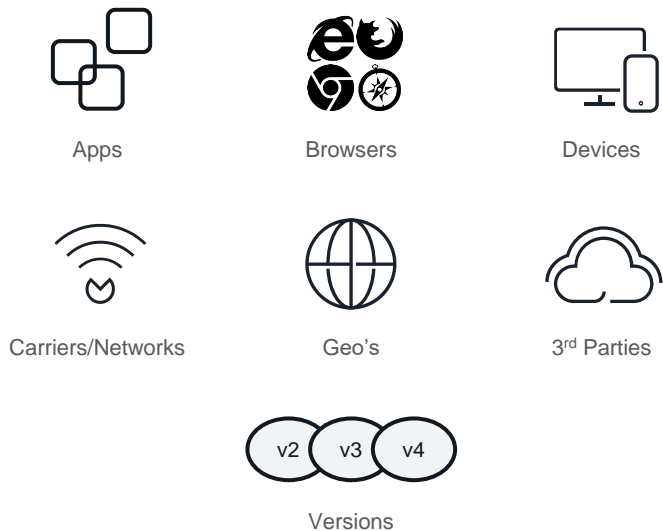
of lost productivity due to enterprise outages costing approximately **\$700B/year**



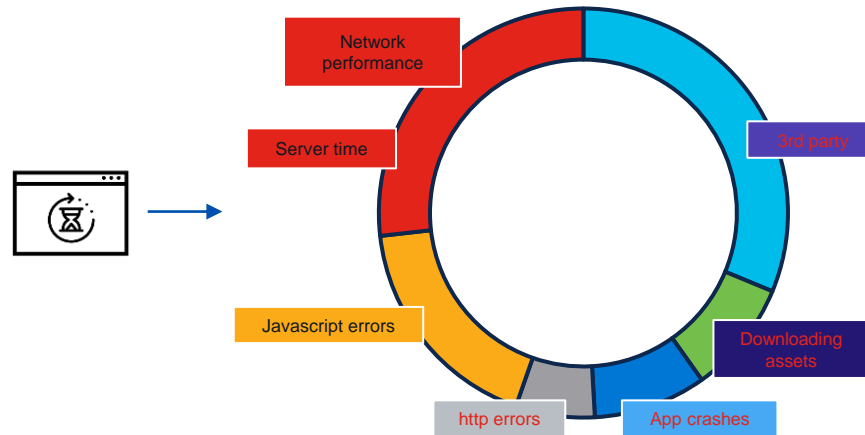
**PRODUCTIVITY LOSSES**

# Managing Diversity is Complex

## Who experiences poor performance?



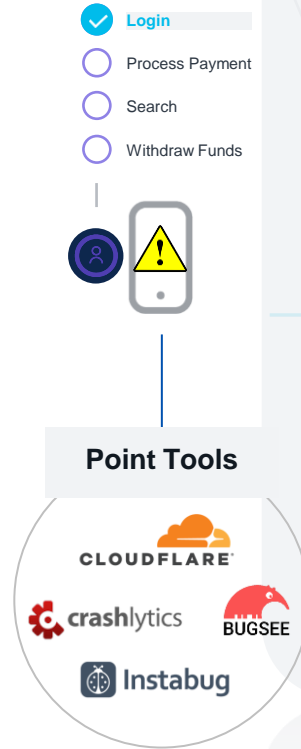
## Why is my app slow?



# How Do You Identify App Performance Issues

## What if the issue is not on the front-end app itself?

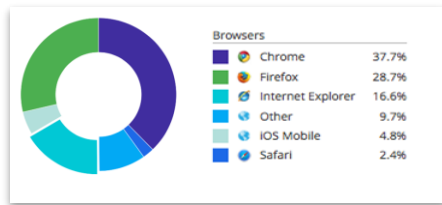
- User Behavior
- App Code
- Backend Infrastructure





# End-to-End Visibility of Real User Performance

App | Business IQ

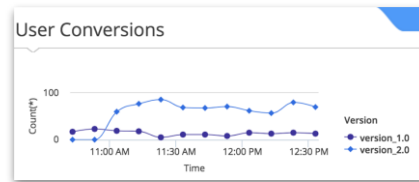


Events Prior to Crash

Time	Event
3:34:45 PM	ChangeAddressView
3:34:37 PM	SettingsView
3:34:32 PM	CartView
3:34:25 PM	ListView
3:34:21 PM	LoginView

UNDERSTAND CX

PERFORMANCE DIAGNOSTICS

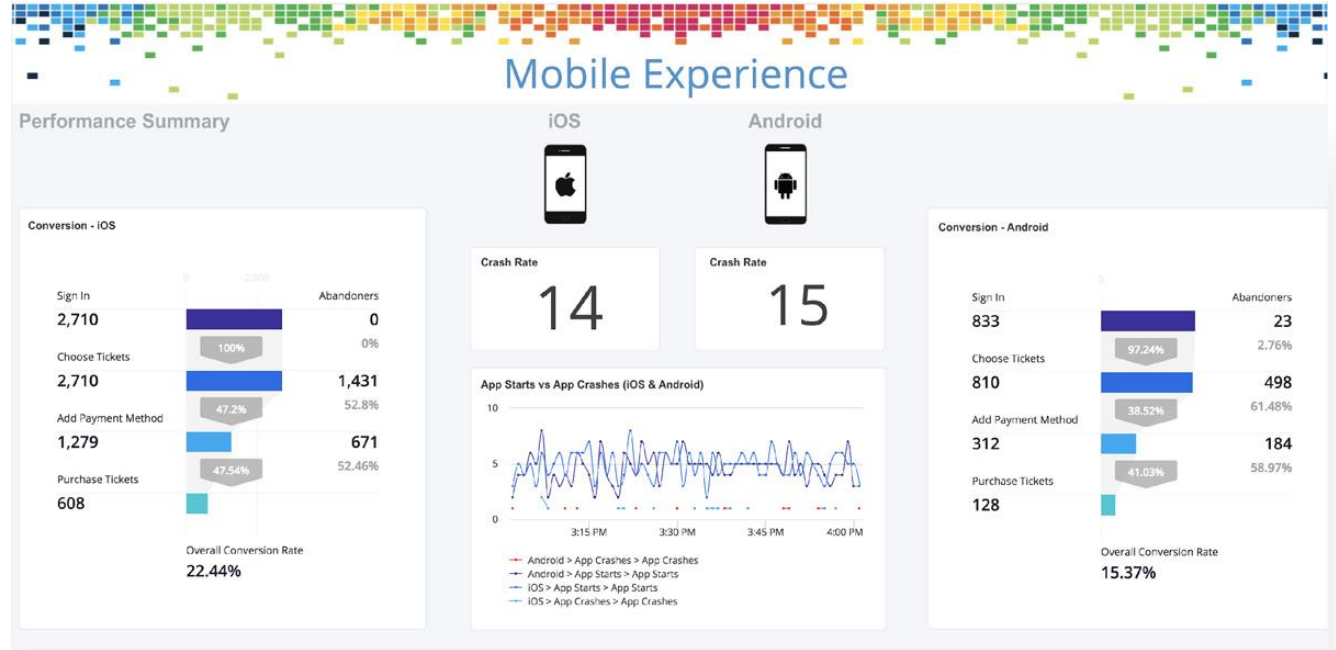


BUSINESS OUTCOMES

# Understand Customer Experience

Seamlessly visualize application performance across mobile & web platforms

Empower product managers for insights

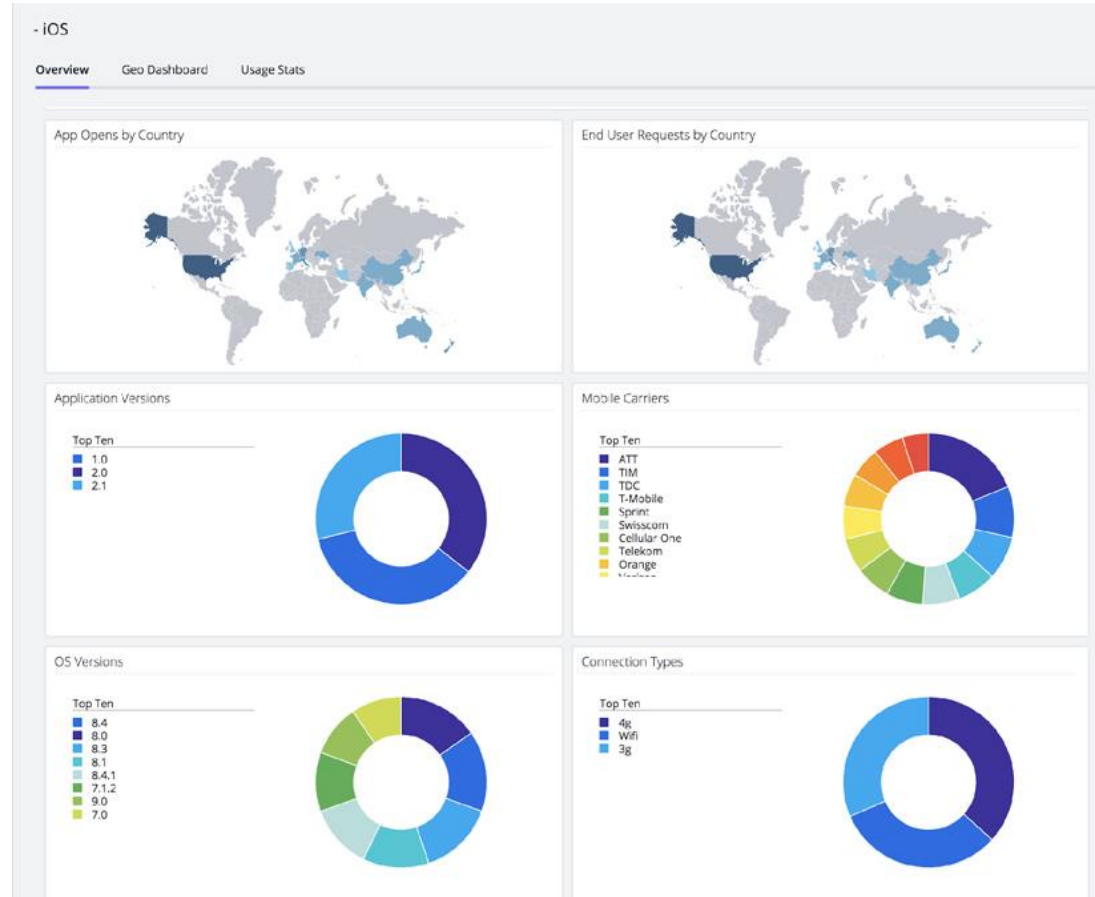




# Understand Customer Experience

## Segment your users' digital experience

Analyze user experience by browser, device, carrier, location, and more



# Understand Customer Experience

## Pinpoint performance issues in the context of a user session

Understand, visualize, and reproduce what users are doing when issues occur

Session - 05/29/18 3:06:18 PM to 05/29/18 3:06:56 PM

Session Summary

Screen Views in Session

Activity	Timeline
Unknown	Start
LoginView	+2.800 sec
ListView	+6.041 sec
<b>CartView</b>	<b>+16.902 sec</b>
CheckoutView	+20.132 sec

Screen View Details - CartView

Timeline

Sort by Start Time

Network Request

Infopoint

System Event

UI Event

Screenshot

rest/cart/1

@/cart/.GET

-[Cart checkCart]

Connection Transition - wifi

Text Field Focused: An iOS text field

Touch Event

Screen

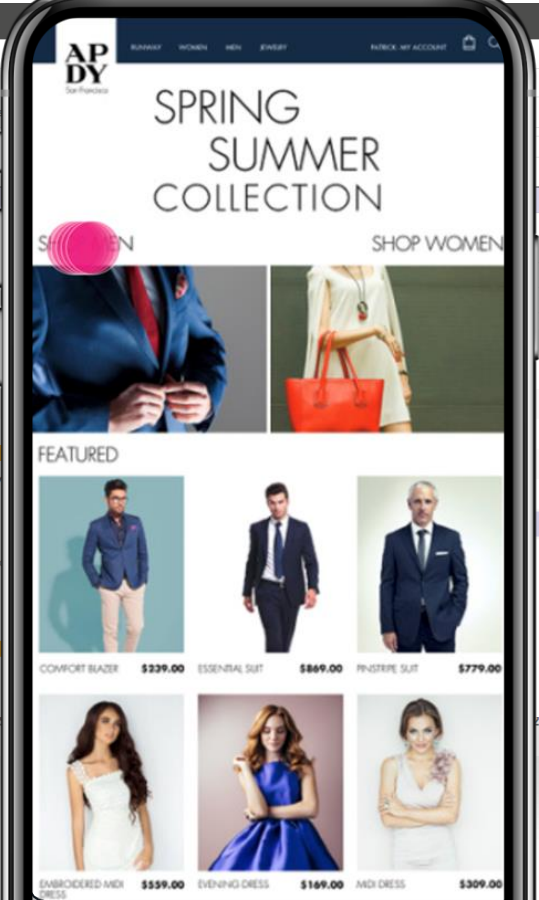
rest/ca

@/cart

[View Snapshot >](#)

410 of 410 Sessions for this Agent

Region U4/11/17 3:01:47 PM 20.613 sec iPhone GSM

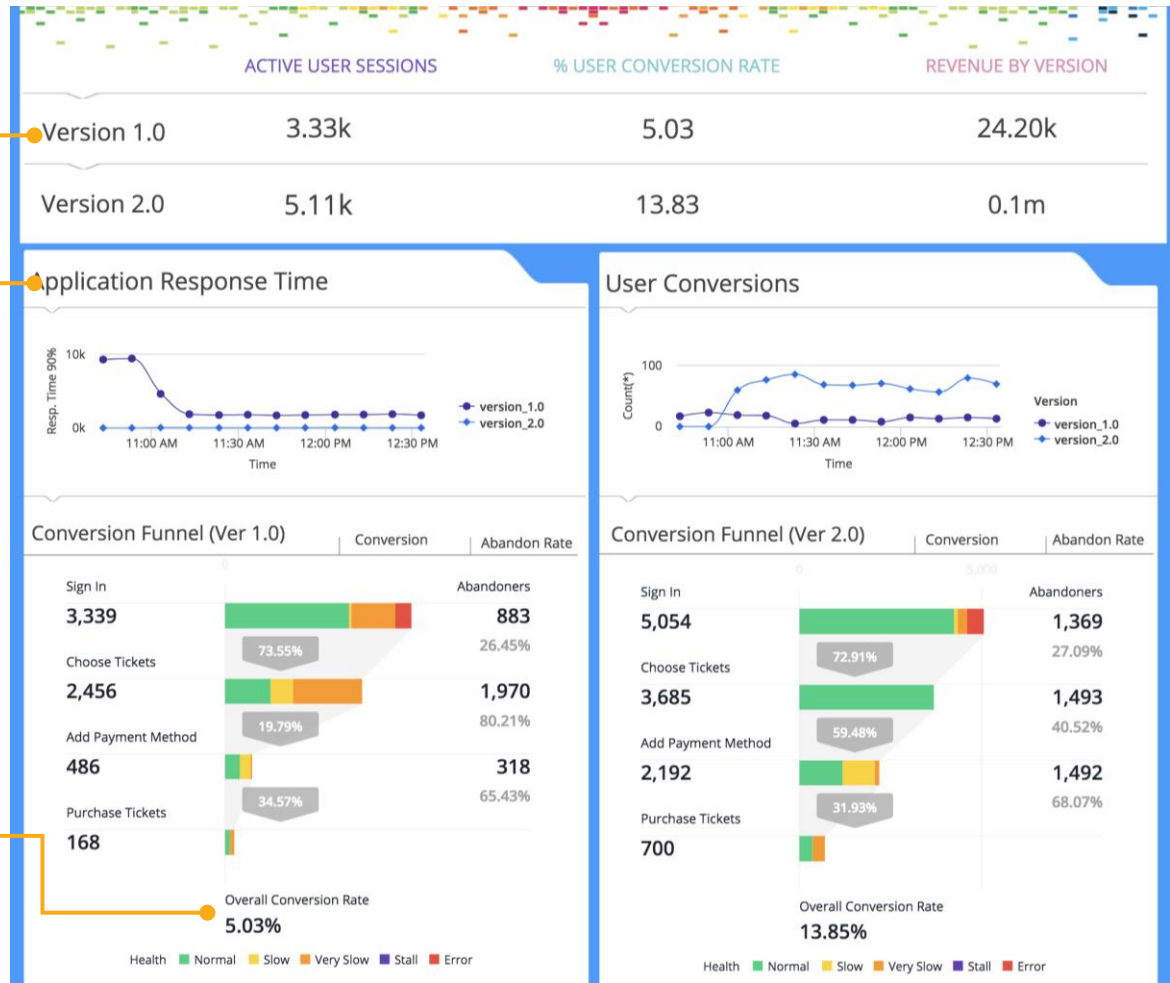


The image shows a mobile application interface for 'APDY' (Aspen Park). The main banner reads 'SPRING SUMMER COLLECTION' with a 'SHOP WOMEN' button. Below the banner, there are two rows of featured clothing items. The first row includes a 'COMFORT BLAZER' for \$339.00, an 'ESSENTIAL SUIT' for \$869.00, and a 'PIN-STRIPED SUIT' for \$779.00. The second row includes an 'EMBROIDERED MEN'S DRESS' for \$559.00, an 'EVENING DRESS' for \$169.00, and another 'MEN'S DRESS' for \$309.00. The interface is displayed on a smartphone screen, which is overlaid on a performance analysis tool window.

# Performance Diagnostics

Compare the performance of application releases/sprints

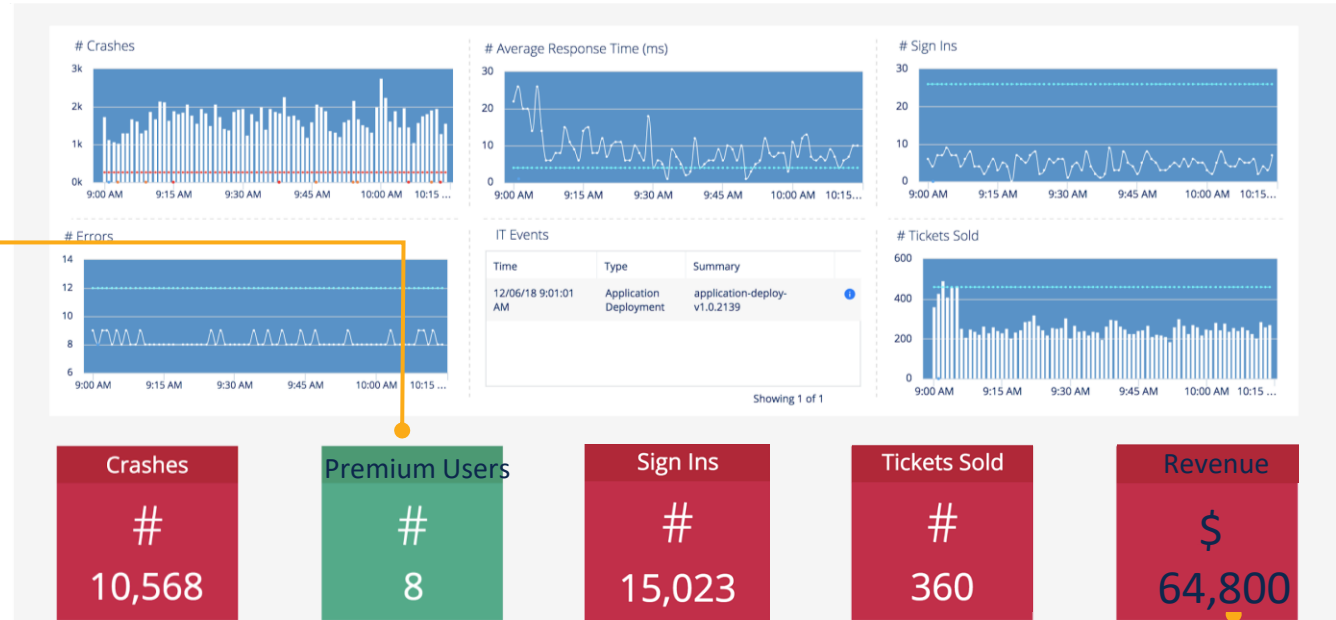
Understand impact of application changes on revenue, performance, and user experience



# Business Outcomes

## Correlate App Performance to Business Outcomes

user segmentation



“How were ticket sales impacted by the version release on 12/6/18?”

# Customer Use Cases – End User Monitoring

## Troubleshooting

- One customer action may trigger multiple services: how do I track, trace, and correlate back-end processes to front-end actions?
- Customer experienced a slow interaction: what series of steps led to that situation?
- Ability to identify root causes of common HTTP error codes -- 500, 400, etc. and to identify which tier causes the failure
- Analyzing mobile crashes and identifying root causes

## User

- Customer called support and was unable to complete a transaction; what led to the failure?
- Which users were affected by a network slowdown?
- What are the performance deltas for users of different versions of my app?

## Network, 3rd Party Content, and Geo

- Payload may influence performance of a network request: how do I determine how payload affects performance?
- How do I track and analyze requests to external systems or third party content and services?
- What is the impact of recent site updates on agreed upon SLAs with partners?

## Business Impact

- What are the metrics for the account overview page? What's the experience of loading it?
- How do account views relate to trade executions?
- What impact have site updates had on key user journeys and the associated business KPIs?
- Why is the performance of a key user journey degrading? Where is the bottleneck?

# Drive Organizational Alignment and Collaboration

## Developers



- Find & fix end user issues in pre-production
- Visibility into how the code is performing in production

## Operations

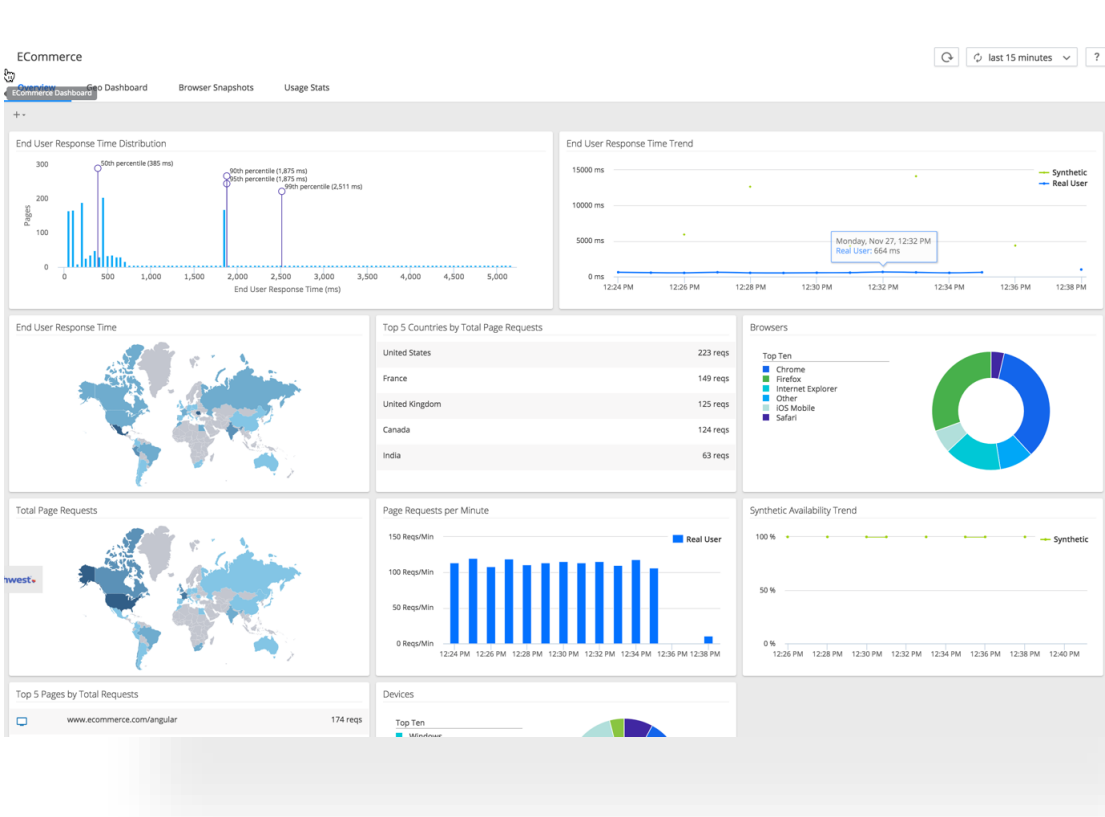


- Comprehensive end-to-end visibility across geos in realtime
- Isolate, troubleshoot and diagnose user session level issues

## Business



- Visibility into true User Experience
- Conversion across business functions and goals, intersected with UX



# Browser Real User Monitoring Solution

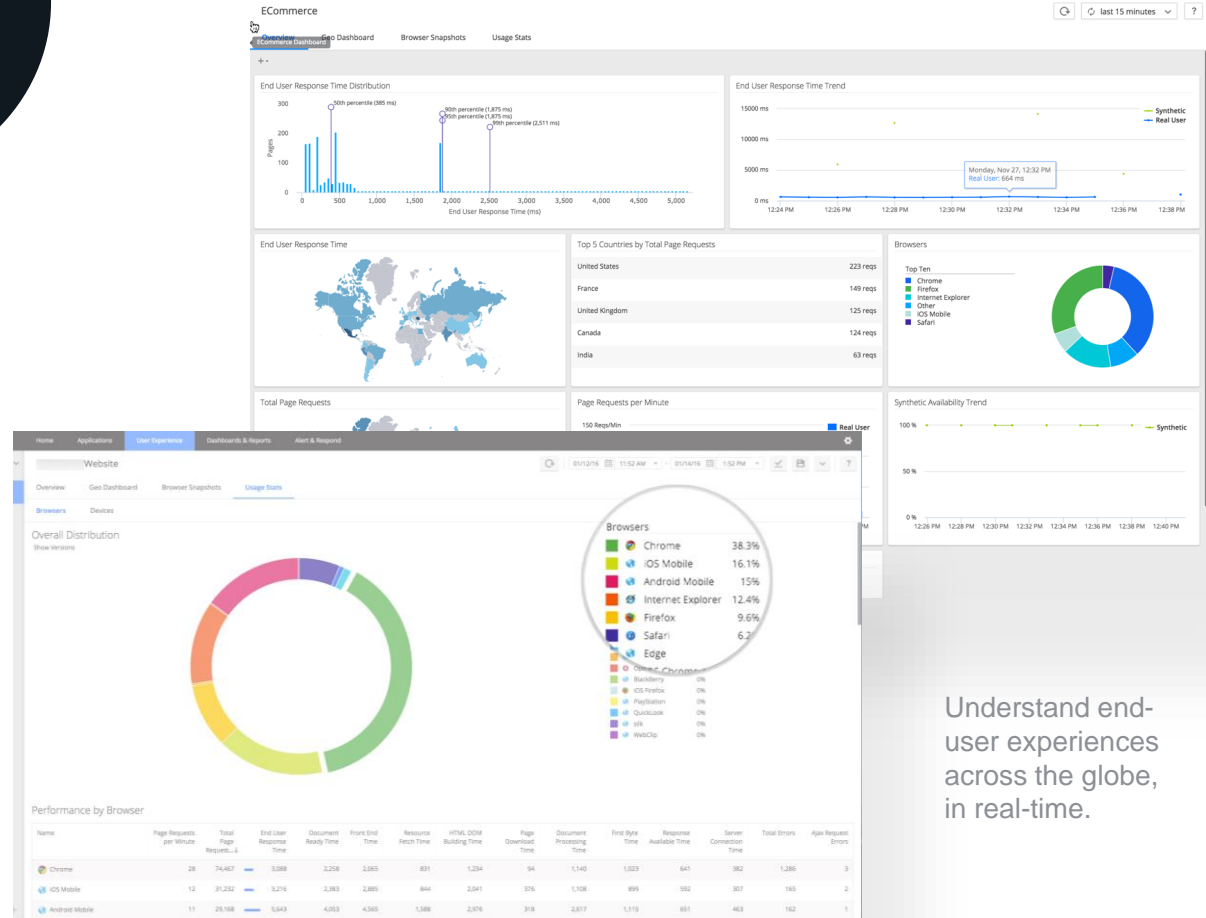
Prevent, identify, and resolve end-user experience  
issues in browser-based applications.



# How do I monitor my browser-based web applications?

## Browser Visibility

- Lightweight Agent
- Realtime Performance Data
- Page Visibility and Segmentation



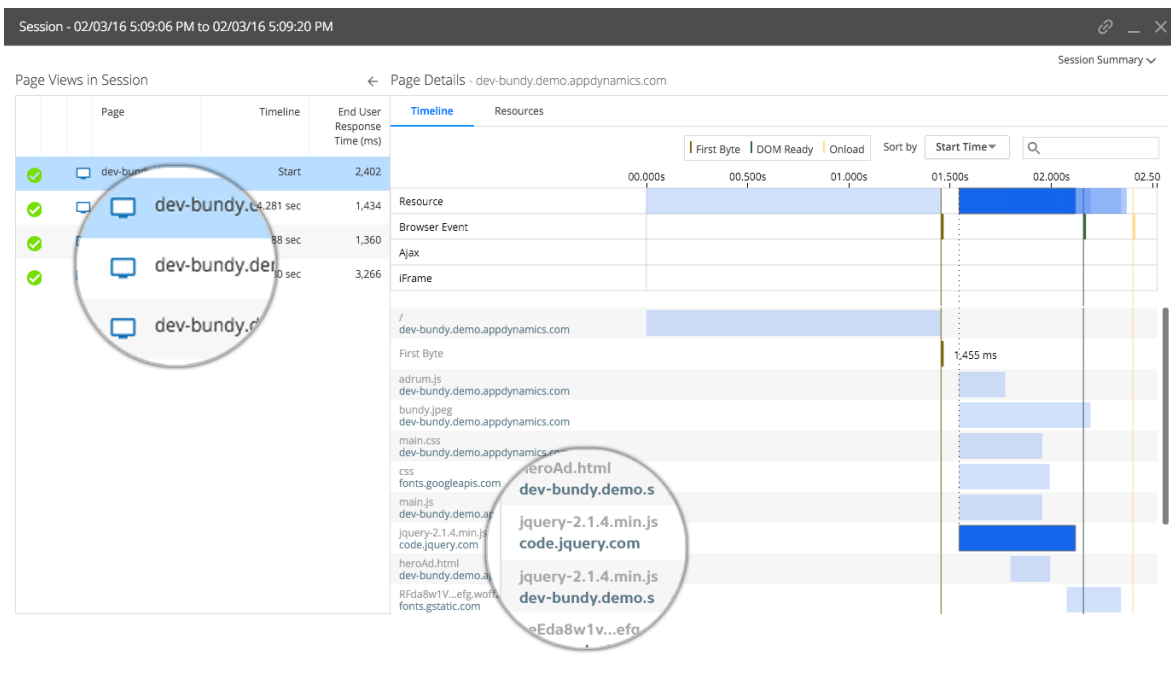
Understand end-user experiences across the globe, in real-time.



# How do I fix what's broken?

## Page Diagnostics

- Page Performance
- Resource Load Time
- Real User Sessions

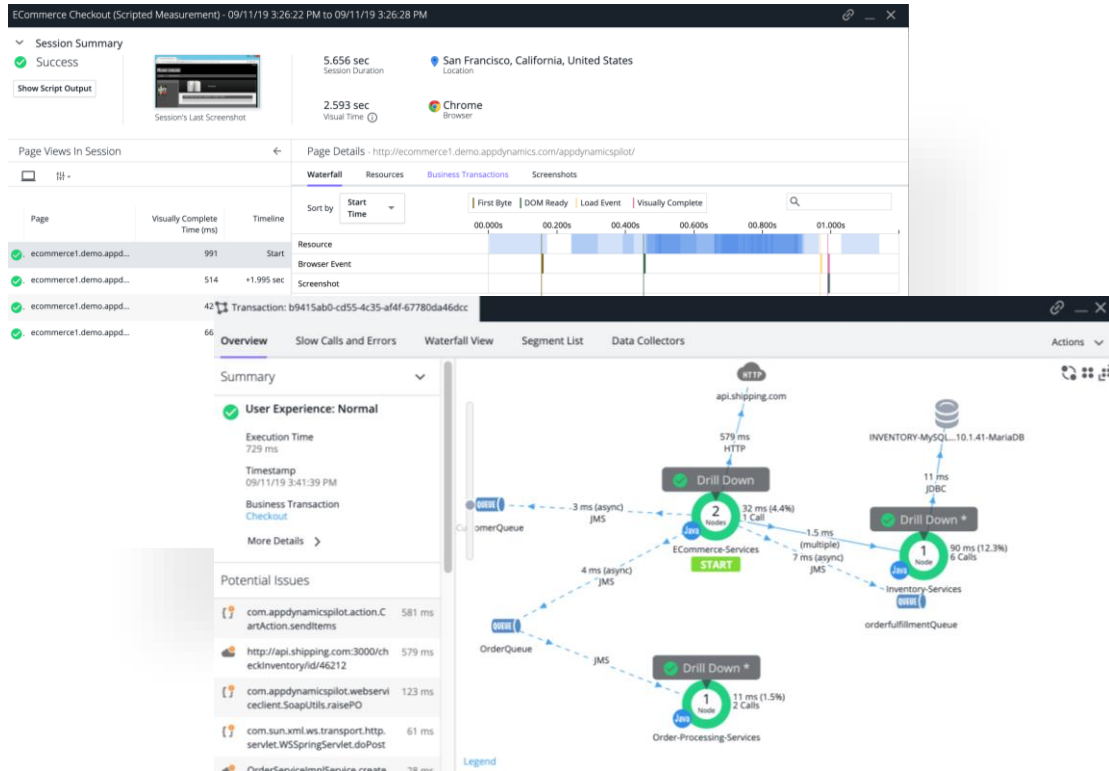


Optimize the end-user experience with browser app performance metrics and real user session playback.

# How do I determine if a performance problem is caused by a front-end or back-end issue?

## Fullstack Correlation

- Session and Page Performance
- Discover Business Transactions for end-to-end Visibility
- Fully Correlated Back-end Snapshots

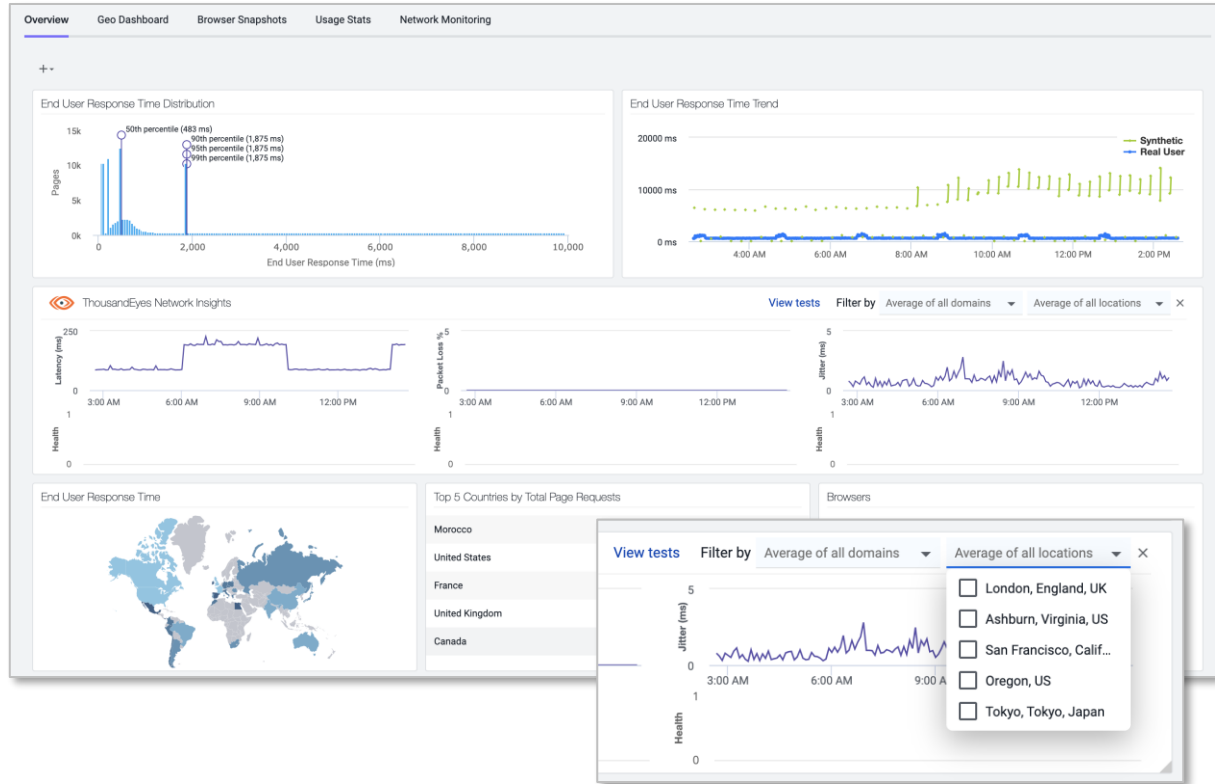


Quickly resolve end user performance issues with correlated back-end snapshots

# How do I see if the problem is the network?

## Integration with ThousandEyes

- Network metrics for web-page resources
  - Latency
  - Loss
  - Jitter
- Filter through resources or locations
- Contextual click-through to ThousandEyes portal



Quickly resolve end user performance issues with correlated back-end snapshots

# Browser Synthetic Monitoring Solution

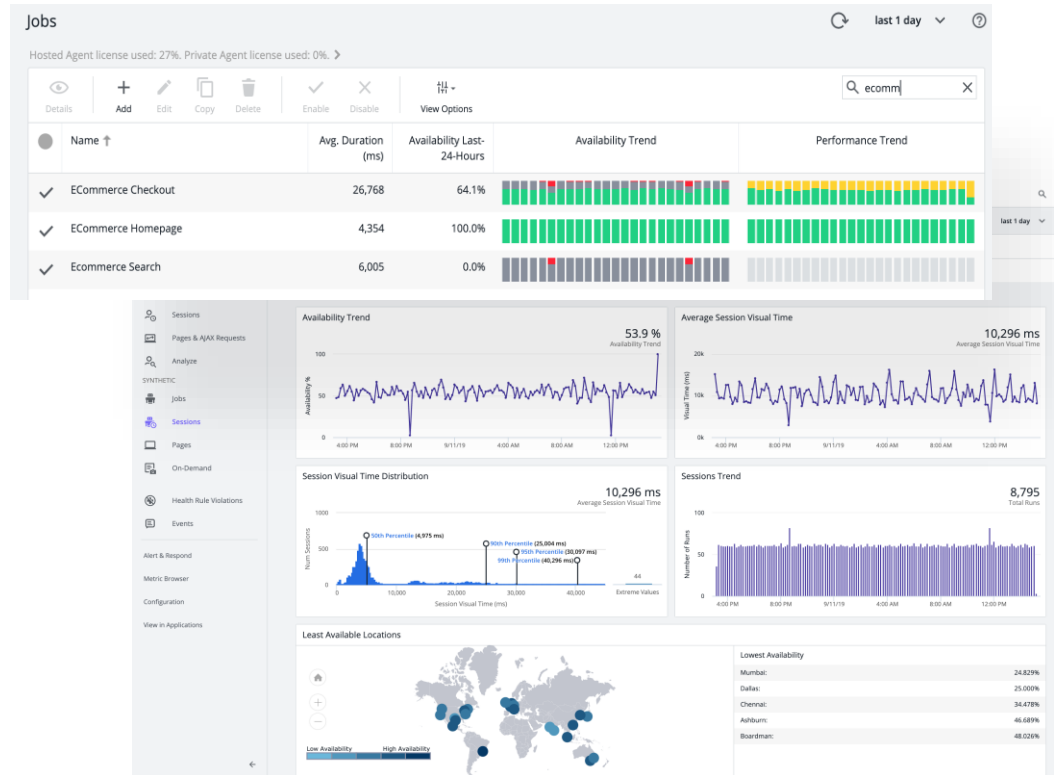
Identify and resolve experience issues in browser-based applications before they impact users.



# How do I ensure the performance of my key user journeys?

## Browser Synthetics

- 24x7 Availability & Performance Monitoring
- Geographically Distributed Agents
- Synthetic Scripting – Simulate Real-user Workflows

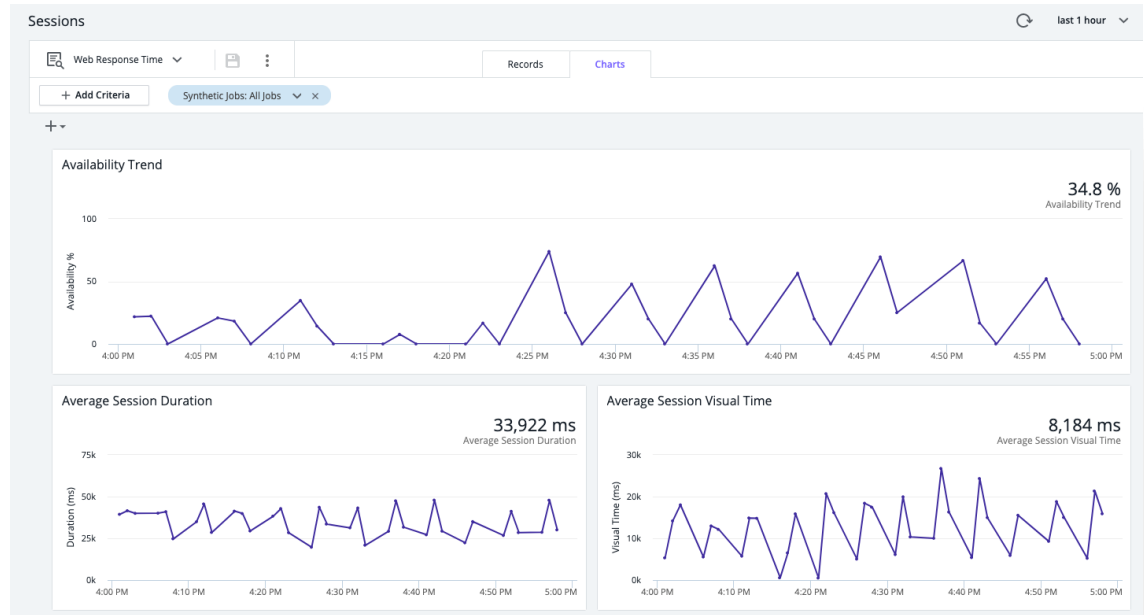


Continuously verify the health of key user journeys

# How do I know if user experience is degrading?

## Performance/SLA Management

- Baseline User Experience over Time
- Smart Alerting and Retesting
- Real Browser Response Times

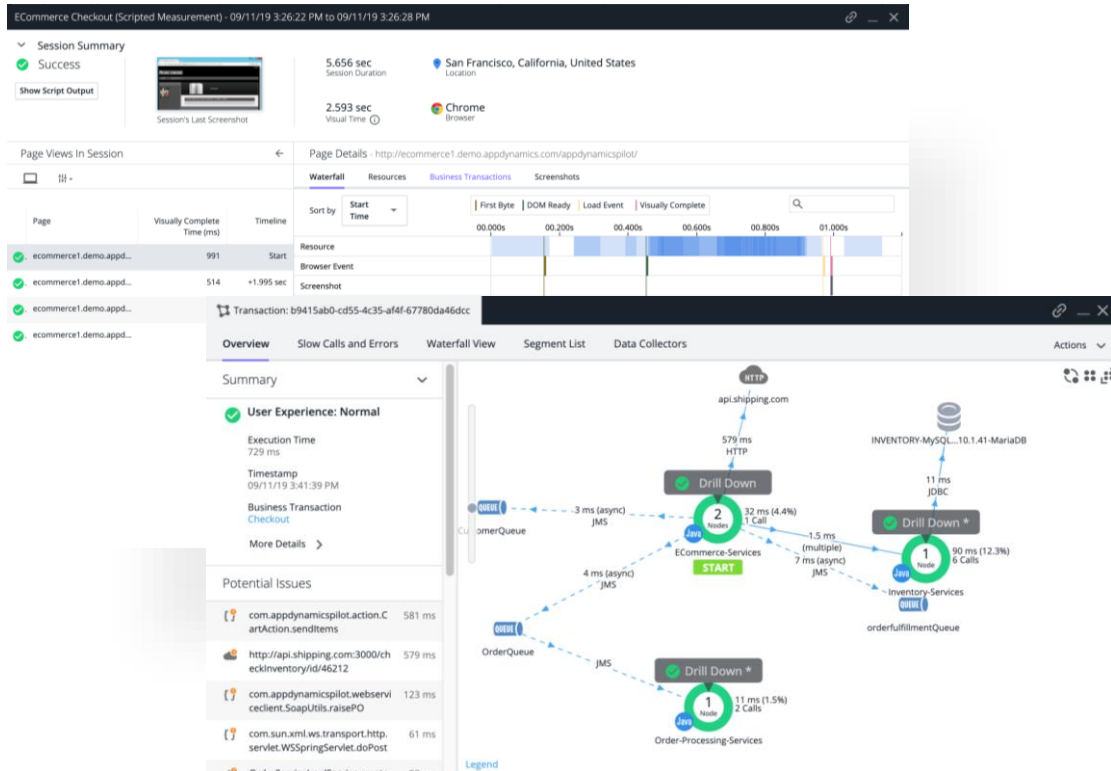


Proactively address degradation in user experience

# How do I determine if a performance problem is caused by a front-end or back-end issue?

## Fullstack Correlation

- Session and Page Performance
- Discover Business Transactions for end-to-end Visibility
- Fully Correlated Back-end Snapshots



Quickly resolve performance issues with key user journeys with correlated back-end snapshots

# Mobile End User Monitoring Solution

Prevent, identify, and resolve end-user experience  
issues in mobile applications.

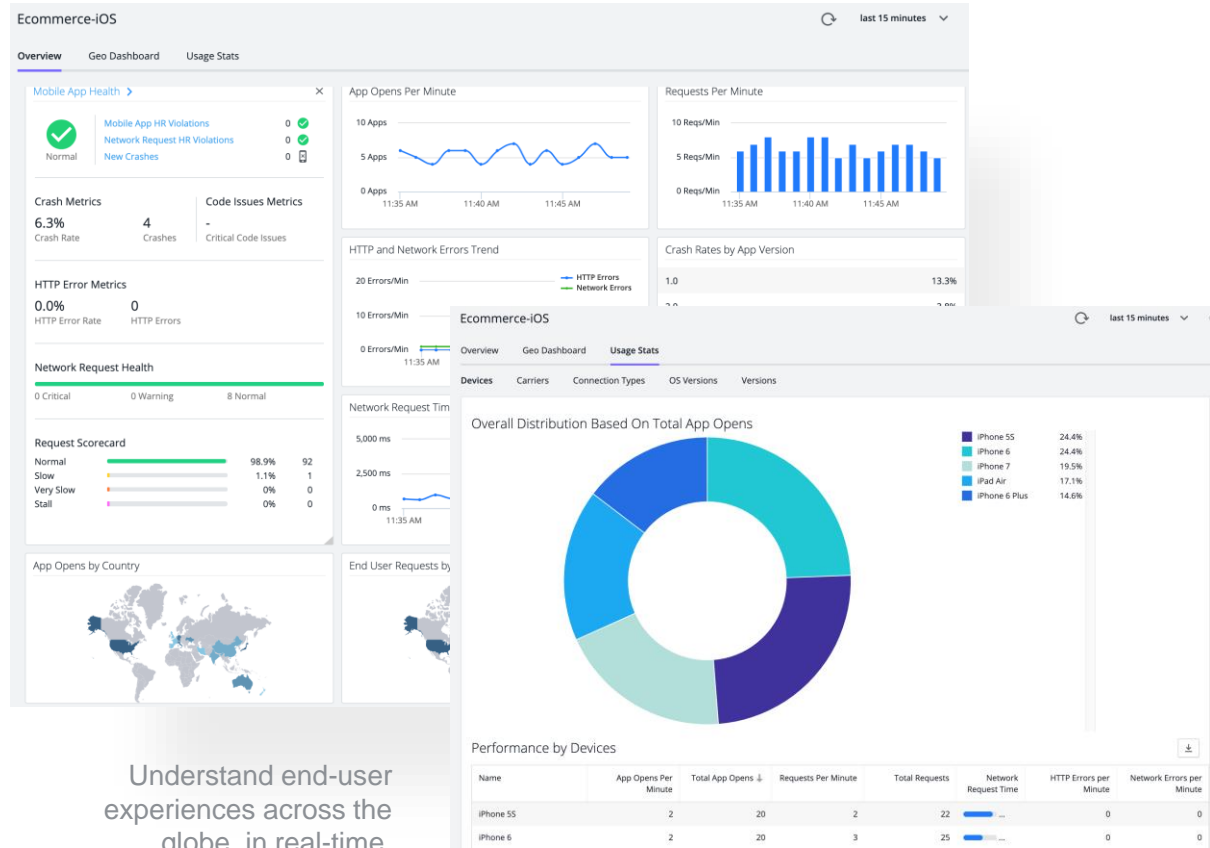




# How do I monitor my mobile applications?

## Mobile Visibility

- Lightweight Agent
- Realtime Performance Data
- Segmentation



Understand end-user experiences across the globe, in real-time.

# How do I fix what's broken?

## Session Diagnostics

- Session Timelines
- Network Requests
- Screen Snapshots

The image displays a mobile performance monitoring interface. The top section shows a session timeline for 'Session - 09/18/19 12:37:19 PM to 09/18/19 12:37:41 PM'. Below this is a detailed view of the session with a timeline and a table of events. The table includes columns for Start Time, Duration, Type, Description, and Additional Details. The events listed are a Screenshot at 12:37:28.854 PM and a Touch event at 12:37:28.933 PM. On the right side, there is an order summary for 'COMFORT BLAZER' by 'APDY'. The order is billed to Patrick Smith, a Mastercard user. The order summary shows a quantity of 1, a price of £235.00, shipping of £4.95, tax of £28.18, and a total of £268.13. An 'ORDER' button is visible at the bottom of the order summary.

Session - 09/18/19 12:37:19 PM to 09/18/19 12:37:41 PM

Timeline Session Summary Business Transactions

View Options

12:37:19 PM 12:37:22 PM 12:37:25 PM 12:37:28 PM 12:37:31 PM

Session - 09/18/19 12:37:19 PM to 09/18/19 12:37:41 PM

Timeline Session Summary Business Transactions

View Options

12:37:19 PM 12:37:22 PM 12:37:25 PM 12:37:28 PM 12:37:31 PM

Network Requests

Network Requests Normal

Custom Data

Metrics

Timers

Info Points

System Events

Connection Transition

General

Screenshots

Start Time ↑	Duration	Type	Description	Additional Details
09/18/19 12:37:28.854 PM	-	📷 Screenshot	Screenshot Event	
09/18/19 12:37:28.933 PM	-	👆 Touch	Touch Event	

Billed to

Patrick Smith

\*\*\*\*\*5100 mastercard

Order Summary

COMFORT BLAZER

Size **52**

Qty **1** **£235.00**

SHIPPING **£4.95**

TAX **£28.18**

TOTAL **£268.13**

ORDER

Optimize the end-user experience with mobile session performance metrics

# How do I fix what's broken?

## Performance Diagnostics

- Crash Reporting
- Mobile Stack Traces

The screenshot displays a web-based crash reporting interface. At the top, there is a navigation menu with options: Home, Applications, User Experience (selected), Databases, Servers, Analytics, Dashboards & Reports, and Alert & Respond. Below the navigation, the main heading is "Crashes", with sub-sections for "Crash Dashboard" and "Analyze".

The "Summary Crash Trend" section shows a "Crash Summary" with the following data:

- Total Crashes: 6
- Impacted Users: 6
- Shared.m in Line Number: 108
- Crashed File: SKISEGV
- Exception Name: SDK Runtime

A "Crash Trend" graph shows the number of crashes per minute over a period from 3:40 PM to 4:30 PM. The graph indicates 2 crashes per minute at 3:45 PM, 3:50 PM, 4:00 PM, and 4:05 PM, and 1 crash per minute at 3:40 PM and 4:10 PM.

The "Stack Trace at 08/19/19 3:34:49 PM" section shows a list of stack frames for "Thread 0 crashed":

Address	Module	Offset	Symbol
0-2	libsystem_platform.dylib - libsystem_c.dylib	0x35b09978 - 0x35a18a00	_platform_mempmove - _strcpy_chk
3	ECommerce-iOS	0x000e0fe	add (Shared.m - 108)
4-18	UIKit - UIKit	0x27951c06 - 0x2798218a	-[UIApplication sendAction:to:from:for:Event:] - UIApplicationMain
19	ECommerce-iOS	0x000e0d5a	
20	libdyld.dylib	0x359a1870	start

Below the stack trace, there are sections for "Thread 1", "Thread 2", "Thread 3", and "Thread 4", each with a right-pointing arrow indicating they can be expanded.

On the right side of the stack trace, there are sections for "Properties", "Events Prior to Crash", and "User Data". The "Events Prior to Crash" section shows a list of events:

Time	Event
3:34:45 PM	ChangeAddressView
3:34:37 PM	SettingsView
3:34:32 PM	CartView
3:34:25 PM	ListView
3:34:21 PM	LoginView

The "User Data" section shows "No data available".

Correlate crash events with user sessions to understand the cause of a crash and how to reproduce it.

Automatically capture stack traces to pinpoint code issues.

# How do I determine if a performance problem is caused by a front-end or back-end issue?

## Fullstack Correlation

- Session Diagnostics
- Discover Business Transactions for end-to-end Visibility
- Fully Correlated Back-end Snapshots

The screenshot displays a performance monitoring tool interface. At the top, it shows the session ID and time range: "Session - 09/18/19 12:20:57 PM to 09/18/19 12:21:27 PM". The main view is a "Timeline" showing a sequence of business transactions: Unknown, LoginView, ListView, CartView, SettingsView, ChangeAddressView, and CheckoutView. Below the timeline, there are sections for "User Interactions" (Text Fields, Touches), "Errors And Warnings" (Crashes, Network Requests), and "Custom Data" (Metrics, Timers). A table lists the transactions with their start times and durations. A specific transaction is highlighted: "Transaction: f6ce7e6d-11e9-4498-a694-e7020bf8771d" with a duration of 4,166 ms. The detailed view for this transaction shows a "User Experience: Error" with an execution time of 4.2 s. The error message is: "com.appdynamics.pilot.persistence.ItemPersistence : Critical transaction Error, rolling back changes....". Below the error message, a SQL query is shown: "SELECT COUNT(1) COUNT FROM ITEM IT1, ITEM IT2". To the right, a "Waterfall View" diagram shows the transaction flow starting from "START" (ECommerce-Services) and ending at "XE-Oracle-ORACL...4bit Production". The diagram includes a "Drill Down" button and a "2 Nodes" indicator.

Quickly resolve end-user performance issues with correlated back-end snapshots

# SmartLook Acquisition

Expanding User Experience Monitoring Capabilities



# How do I know where my users struggle? How they really use the application?

## Application Screen Recording

- Web and Mobile
- Customizable privacy adherence
- Live replay, including issues information
- Very efficient data format for transport and storage

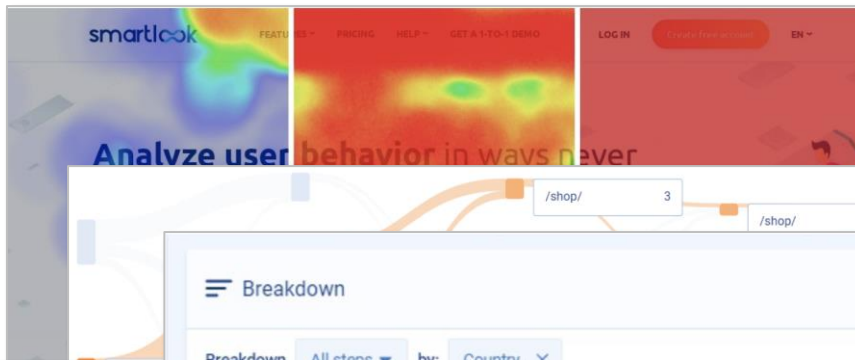
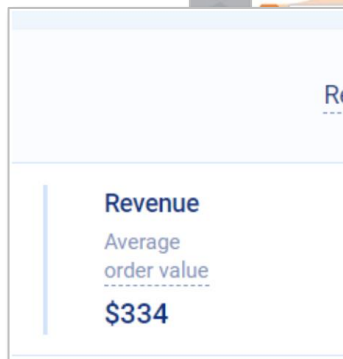
The image displays a multi-layered view of a user's session on the Smart Cinema website. On the left, a sidebar provides user information for 'calexnorman@gmail.com', including active sessions, dimensions, and user ID. The main browser window shows a shopping cart with items like 'Blade Runner 2049' and 'Green Room', and a checkout page with a 'YOUR ORDER' summary. A bottom overlay shows a timeline of user interactions with a red error message: 'Uncaught TypeError: Cannot read properties of null (reading 'a')'.

See the user interactions as they happened.

# How can the application improve? What are the business results?

## Strong Analytical Tools

- See what attracts users, and what's hidden in plain sight
- See how users navigate the application
- Analyze collected data at scale
- Derive business metrics



Breakdown

Breakdown All steps by: Country

Country	Conversion rate	Click on Select Package	Pay now Button
United States	65.71%	35	30 (85.71%)
Brazil	42.86%	14	10 (71.43%)
Spain	63.64%	11	9 (81.82%)
Germany	77.78%	9	9 (100%)
Canada	37.5%	8	5 (62.5%)
United Kingdom	75%	8	6 (75%)
France	71.43%	7	6 (85.71%)
Poland	42.86%	7	3 (42.86%)
Israel	50%	6	5 (83.33%)
Australia	100%	5	5 (100%)

See the user interactions as they happened.

# ThousandEyes

Expanding User Experience for SaaS Applications

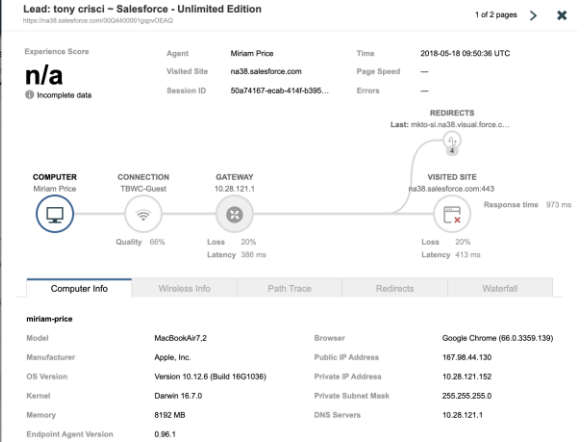
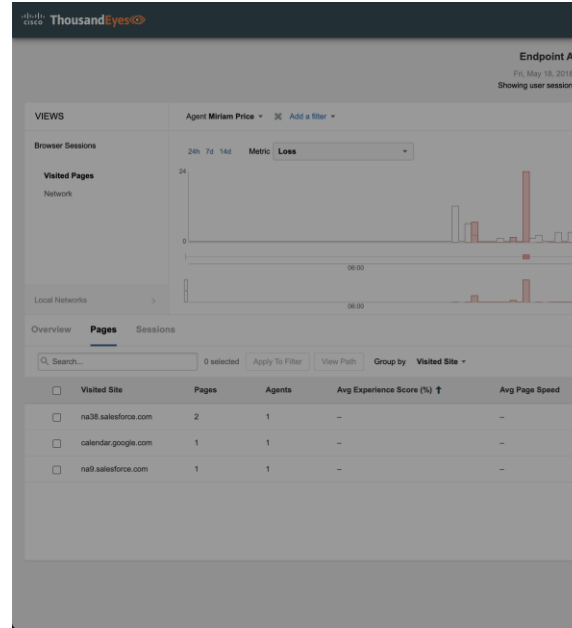




# What is experience of my users? And Why?

## Endpoint Agent + Browser Sessions

- See user's PC resources, network metrics, and application behavior in one place
- Quickly decide what is the issue
  - WiFi
  - Network
  - Application
  - PC resources



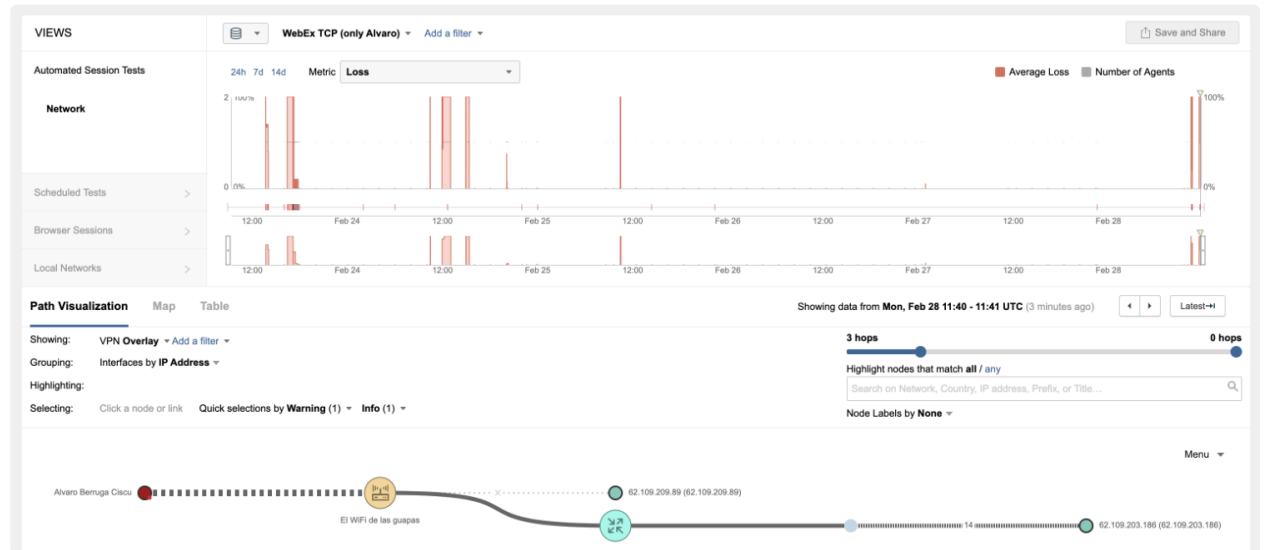
Gmail - <https://qevzfkev.share.thousandeyes.com/>  
Salesforce - <https://dxkptgf.share.thousandeyes.com/>  
WiFi - <https://tspng.share.thousandeyes.com/>

# What is quality of my MS Teams calls? Or WebEx?

## Endpoint Agent + Automated Session Tests

- Periodic testing of services behind MS Teams, Cisco Webex, and Zoom
- See network metrics, user experience, and voice call quality for live conversations

Scheduled Tests	Automated Session Tests	Test Labels				
Add a filter ▾						
<input type="text" value="Search..."/> 15 tests <span style="float: right;">Add New Test</span>						
🗑️ 45 deleted tests						
Test Name	Application	Last Modified ↓	Assigned Agents (24h)	Prioritised	Enabled	
	Microsoft Teams	2 hours ago	–	<input type="checkbox"/>	<input type="checkbox"/>	...
	Webex	2 hours ago	–	<input type="checkbox"/>	<input type="checkbox"/>	...
	Webex	20 hours ago	1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	...
	Microsoft Teams	20 hours ago	1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	...





The bridge to possible

Thank you

