

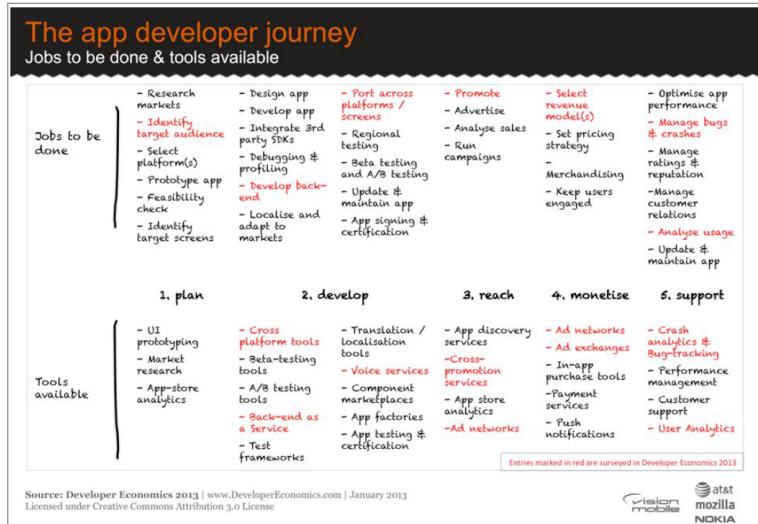
Strategy & Insights Team

The App Developer Experience

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The goal of this report is to give teams even more insights to help them support app developers



Market research provides us with the context:

- Key elements and process of the developer journey
- Tasks performed by app developers at each stage (JTBDs)
- Preferences and motivations of different types of app developers

User research provides us with the stories:

- How developers interact with people, tools, resources at each step of the way
- Emotions and cognitive frames that influence decision-making
- How Mozilla can help

LEARNING

LET THE EXPERTS
GUIDE ME

MORE EVANGELIST
EVENTS

CHRISTIAN IS
THE BEST

WRITE MORE
BOOKS

MON IS THE
BIBLE FOR
DOCUMENTATION
ABOUT HTML5,
JS

HAVE MORE
DEV EVENTS
THAT WALK
THROUGH PROCESS
OF BUILDING FFOS
APPS

KEEP ME ON THE
BLEEDING EDGE

MORE MOZILLA
TWEETS ON
LEARNING OPS
+TOPICS

PUT MORE
ON TWITTER

ARTICLES ON
MOZHACKS A/B
TESTING +
TOOLS ARE
GREAT

VIDEOS
MEET UPS
HTML5 CONFERENCES

FREE UP MY
MEMORY (for problem
solving)

DON'T SWITCH OF
MDN!
+ WELL DESCRIBED
JS APIs

MORE DOCS +
EXAMPLES FOR
FFOS DEVICE APIs
THAT ARE EASILY
DISCOVERABLE

MORE
DOCUMENTATION
ON WEBGL +
SLIDERS

MORE PLATFORM-
SPECIFIC INFO
ON MDN

HELP ME RECOVER
FROM A CRISIS

HELP WITH
APPROVALS IN
STORES

GIVE ME A
PERSON TO TALK
TO WHEN I NEED
HELP DURING RELEASE/
WORKING WITH NEW
TECH

CLEAR + ACCURATE
FEEDBACK ON HOW
TO REVENGE SHOOTOUT
IF REJECTED FROM
STORE

A WAY TO
AUTOMATE REVIEW
PROCESS FOR
CRITICAL BUG FIXES
(even willing to
PAY FOR THE SERVICE)

ANTICIPATE ERRORS
BEFORE SUBMISSION

INFO ON
RELEASE BOST
PRACTICES

CREATE A WAY TO
GET Beta LIGHTLY
VERSIONS OF MY APP TO
DISTRIBUTION
CHANNELS

CREATE A CHECKLIST OF
HELPFUL THINGS
APP DEV SHOULD
THINK ABOUT BEFORE
UBLISHING THEIR APP

DISTRIBUTE PRE-RELEASE
VERSIONS

INSPIRE ME TO START
BUILDING

push technical boundaries

INCENTIVES DEV'S
WHO'S ALREADY
MADE AN APP TO
TRY + INCORPORATE
NEW TECH INTO IT
(esp. DEVICE APIs)

MAKE SURE THERE'S
EXCITING TECH
FOR DEVELOPERS
TO PLAY WITH +
COMMUNICATE IT
WELL

INTEGRATE THE
WEB BETTER W/
THE PHONE INSTEAD
OF CREATING "APPS"
THAT BEHAVE JUST
LIKE OTHER PLATFORMS

MAKE SURE USERS
+ DEV'S
UNDERSTAND WHY
FFOS IS DIFFERENT
(FROM IOS ETC)

BUILDING
OFFER THOUGHTFUL TOOLS
THAT SUPPORT MY PROCESS

UNPACK
TOOLS
MORE!

MOZILLA'S DEV
TOOLS UI IS
NOT AS INTUITIVE
AS CHROME'S
(SEE LIST OF
IMPROVEMENTS)

PROVIDE BETTER
TOOLING FOR
DEV'S

HAVE A TOOL TO
COMPARE MY SITE
ON DIFF SCREEN
SIZES AT THE
SAME TIME

CREATE A GOOD
TOOL FOR ANDROID
(NATIVE)
DEVELOPMENT

DIFF BETWEEN
FIREFOX +
FIREBUG IS
CONFUSING

A PROPER THAT
HELPS DEBUG
MEMORY LEAKS

access

COULD NOT BUY
A FFOS PHONE
TO BE ABLE TO
TRY DEVELOPING
FOR IT!

RELEASE BETTER
PHONES!

GIVE ME
A PHONE

hacking made easy

MAKE IT EASY
AND FAST TO
GO THROUGH
THE BUILDING
PHASE

MAKE WORKING
WITH SIMULATORS
EASIER

MAKE FFOS
MORE FRIENDLY

HAVE A CLEAR
ROADMAP FOR FFOS
THAT YOU CAN
COMMUNICATE W/
DEVS + STICK TO

HELP ME ITERATE MY PROCESS

MORE ARTICLES
ON TOOLS

MORE TOOL
REVIEWS

IN DEVELOPMENT
PROCESS

Gathering Insights

We spoke to 12 mobile app developers in two different locations about what they do and why

Bay Area, California



P1



P2



P3



P4



P5



P6

Warsaw, Poland



P7



P8



P9



P10



P11



P12

Our participants were all porters within different developer segments from past market research¹

Hobbyists



Explorers



Opportunists



Contractors



VC Funded



Brands
Media



¹ The only segment we didn't talk to was "Corporate IT", which is not one of our main target markets. "Brands" and "Media" are two different segments, but the participant we interviewed had experience in both. Some participants can be classified under multiple segments based on their professional and personal work, but we only placed them under the segment that we focused on discussing during the interview.

We asked about four different aspects of their development process



Learning



Building



Releasing



Then What?

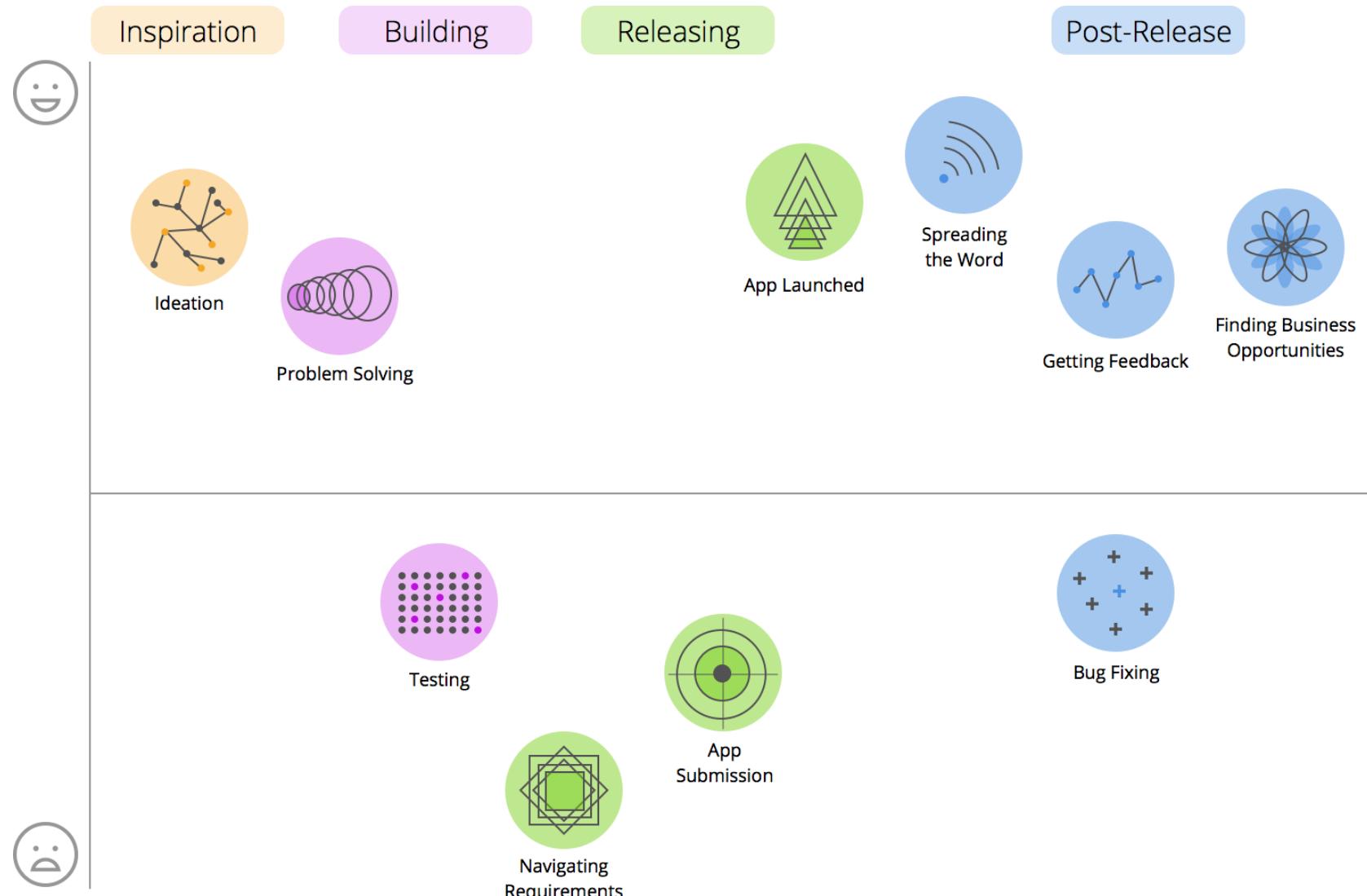
We talked about stories of their first app, what success means, and how to be successful



"I really like seeing users use my apps. Especially when I meet complete strangers who tell me: 'you made this app? I use it everyday!'"



Ultimately, we created an experience map to help us better understand the app developer journey



And discovered the following core insights about the app developer experience:

- 1 App developers **learn** in different ways throughout their experience and thus need different kinds of resources at each phase
- 2 The process of **releasing** an app on an app store is an emotional low unlike releasing it on the Web
- 3 By helping developers feel successful **post-release**, Mozilla can inspire them to continue creating for the Web and FirefoxOS
- 4 By emphasizing the Web's rich ecosystem that's everywhere, we can inspire more app developers to **build** for it



Learning throughout the journey

Developers see Mozilla and Mozillians as trusted sources of information



“Every time I have to research, I always start with MDN... Because you guys are the bible of Javascript. I will always start with that as a reference.”

“One of the two blogs I check every day is Hacks Mozilla because there’s a lot of news there that’s not available on other services.”



“There are lots of people working for Mozilla that share information... if they put something, on Twitter for example, I will have to check it because it has to be something interesting.”

App developers learn *throughout* their journey using different kinds of resources at each phase

Phase	Mode of Learning	Sample Sources
Inspiration	Ambient Learning for learning's sake or for future inspiration	Hacks Blog , Twitter, developer / platform blogs, mailing lists, meetups & conferences, introductory videos, HackerNews , Reddit, gurus
Building	Practical Learning in order to solve a problem or accomplish a task	MDN , writing code, search, Stack Overflow, specs & documentation, sample code & snippets, Github
Releasing	Experimental Trial & error; Learning through others' and your own past experiences	FirefoxOS developer device , QA & testing, release checklists, code reviews, app submission process, device testing
Post-Release	Observational Learning from feedback and observed patterns	Marketplace , user reviews & feature requests, analytics, bug & crash reports

Ambient learning: Learning for learning's sake

Developers love to learn about new technology because it inspires them to make more cool things. They create systems for themselves and identify trusted sources that ensure they're always in the loop.



"I've built a Twitter base that is good enough for me... I'm not going anywhere for the knowledge; The knowledge is already finding me. But you have to build it first-- right now, it's tailored for me."



"It's very important to keep learning. If you're standing in place, you simply stay behind."

Mozilla can help developers by:

- Encouraging Mozilla developers to participate (informally) in local community gatherings such as meetup groups and book clubs
- Frequently posting new material on blogs and Twitter, writing more books about Javascript (from the experts)
- Sharing resources that Mozilla developers trust

Practical learning: Learning in order to build

Developers encounter issues while building their app which prevent them from continuing. They must find practical information and answers that they can immediately apply to the problem at hand.



"We're a small team; we have to move fast. I wish I had time to master Firefox developer tools but I don't know what benefits it will give me today since I'm already pretty fluent with Chrome developer tools."

Mozilla can help developers by:

- Hosting creative challenges that incentivize developers to take on new technical challenges such as developing high-performance apps on low-end hardware
- Incorporating features that provide developers with immediate feedback in their developer tools
- Providing small, interactive examples that developers can play with and look at the code for
- Making it easy for developers to switch from one set of developer tools to another

Experimental learning: Learning to reduce anxiety

Releasing an app comes with many unknowns, such as undiscovered bugs and changing store requirements. Developers rely mostly on experience to anticipate problems during the release.



"The hardest part is testing a game on various devices, many of which I don't own. I assume it will work, but I don't always know."

Mozilla can help developers by:

- Documenting or reducing the number of device-specific bugs that might surprise a developer in the field. We can also provide ways for developers to report these bugs or share this knowledge with their peers
- Providing ways for developers to share their experiences with platform or device-specific idiosyncrasies with others
- Developing a side-by-side comparison of what an app looks like on different screen sizes
- Documenting all the different app store requirements in one place
- Creating tools that allow a developer to submit the app to multiple app stores automatically without having to manually refer to different app store requirements

Observational learning: Learning through feedback

Developers want to improve their app so that they can attract new users and keep existing ones. Once an app is released, they pay attention to user reviews and analytics to get information about bugs and feature requests.



"That app is my baby... I read comments on the stores, mostly on Google Play because it's easy to communicate with them via G+ or Facebook. So when I heard that someone has a problem with our app, then I find him or her and ask them to explain it to me. I want my app to be the best."

Mozilla can help developers by:

- Making it easy for developers to get feedback about their app in one place, even if it's in multiple app stores.
- Helping developers get in contact with customers / allowing users to file bugs on apps so that they can improve the app.
- Giving developers ways to connect with their customers who don't speak the same language that they do.

How can Mozilla help a developer evolve by learning at every stage of the journey?



Let Mozilla's expertise guide me

"I don't see Mozilla at a lot of Javascript meetups. The Chrome Evangelism Team does a great job of getting out there and teaching new things... Firefox needs to do that more."



Increase my ability to learn by building

"Learning is time-consuming. We have limited resources, so sometimes I feel that I just don't have enough time... If it's not very important, I have to skip it. It's hard to learn and stay up to date because there are so many things to learn."



Be the experience I can learn from

"For websites, someone has written a Web development checklist for smart things you should check before releasing your app... just good defaults for things. Someone should make a mobile checklist of things to do on mobile."



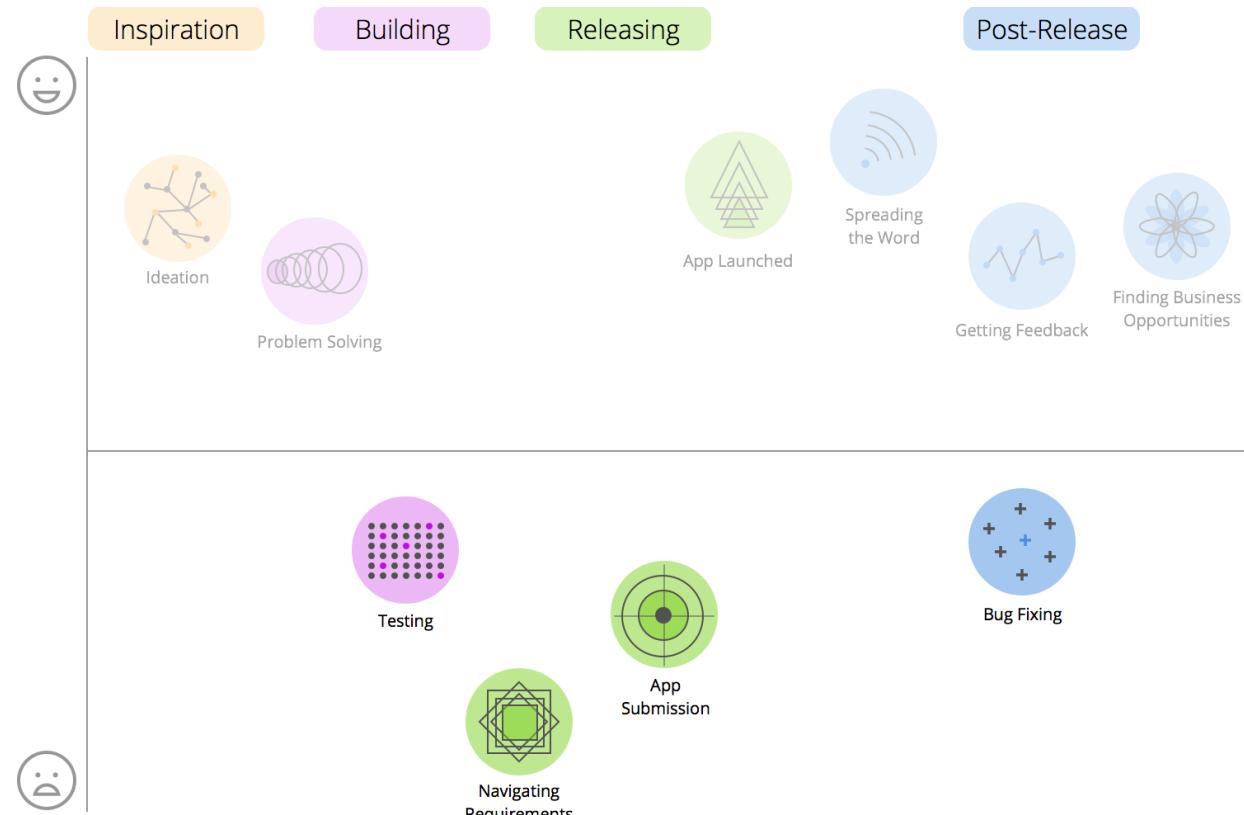
Deepen my understanding of my customers

"I like measuring progress and performance and displaying it in one concrete report, but it takes a lot of time to recreate... Mozilla can create a tool to automate the process and make diagrams in a form I can show customers."



The emotional low of releasing an app

The process of releasing an app to an app store is a low point for developers



[Releasing an app] is stressful because I'm worried I didn't get it all right and will break people's experiences"

Developers see the release process as a tedious barrier that prevents them from reaching users

Thinking



"I'd even consider paying for a priority list only to make sure that my users have the best available content."



"Being on multiple platforms gives me a better chance of being picked up."

Saying



"Submitting an app is like doing your taxes."



"Releasing is a necessary evil. It's nerve-wracking, but I have to do it."

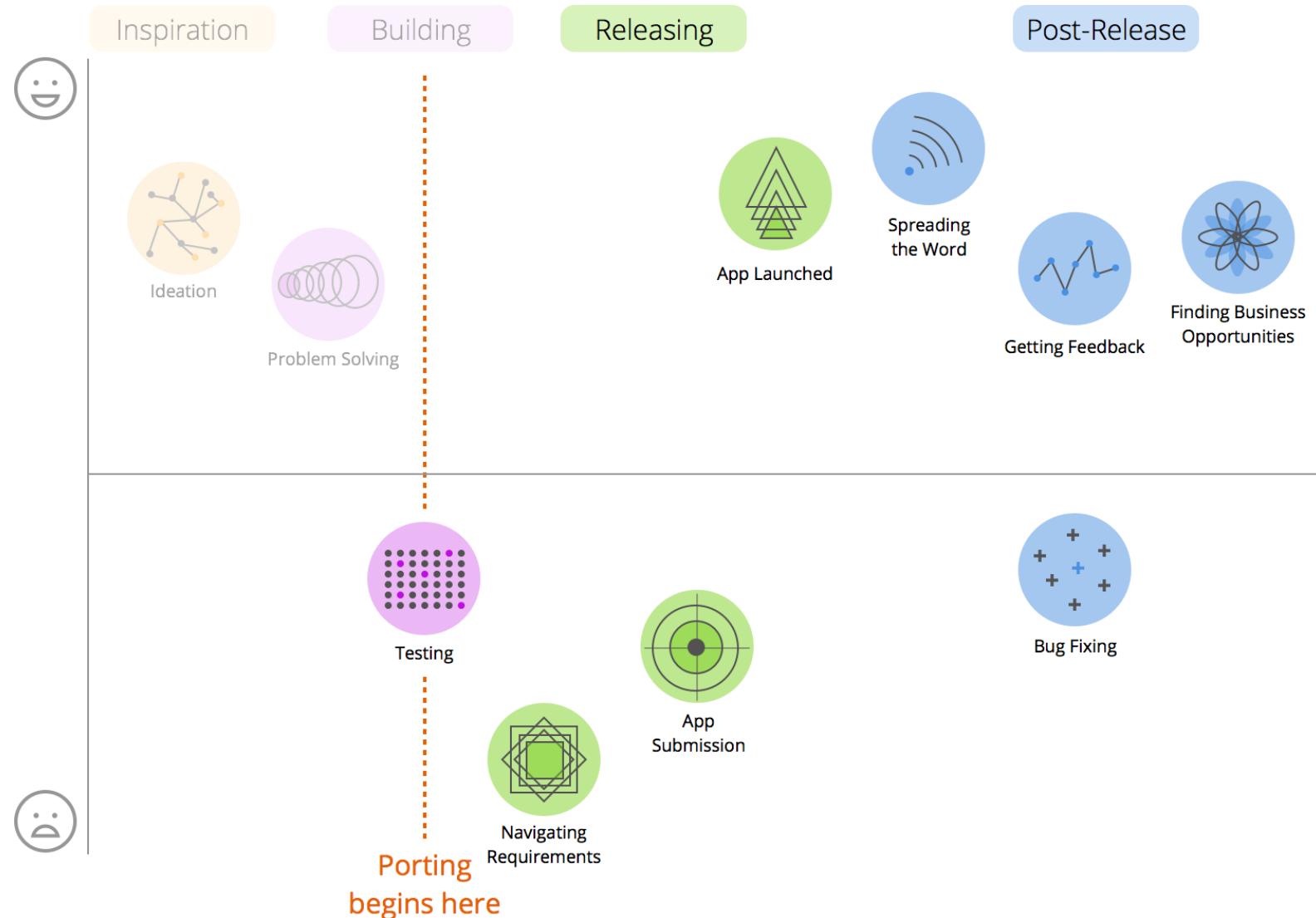
Feeling

- **Anxiety** about whether the app will be submitted and whether it'll break anything
- **Frustration** at meeting the variety of requirements each store has
- **Relief** when the app is accepted into the app store

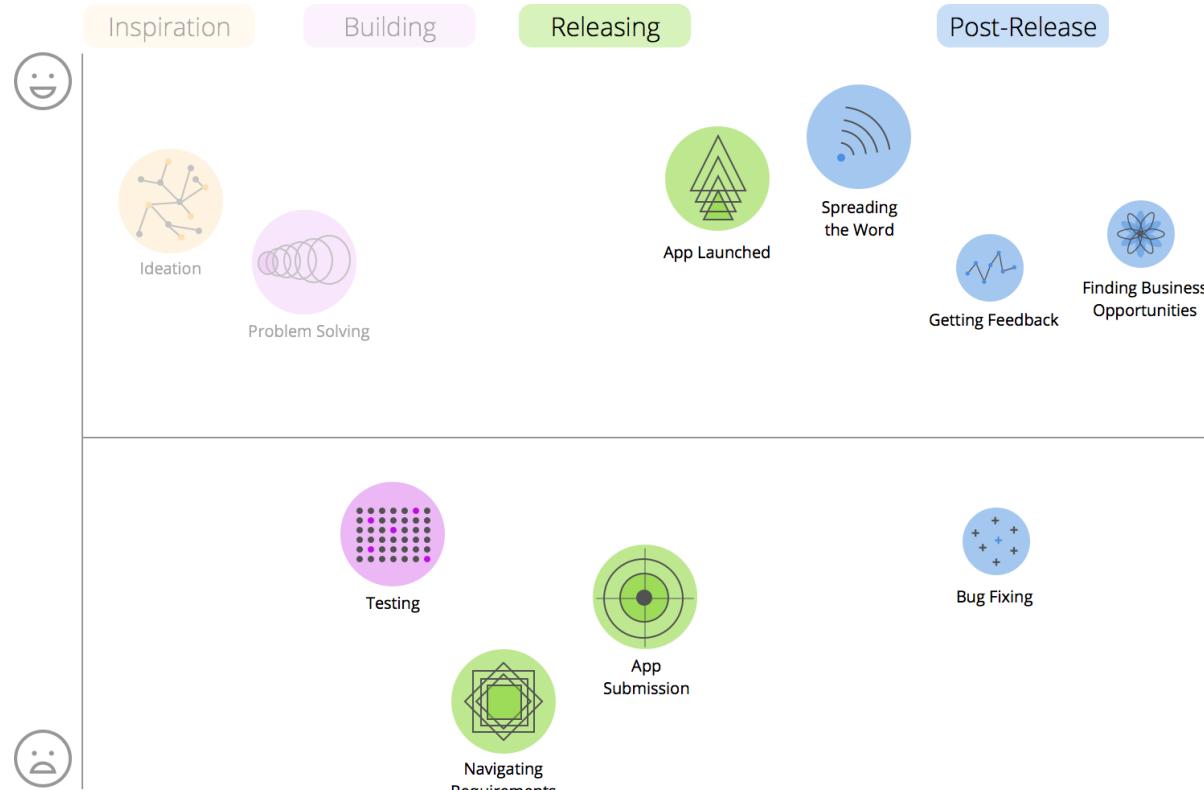
Doing

- Using cross-platform porting tools
- Rewriting parts of the app to make it more performant on lower-end devices
- Per store: taking different-sized screenshots and writing descriptions
- Submitting their app on multiple platforms

Unfortunately, the release process is also where many app developers first engage with FirefoxOS



A great release experience is critical because FirefoxOS still lacks developer value post-release



"As far as I know, too few people use [FirefoxOS]. And [the company] prefers us to focus on other platforms."

Whereas other platforms¹ offset a stressful release experience through post-release incentives

	Stressful release process	Post-release incentives
iOS	<ul style="list-style-type: none">• XCode is painful to use for packaging apps• Long app approval process• Difficult to revert to an older version if the new version is unstable	<ul style="list-style-type: none">• Prestige of being in the Apple store• Revenue potential
Android	<ul style="list-style-type: none">• Device fragmentation makes testing very difficult• Setting up the SDK takes a long time• Different Android stores have different submission requirements	<ul style="list-style-type: none">• Powerful developer ecosystem (e.g. versioning, analytics dashboard, payments, ads)• Large # of users on the platform

¹ We didn't talk with enough developers who had experience releasing apps to other app stores (besides iOS and Android), so we didn't include these platforms here.

The good news: The Web already has a model that addresses issues with the app release process

Developers hate	The Web offers
The long app approval process	Control: Developers don't have to wait before the Web app is updated
Device fragmentation (because they have to test on multiple devices)	Standardization: The Web (almost always) works on all devices
Having to learn and use each platform's tools to release the app	Flexibility: Developers are free to choose the tools that they like
Being constrained by the app store's policies for releasing an app, displaying it in the app store, monetization, etc.	Freedom: The Web has no restrictions (except legal ones) for how a developer can release an app



[The Web] is awesome. It provides flexibility... You can do whatever you want and nobody stops you from that."

How can Mozilla empower developers to get great products to their users sooner?



Help me recover from a crisis

"We made a small mistake and we had to take the app out of the [Apple] store but it was difficult. We even tried calling Cupertino. You pay for a developer subscription but there's no one to help you. Apple on the outside is great, very beautiful, but on the inside, it's very poor."



Make my desire to scale effortless

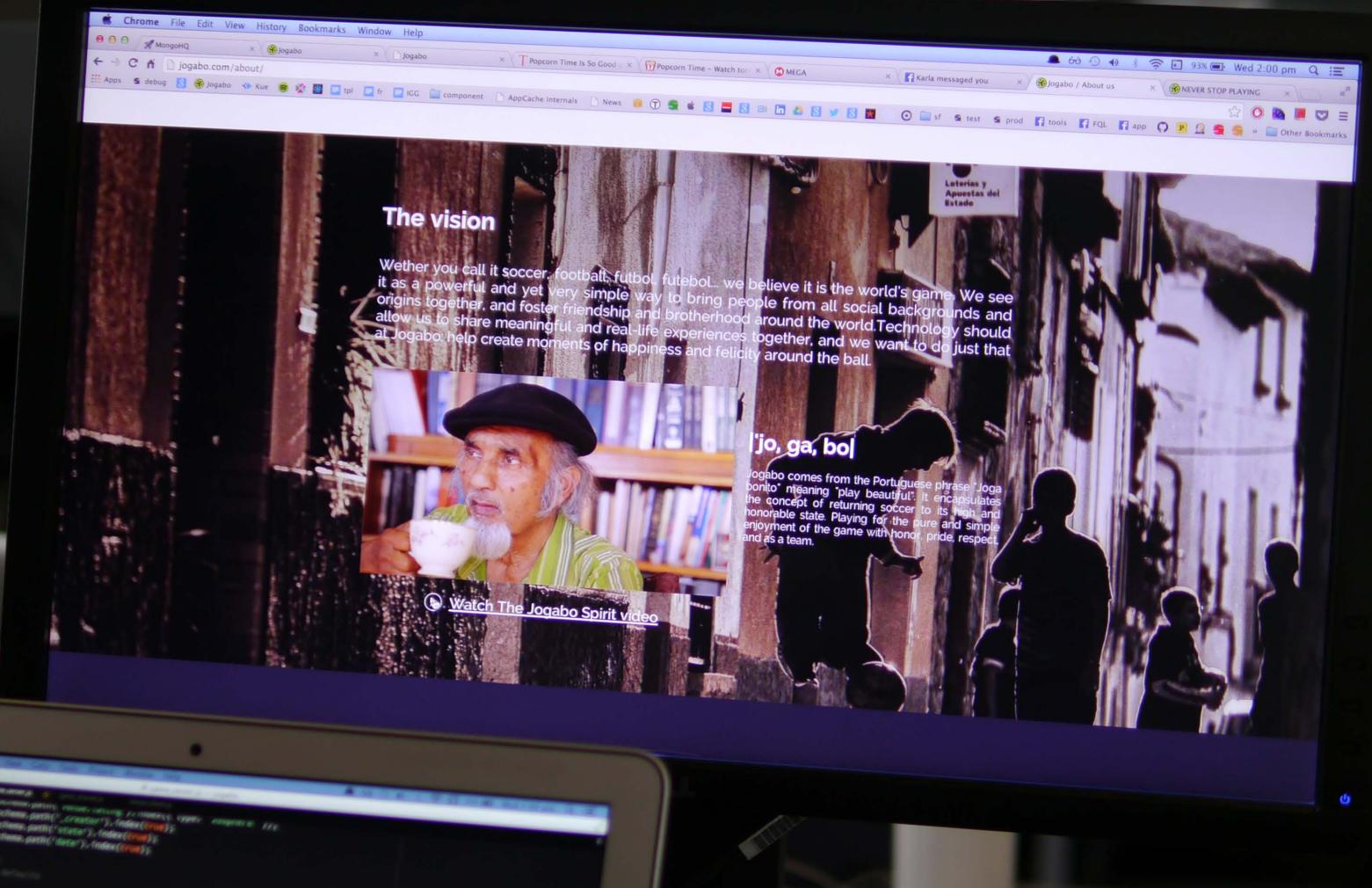
"When you deploy to different marketplaces, it takes so much time. You have to fill out the same information, every single platform wants multiple images... they're not even standard. It's arbitrary, the sizes they pick. It's just because it fits the design that the designer picked that size."



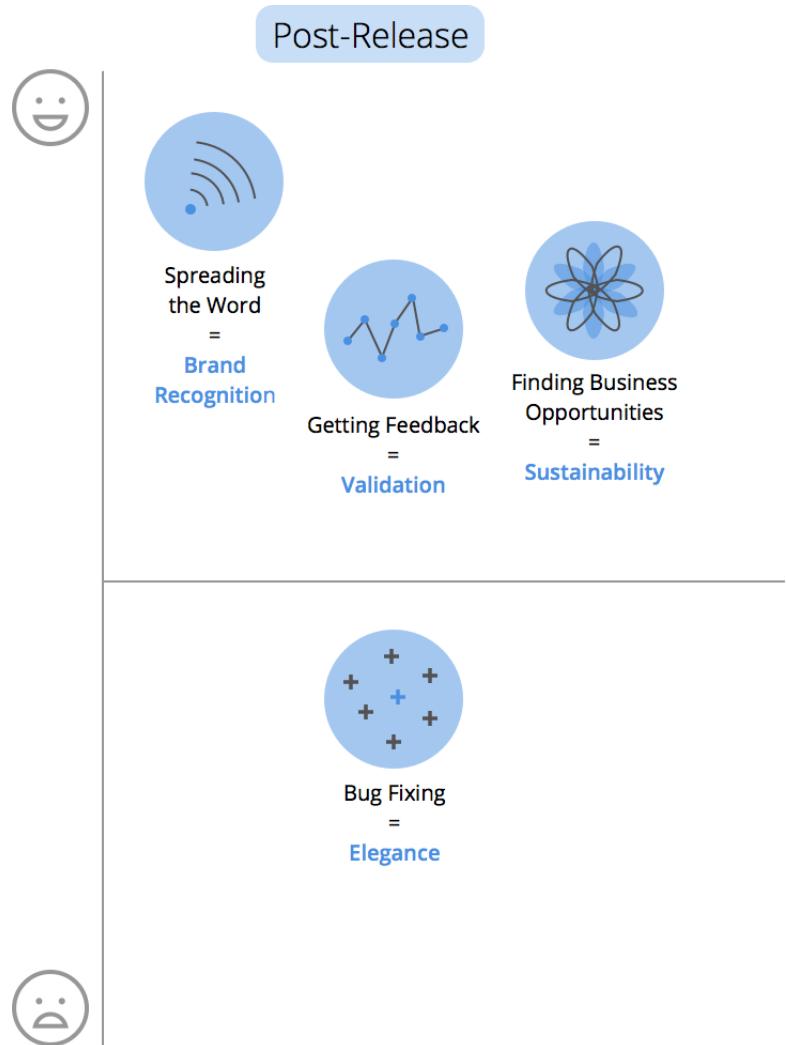
Allow me to set the pace that's best for my app

"After experiencing both approaches, I decided to stay with the self-hosted app because it gives me more control over updates."

Celebrating developer success



Post-release, developers will continue maintaining an app because they want to fuel its success



"I feel proud. When I saw the icon for my app [on a FirefoxOS billboard in Warsaw], it was very cool, motivating."

Developers may adopt a platform for different reasons, but...

Developer: Segments By Motivation

Developers create relevant content if incentives align with motivations

Segment	Size	Motivations	Evidence For Platform Adoption
Hobbyists	13%	Fun, Recognition, Learning	Reach, Low barriers
Explorers	20%	Ancillary income, Experience	Reach, Social proof
Opportunists	24%	Revenue from apps	Reach, Engagement, Affluence
Contractors	17%	Projects utilizing existing skills	Familiarity, Developer interest
Brands	10%	Engagement with primary products	Reach, Engagement
Media	5%	Content Consumption	Reach, Engagement
VC Funded	4%	(Representation of) Growth	Reach
Corp IT	6%	Productivity	ROI
Platform	<1%	Ship in the box	Reach



"You have to go where your customers are... If you had 10% market share, I would definitely consider developing an app for FirefoxOS."

By making developers feel successful, Mozilla can inspire them to continue creating for FirefoxOS

What personal success means

Brand recognition - App developers want the world to know about and use their app so they spread the word on multiple channels.

Validation - App developers want to know how users feel about their app so they pay attention to customer feedback, downloads, money, app analytics etc.

Elegance - The desire to create a polished, performant, brilliant app drives a developer to fix bugs or rewrite the app.

Sustainability - Developers are passionate about what they do. By seeking opportunities to sustain themselves, they can continue to build awesome apps.

A cautionary tale

We featured one of our app developer's apps in the Marketplace only for him to discover a major bug on a device he didn't have. His app then got low ratings from people who downloaded it.

App developers were concerned about reaching new markets where they didn't speak the language and thus wouldn't be able to understand user feedback.

A developer who's passionate about the Web had to rewrite his app in Objective C when he turned the idea into a startup because he couldn't spend time fixing performance and layout bugs.

One developer stopped putting his app in the "Paid" section of the Windows Store because users who were only looking for free apps never saw his app.

How can Mozilla show developers that we are invested in their personal success?



Amplify my presence

"You can buy your way into getting to be a top app in the app store. Some awesome apps aren't getting discovered... Most mobile developers are not getting a fair shot. There's no way to get you stuff out there if you have no money to market it."



Develop me

"[My game was successful] because I got to go to MWC and show my game in the FirefoxOS booth. I was able to showcase my brand. It was great to be there and to learn from others that I respect and find out that they respect me too"



Make our relationship personal

"Having a person to talk to [would be helpful]... I want to have a relationship with the company, person-to-person so that when you ask a question, you get important information from a trusted source. Then you have a reason to do something, to add new technology. It's not this faceless things. Understanding what's going on has its advantages."

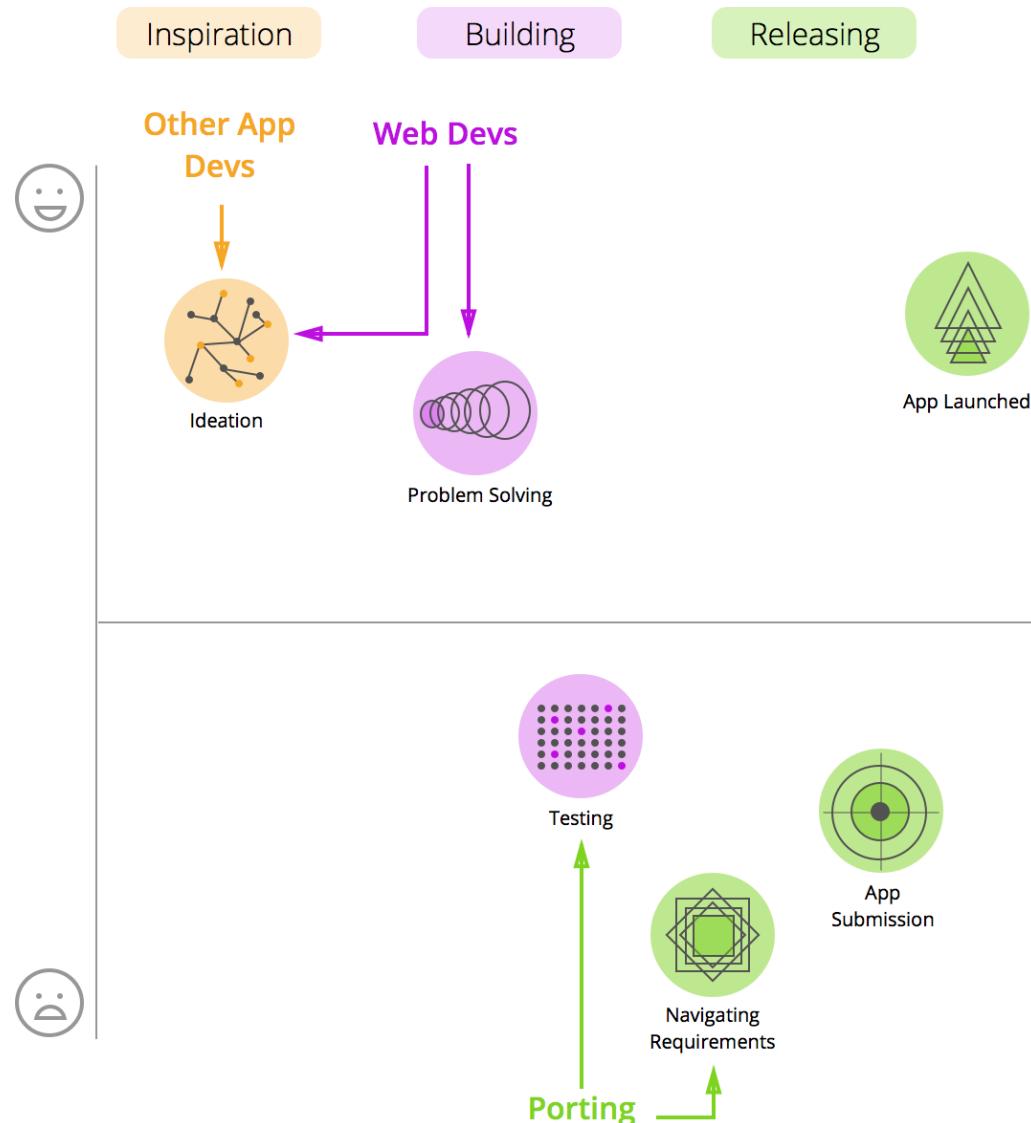
A medium shot of a man with dark hair and a beard, wearing a brown hoodie with a white graphic on the chest. He is looking upwards and slightly to his left with a thoughtful expression. In the background, there is a blue poster on a wall. The poster features a superhero-like figure in flight and contains the text "Engineered For Heroes" in large white letters and "oracle.com/ir" in red letters.

Engineered For Heroes

oracle.com/ir

Inspiring app developers to build

How can Mozilla activate developers who aren't even building mobile Web apps yet?



FirefoxOS gives native speakers of the Web a platform where they are finally first-class citizens



"I like that it's written in Javascript, HTML, CSS-- things that I already know. Theoretically speaking, I should be able to write an app if I manage to buy the phone or get it from the company."

"[On porting an existing Android app to FirefoxOS] I was able to remove a lot of code that was necessary to maintain old Android versions and to use new APIs and CSS animations without any prefixes. So I was able to make the code leaner. Thanks to which the app worked better than when I released it right away with the old code."



Our products and messages need to amplify what Web developers already love about the Web

Everywhere



"I intend to keep developing for the Web because it makes me a more universal developer. The language is everywhere: phones, TVs, browser, watches... I can't afford to ignore it"

A Rich, Evolving Ecosystem



"We have this great community because Javascript is so popular and it's open. You don't find that in other platforms, not in that extent... there is nothing as rich as the Web."

A Force Multiplier



"You only need to know one [language] and package it differently. It's good for a company because you can stay small."

Faster to Launch



"The Web is faster. The language is easier to learn, it's not compiled, and the desktop and mobile versions of an app for the Web are the same"

Open for Participation



"The Web, by its nature, is open. Other models have gatekeepers... they could control the content. The Web is the closest thing we have to a meritocracy and egalitarian system"

While invite, not overwhelm newcomers with the open and diverse platform that the Web offers



Give me a starting point

"There are set APIs for Windows, iOS. There are a gazillion Javascript frameworks out there. How do you figure out what to use? The Web has a constant learning curve."



Make beautiful things easy

"Developing for the Web is hard to do. It's hard to make it look good on everything. I'm not a great visual designer, so I have a difficult time getting it right across all devices."



Help users find me

"On the Web, still the biggest problem is finding about content even though its open. It feels like it's missing curated spaces. There's no go-to place for apps... You can only rely on your users to do the job or pour money into lots of marketing."

How can Mozilla inspire developers to start building for the mobile Web?



Push technical boundaries

"I didn't see the value in making just another Web app, when we could try to do something that wouldn't be possible otherwise or something that would work especially well [on FirefoxOS]... Mozilla should make sure there's exciting technology to work with and communicate it well to developers."



Make early hacking easy

"When the documentation on FirefoxOS was being developed, I had to search for many APIs and I found them in examples made available by Mozilla in Github.... it wasn't available as text for me to read easily. I had to dig through it."



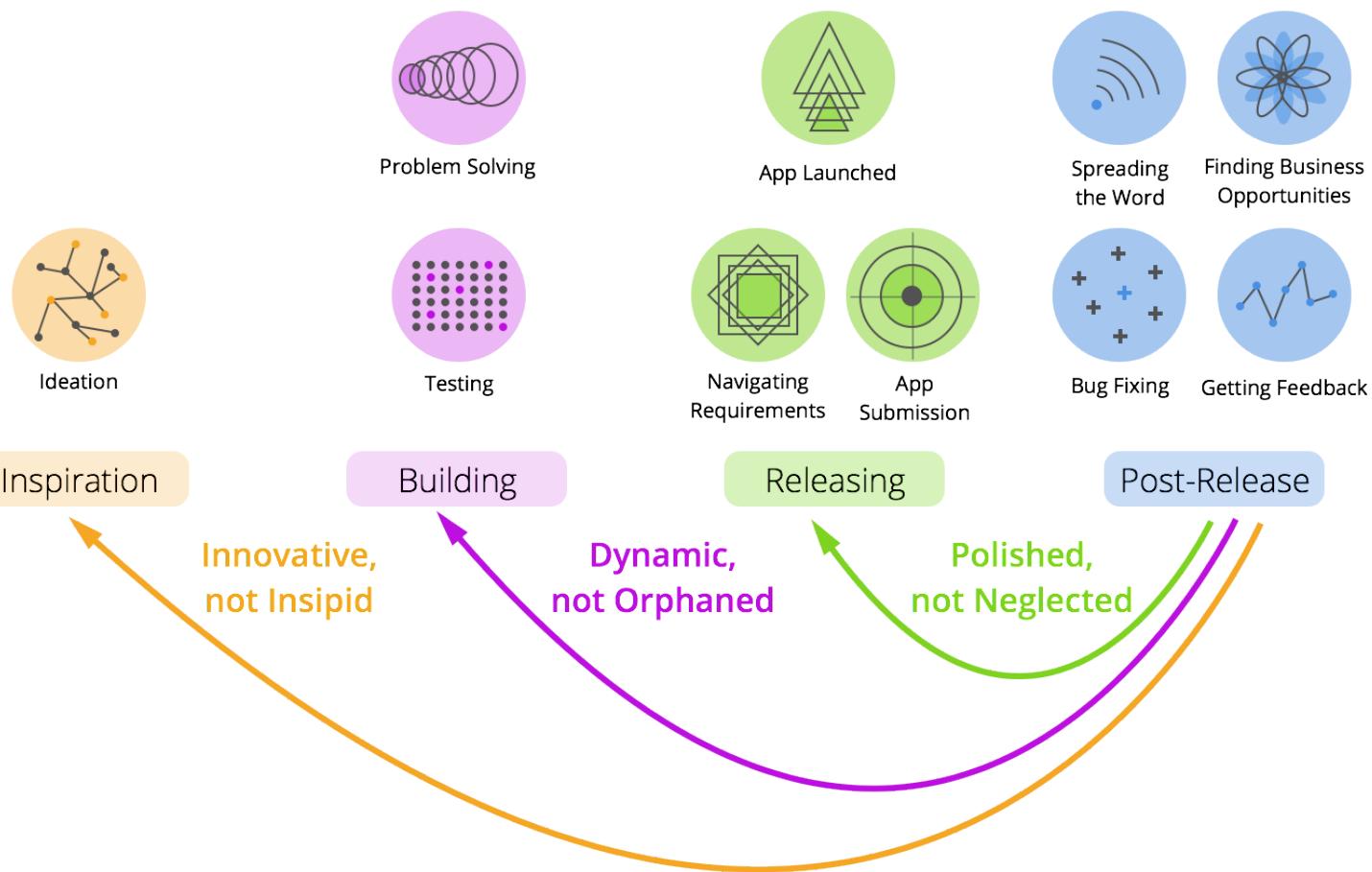
Provide a platform where I can show my craft with pride

"[When I first saw the beta version of FirefoxOS on a Samsung Galaxy SII], it was WOW. We saw the source code of the phone app. That's something new for us. The entire system made in HTML-- It's great!...Then, I saw the first native device with Firefox [on a Geeksphone]. To be honest, there were no wow... it's a really poor device, but of course it was only a developer device."

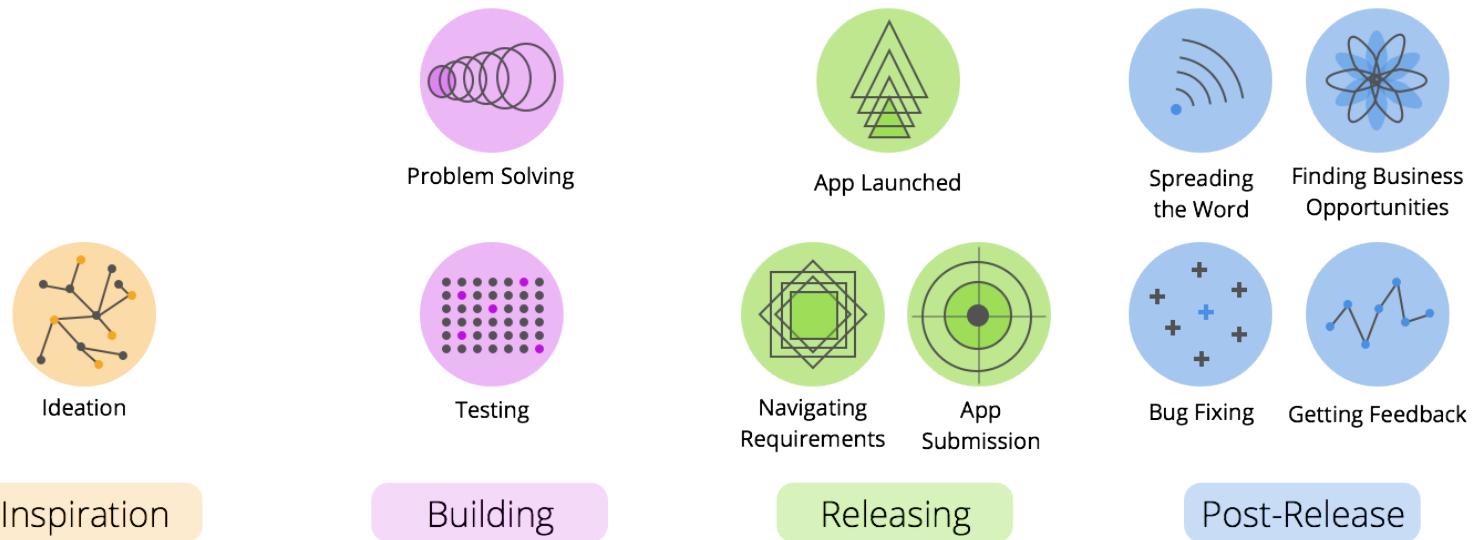


Tying it all together

The Web apps ecosystem depends on a constantly renewing developer journey to continue thriving



By supporting the developer's craft at every stage, Mozilla can keep them excited about the Web



Ultimately, app developers want to see the Web succeed too!



"The Web is going in the right direction. In the future, you won't have to differentiate... because all apps will be Web and native at the same time, independent of Internet access."

"I'm betting 100% on HTML5... it's a shame that Google and Apple have this war on native. They should be throwing their effort to support the Web"



"Everyone has a browser in their pocket... Eventually, Web apps will be really good on every platform. It's not a matter of if, but when."

Let's give developers an experience where they can help build up the mobile Web ecosystem with us

Help me evolve through learning

- Let Mozilla's expertise guide me
- Increase my ability to learn by building
- Be the experience I can learn from
- Deepen my understanding of my customers

Empower me to get great products to my users sooner

- Help me recover from a crisis
- Make my desire to scale effortless
- Allow me to set the pace that's best for my app

Inspire me to start building

- Push technical boundaries
- Make early hacking easy
- Provide a platform where I can show my craft with pride

Invest in my personal success

- Amplify my presence
- Develop *me*
- Make our relationship personal



Thank you!

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Project stakeholders

- Stormy Peters (Developer Engagement)
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- Elizabeth Hunt - for accompanying us in the Bay Area
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What's next? How can we make a tangible impact on your work?

Materials

- Bios of all our participants
- 1-pagers of key insights, frameworks, design principles
- (Hopefully!) A recorded brownbag of the presentation

Actions / Questions

- Discussion + brainstorm for the design principles
- What information do you want to see more of?

For Future Work

- To follow up, contact Cori Schauer (cschauer@mozilla.com)
- For specific questions, contact Larissa Co (lco.mozilla@gmail.com). I will also continue to be part of the mailing list below
- For discussions, join the public mailing list, mozappdev-alliance@mozilla.org (managed by Diane Tate)