

Deep User Engagement:

Add to Home Screen and Web Push Notifications

PROGRESSIVE WEB APP

ROADSHOW

2016



Progressive Web Apps

Reliable

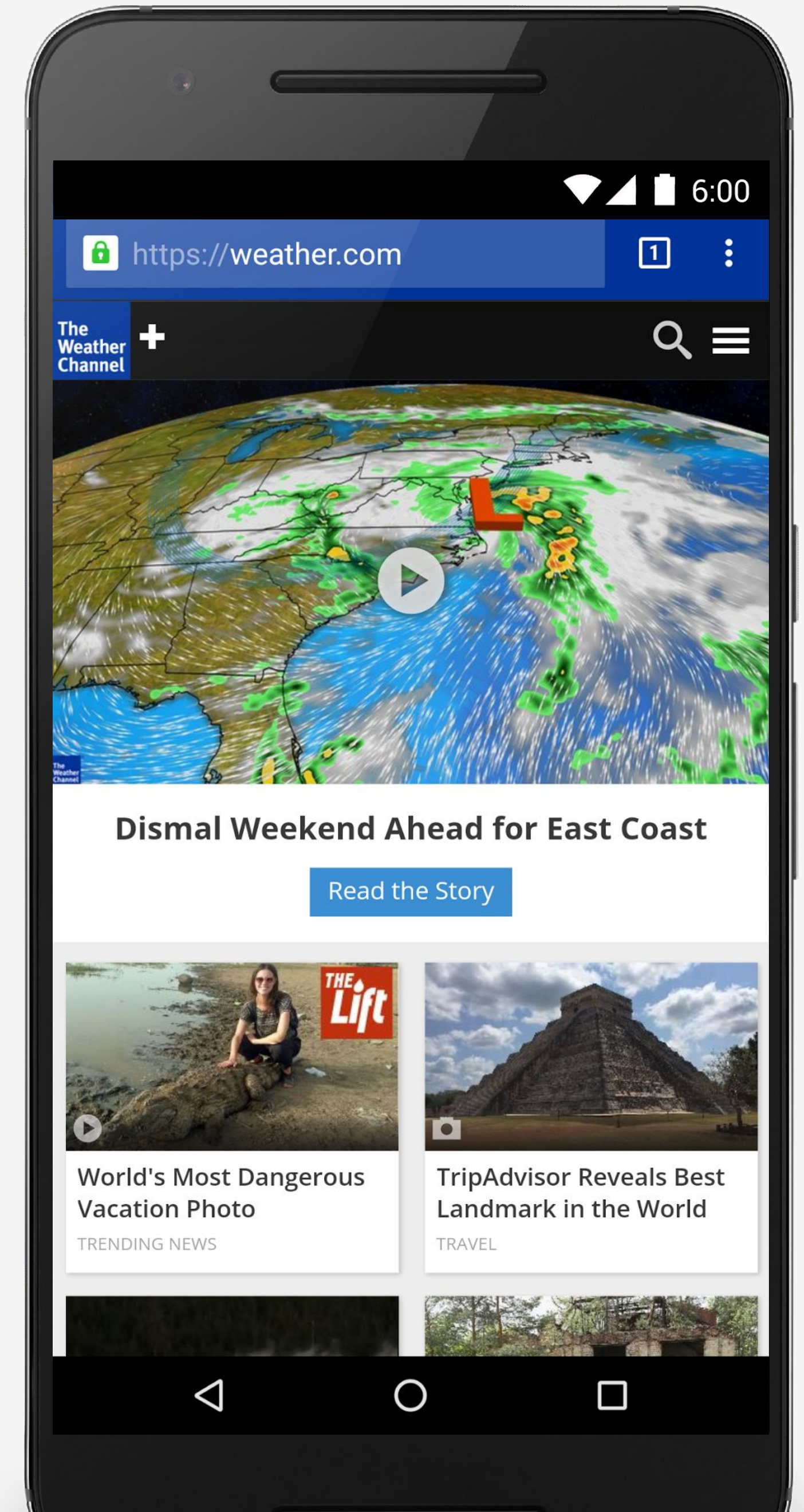
Fast loading, work offline
and on flaky networks

Fast

Smooth animation, jank-free scrolling
and seamless navigation

Engaging

Launched from the home screen and
send push notifications



Progressive Web Apps

Reliable

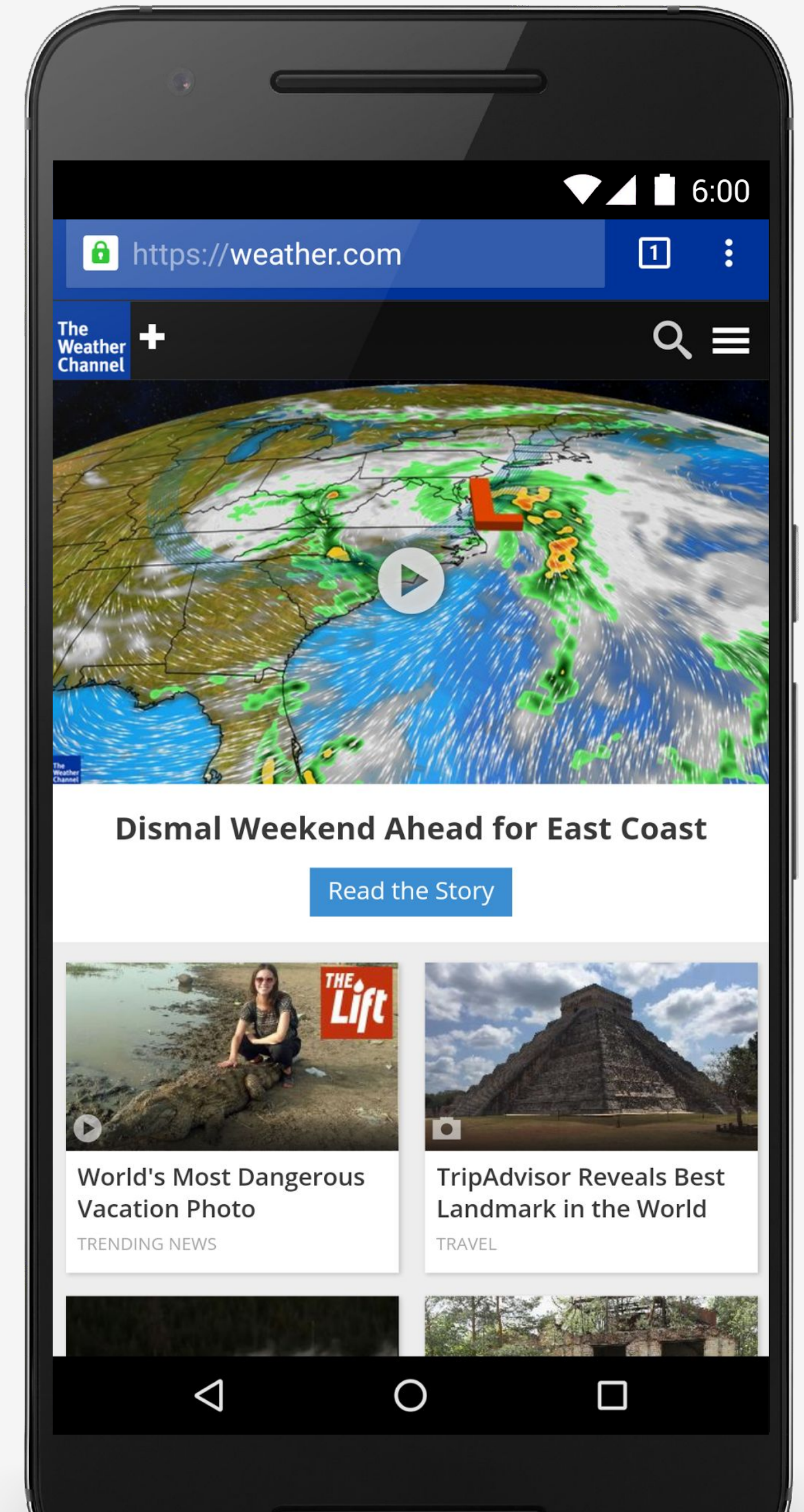
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Engaging

Launched from the home screen and
send push notifications



Add to Home Screen

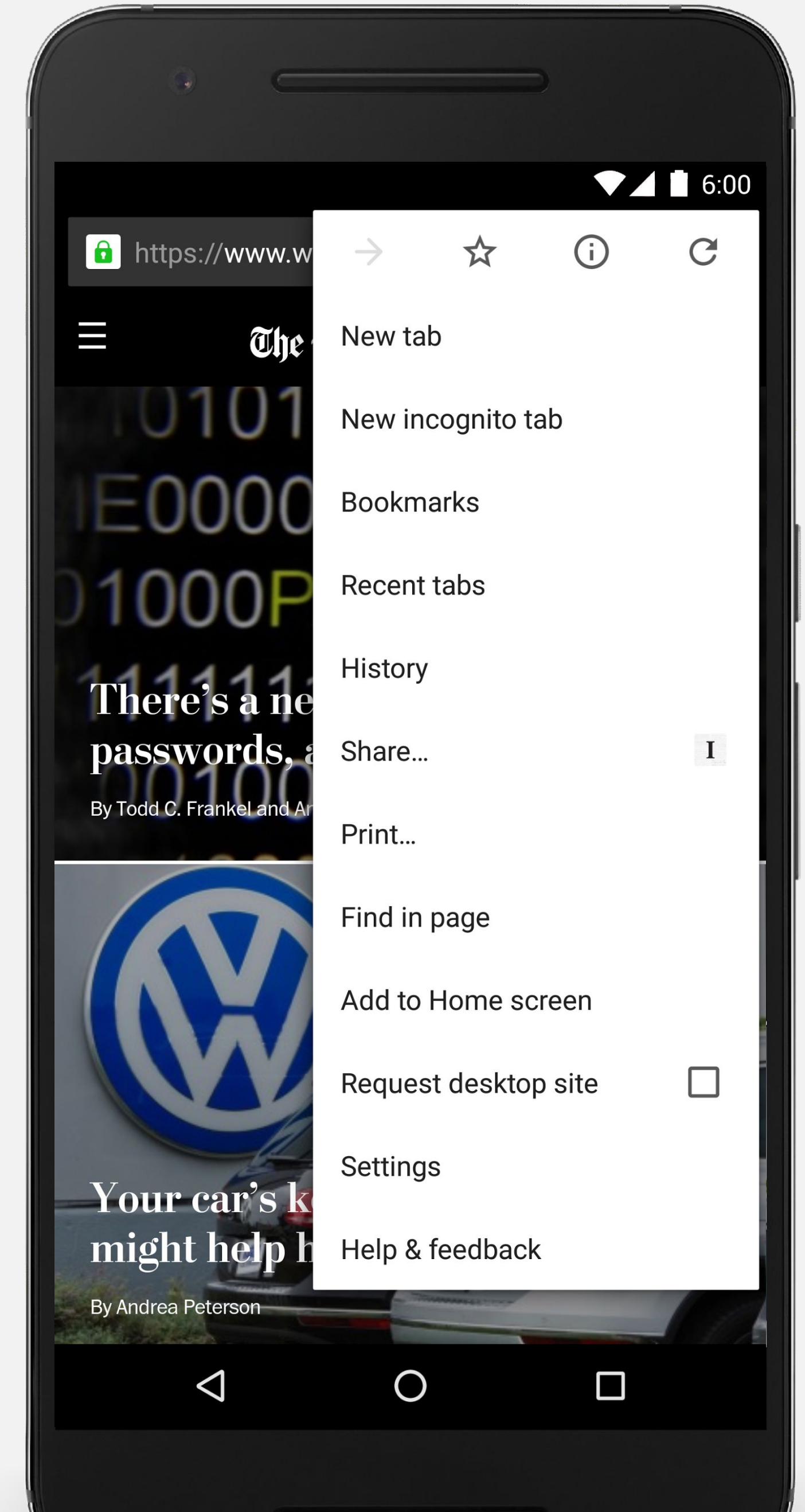


Add To Home Screen Was Broken

Required user interaction
Buried deep in menus

Where would it start?
Dependent on bookmark

Would it work offline?
Users didn't expect offline



<link rel="manifest" href="/manifest.json">

```
{  
  "name": "The Washington Post",  
  "short_name": "Wash Post",  
  "icons": [{  
    "src": "icon-48x48.png",  
    "sizes": "48x48",  
    "type": "image/png"  
  }, { ... }],  
  "start_url": "/index.html",  
  "display": "standalone",  
  "orientation": "portrait",  
  "background_color": "#000000",  
  "theme_color": "#000000"  
}
```


manifest.json

```
{  
  "name": "The Washington Post",  
  "short_name": "Wash Post",  
  "icons": [{  
    "src": "icon-48x48.png",  
    "sizes": "48x48",  
    "type": "image/png"  
  }, { ... }],  
  "start_url": "/index.html",  
  "display": "standalone",  
  "orientation": "portrait",  
  "background_color": "#000000",  
  "theme_color": "#000000"  
}
```



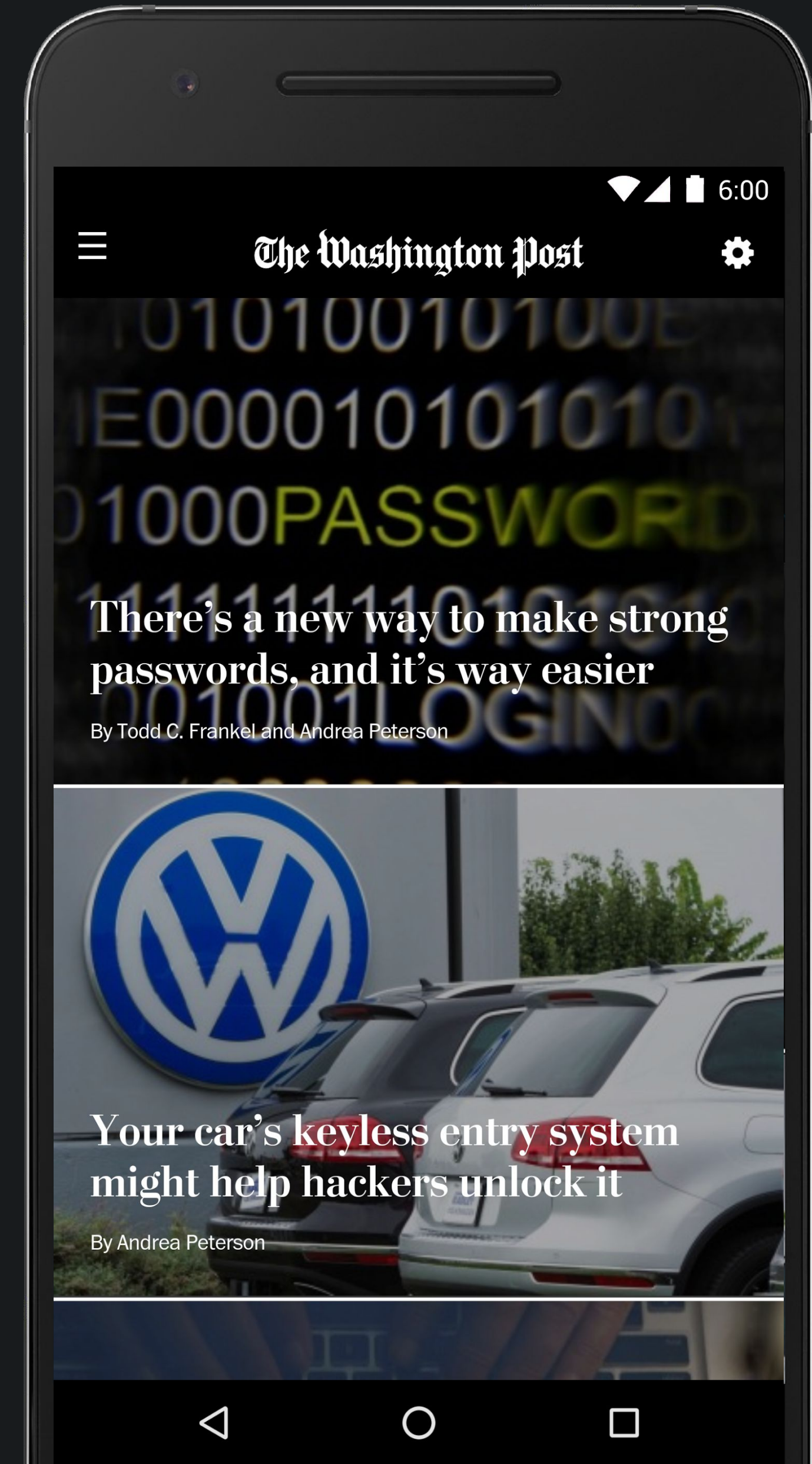
manifest.json

```
{  
  "name": "The Washington Post",  
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  }, { ... }],  
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  "display": "standalone",  
  "orientation": "portrait",  
  "background_color": "#000000",  
  "theme_color": "#000000"  
}
```



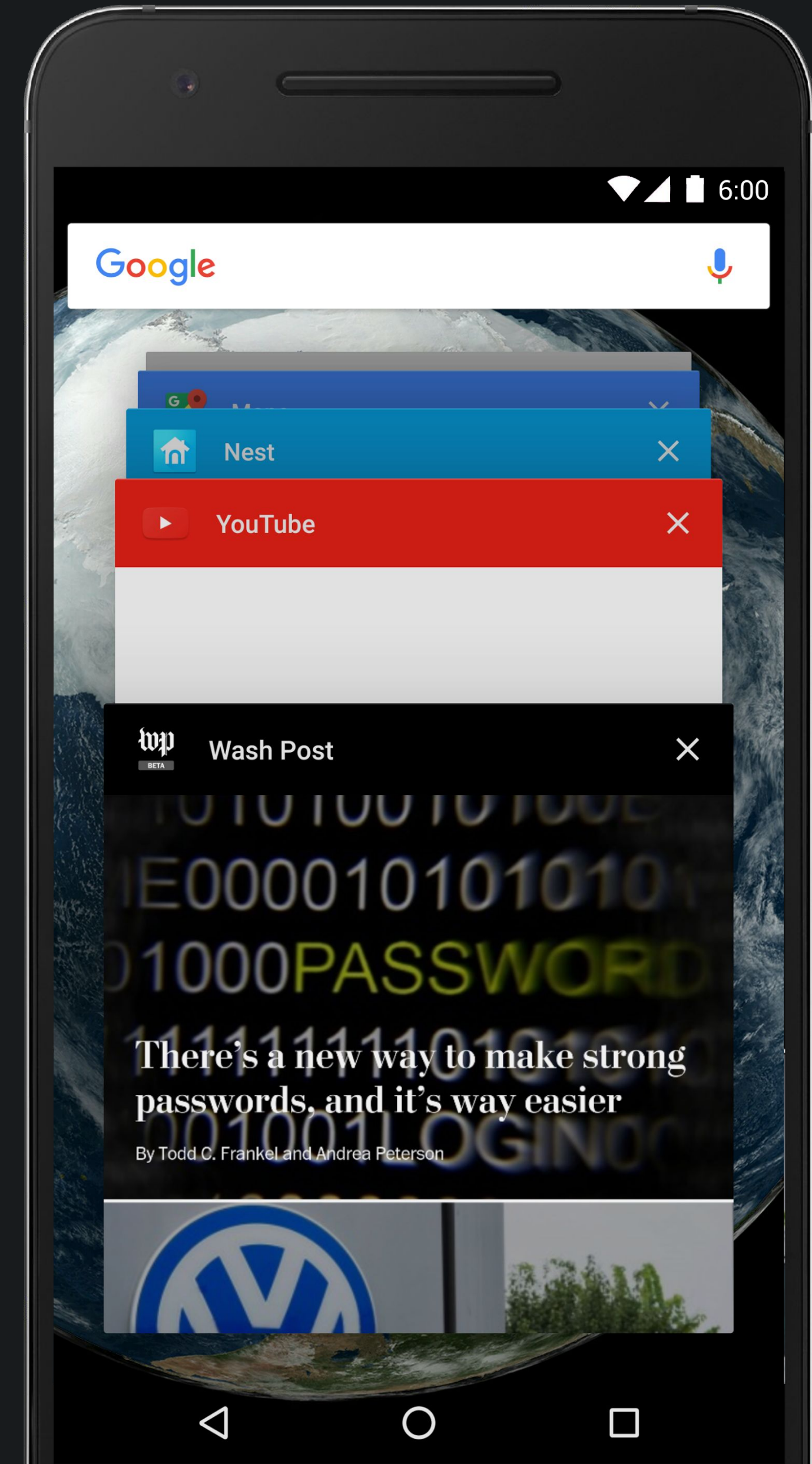
manifest.json

```
{  
  "name": "The Washington Post",  
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  "icons": [{  
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  }, { ... }],  
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}
```



manifest.json

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  }, { ... }],  
  "start_url": "/index.html",  
  "display": "standalone",  
  "orientation": "portrait",  
  "background_color": "#000000",  
  "theme_color": "#000000"  
}
```



Good, but what
about **prompt to
install?**



Automatically Prompting the User

Offline



Uses a Service
Worker for
**Offline
Experience**

Manifest



Defines **what
to launch** and
how to launch

Engaged

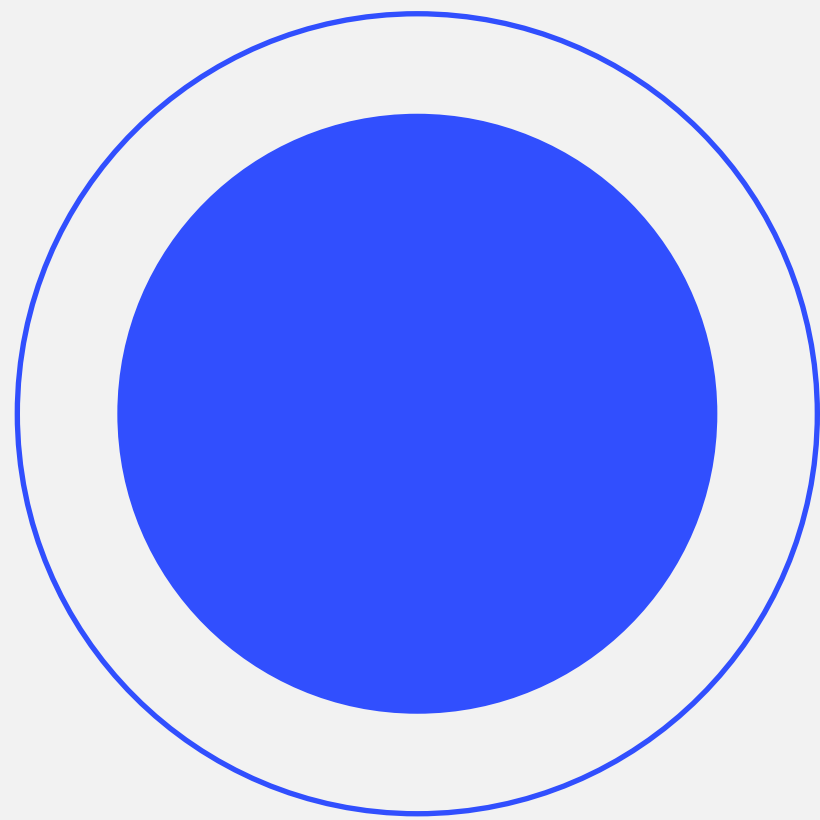


**User is
engaged**, and
uses the app
frequently

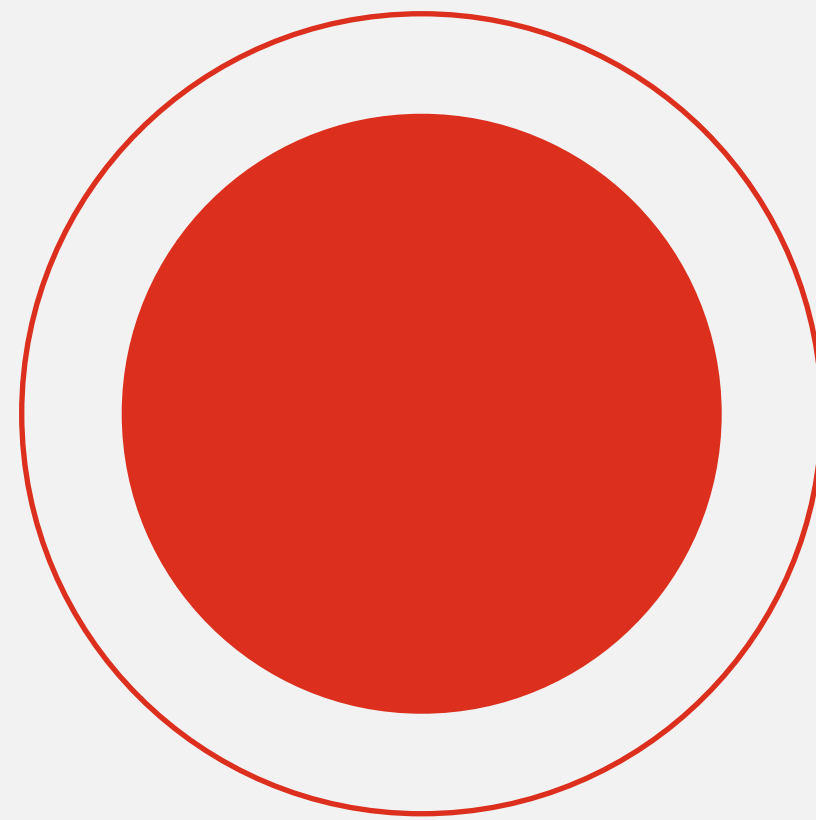


Why are the requirements so strict?

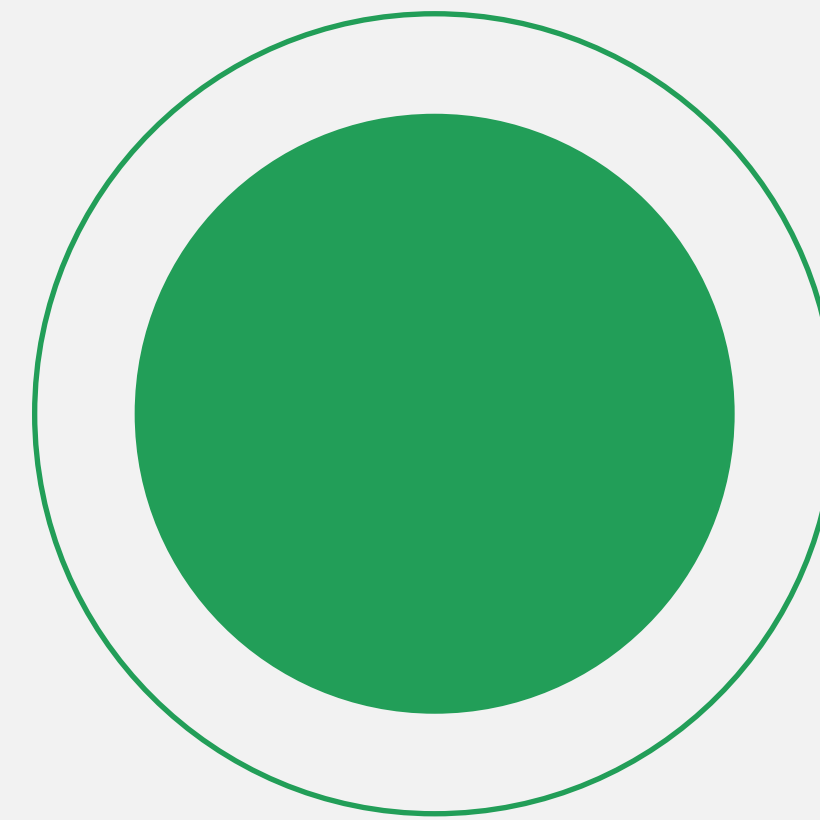
A Promise to the User



Works
Offline



Consistent
Experience

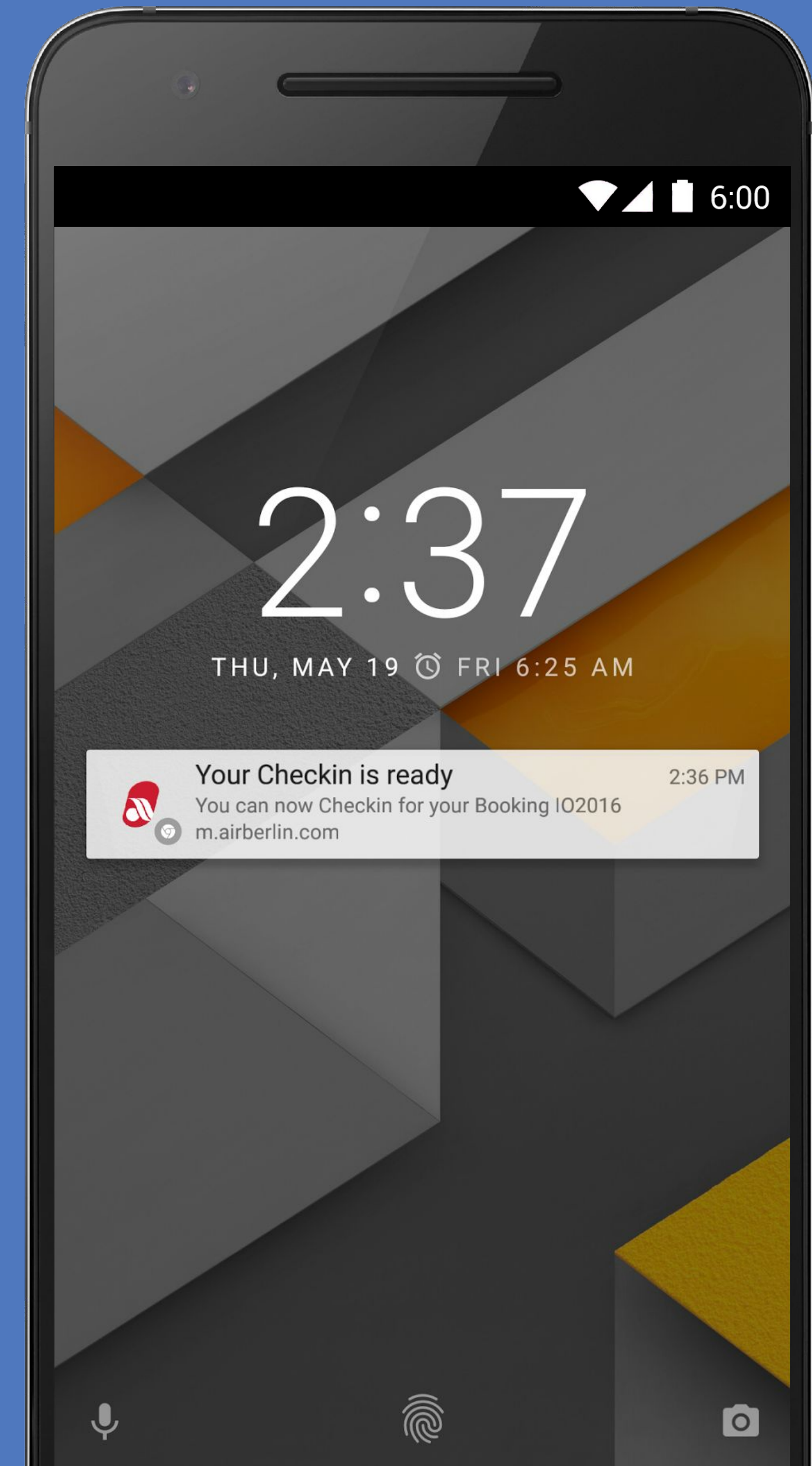


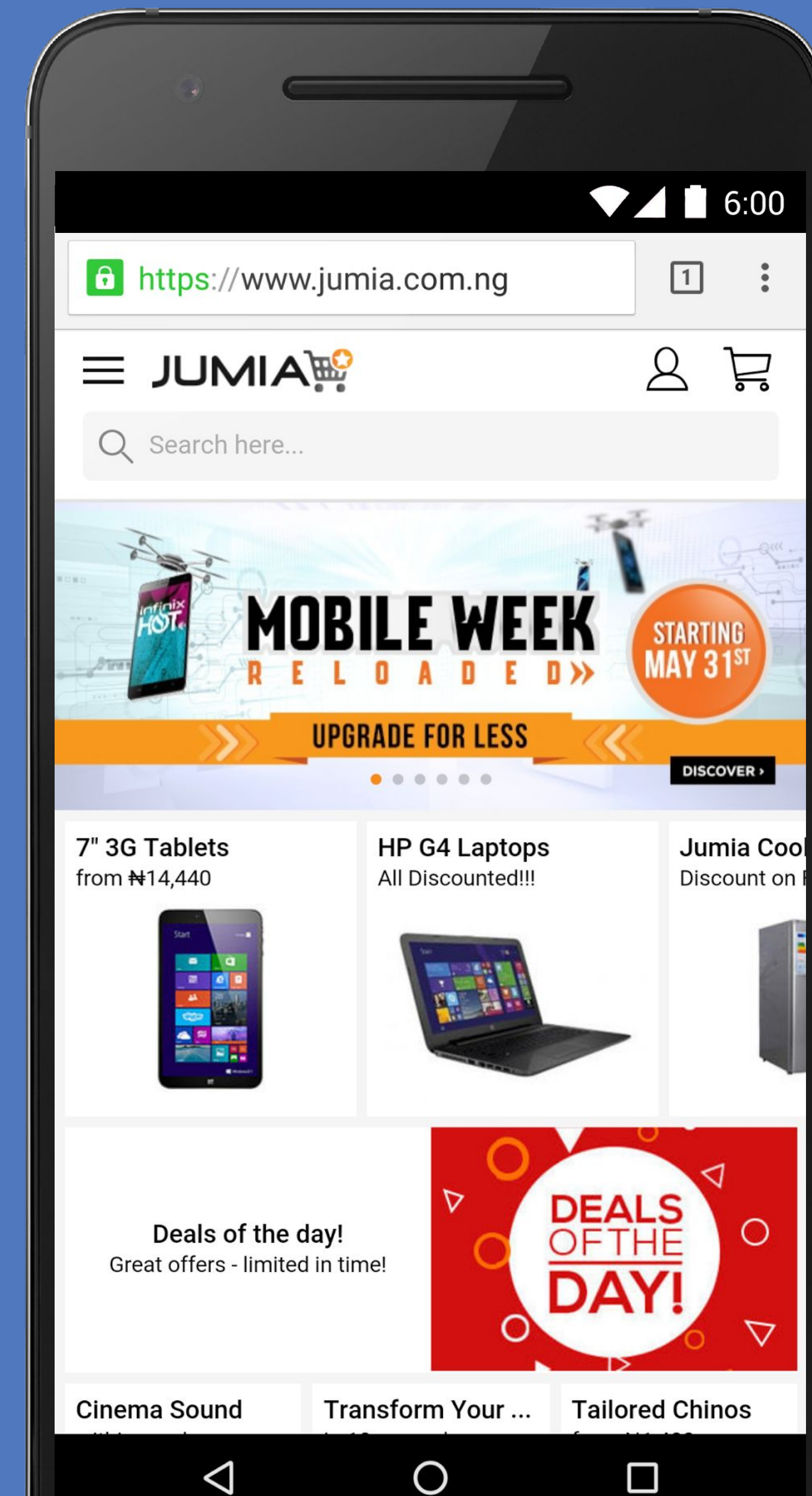
The User is
Engaged

Deep engagement with Push Notifications

Web Push Notifications

The browser doesn't need to be open!





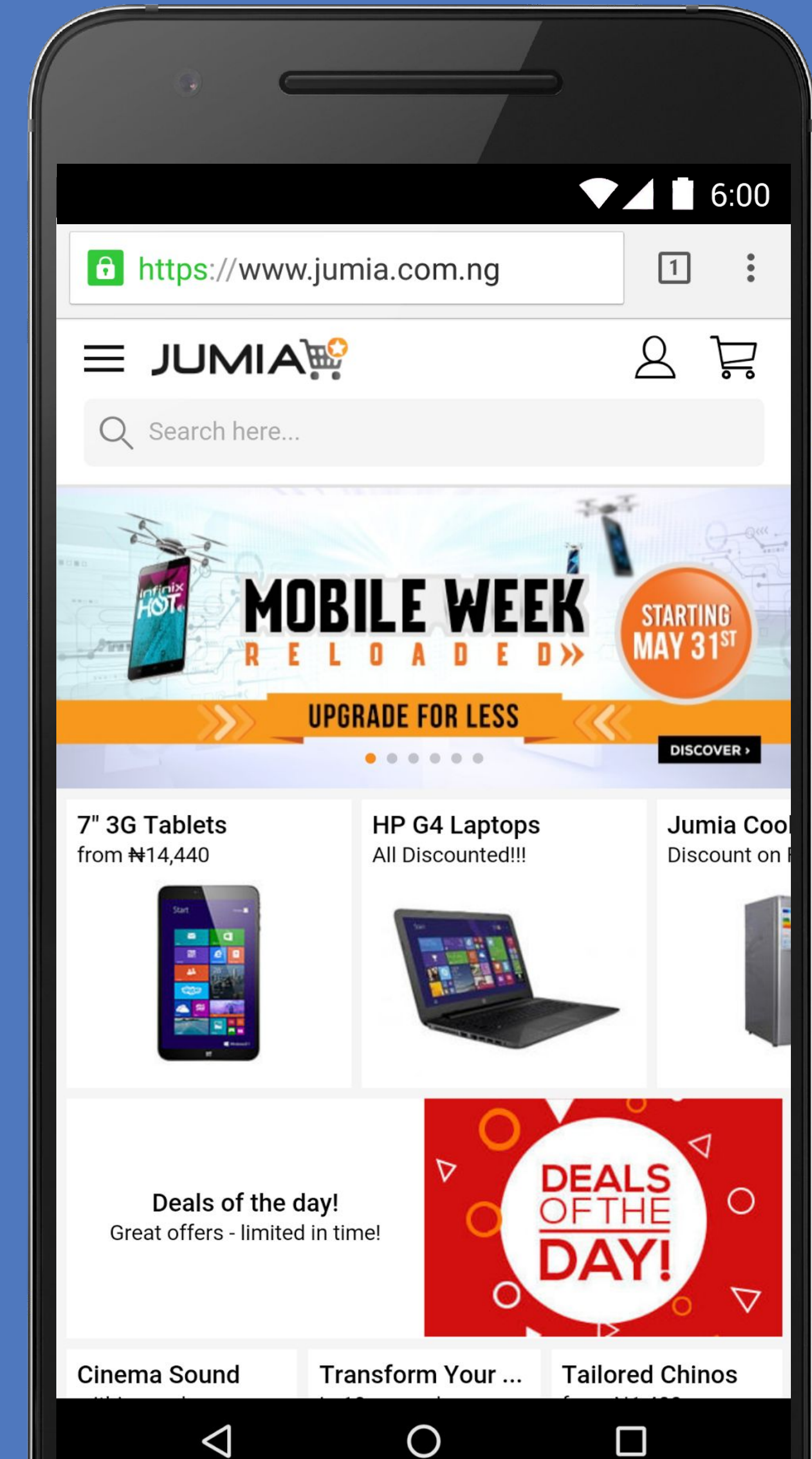


38%

open rate

9x

more conversions on
previously abandoned carts





Is it important enough to warrant
an interruption?

Anatomy of a notification

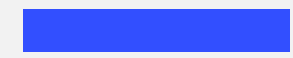
Anatomy of a notification



I feel I need it and
it matters right now.



Anatomy of a notification



I feel I need it and
it matters right now.



Anatomy of a notification



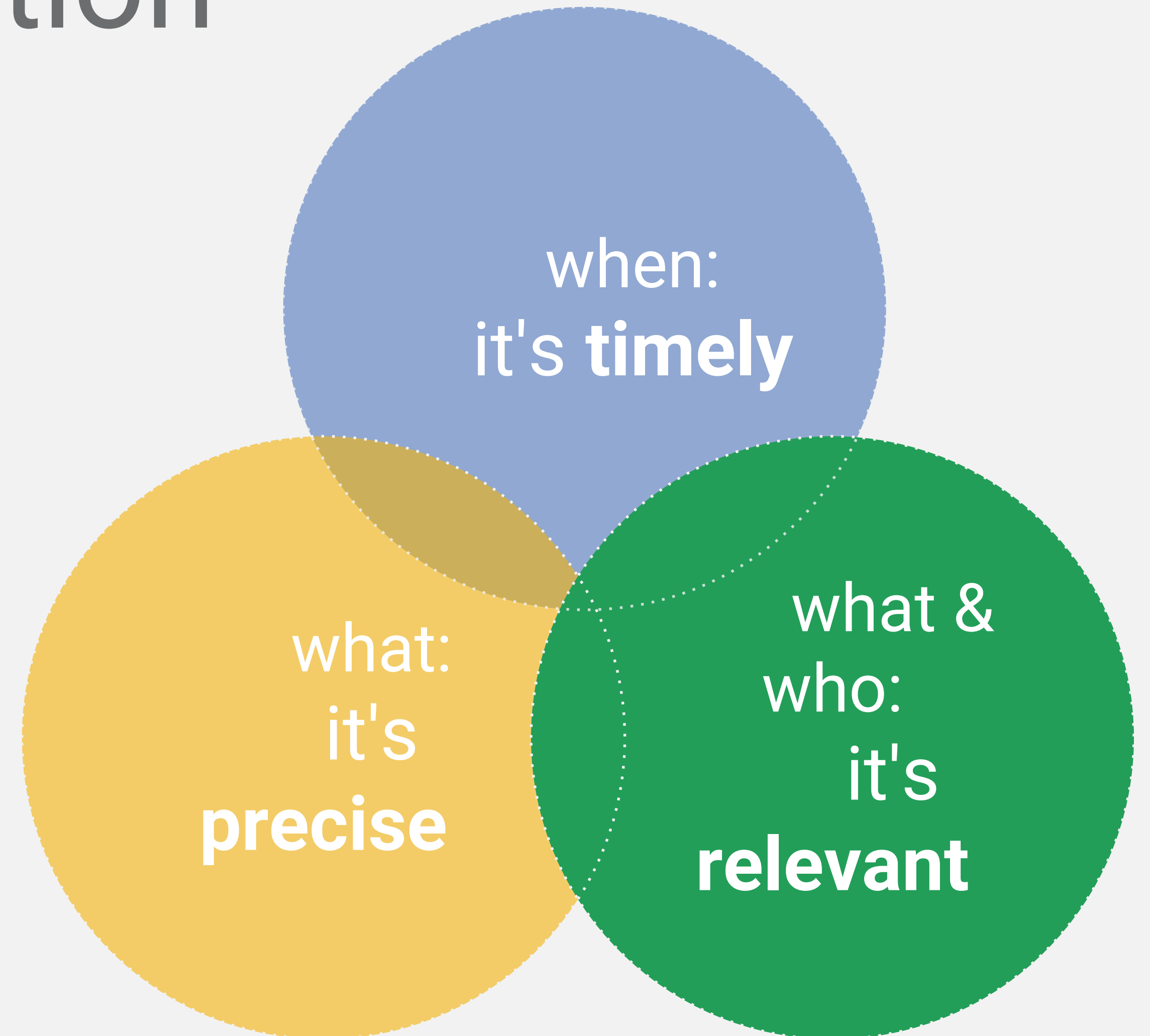
It has **specific info**
that's good to
know or act upon.



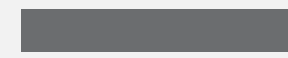
Anatomy of a notification



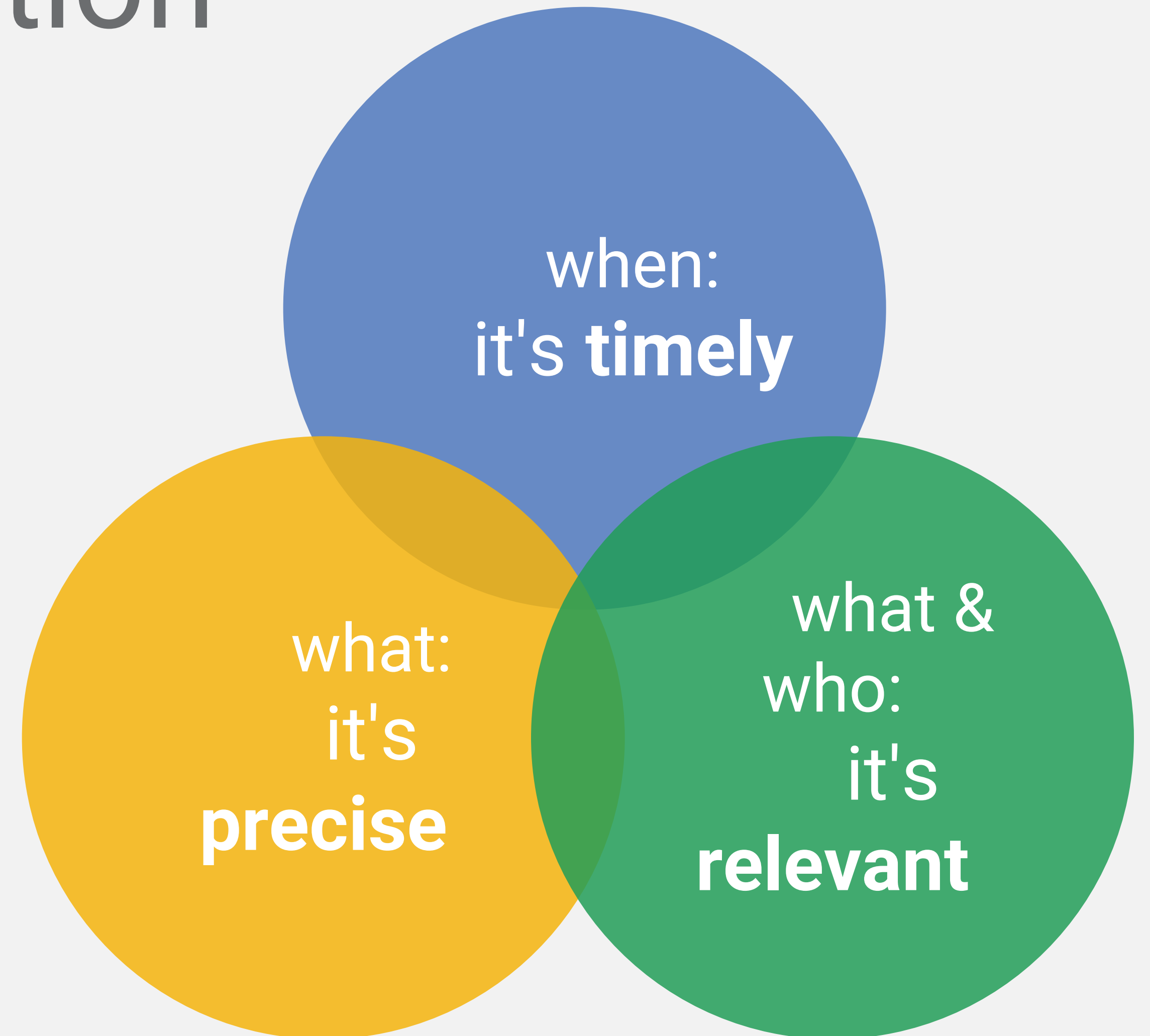
It's from people or sources
that matter to me, which
makes it personal.



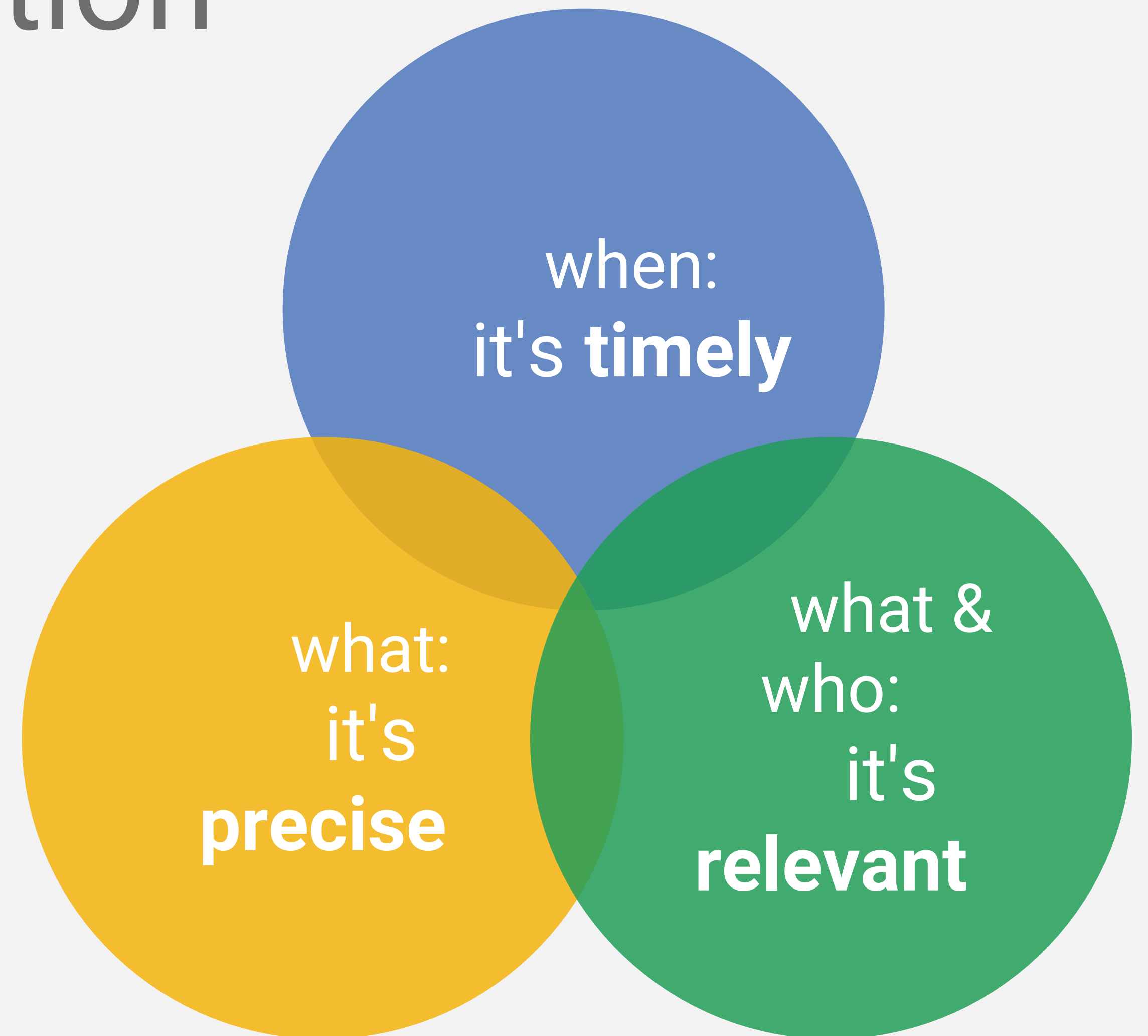
Anatomy of a notification



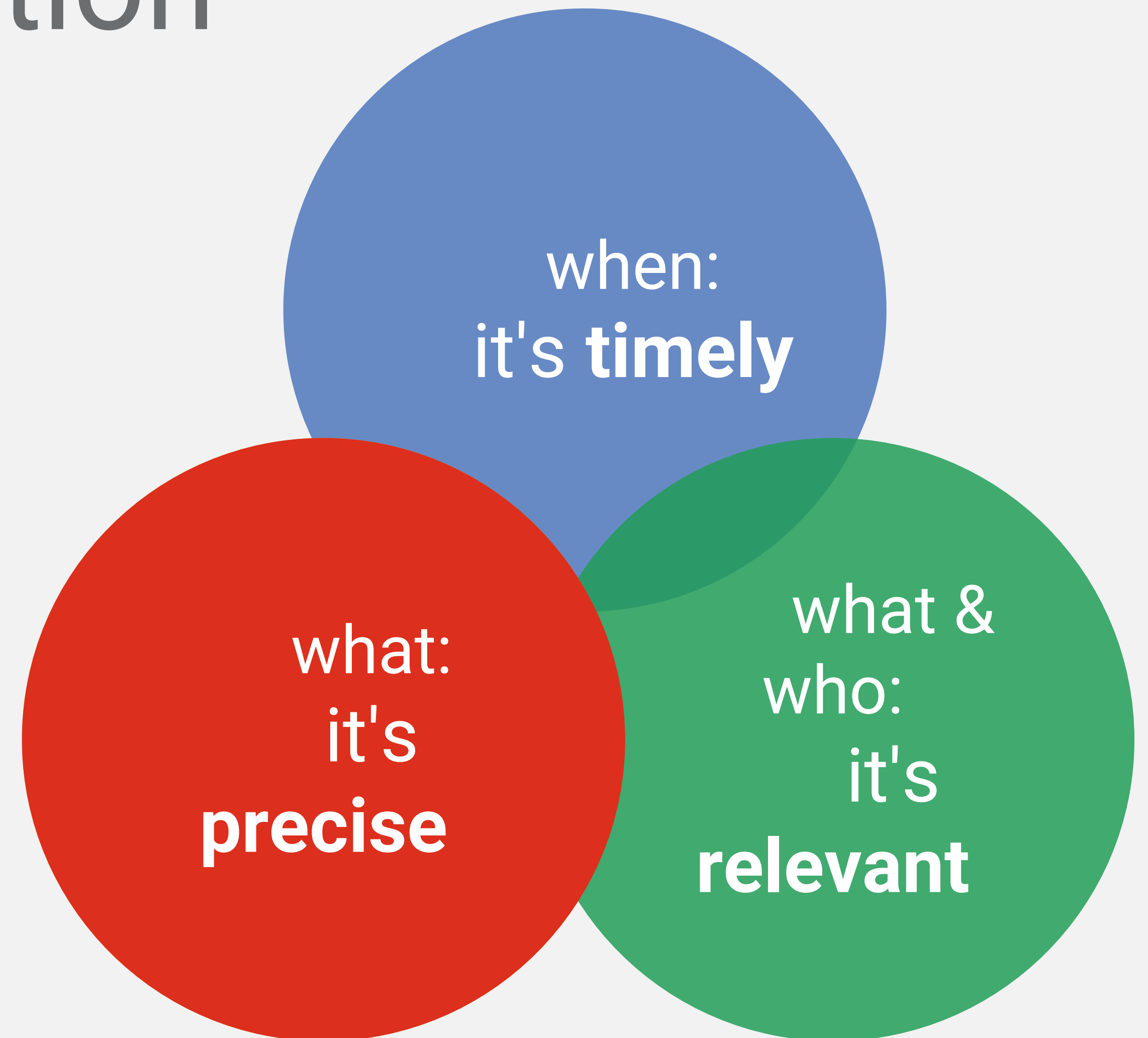
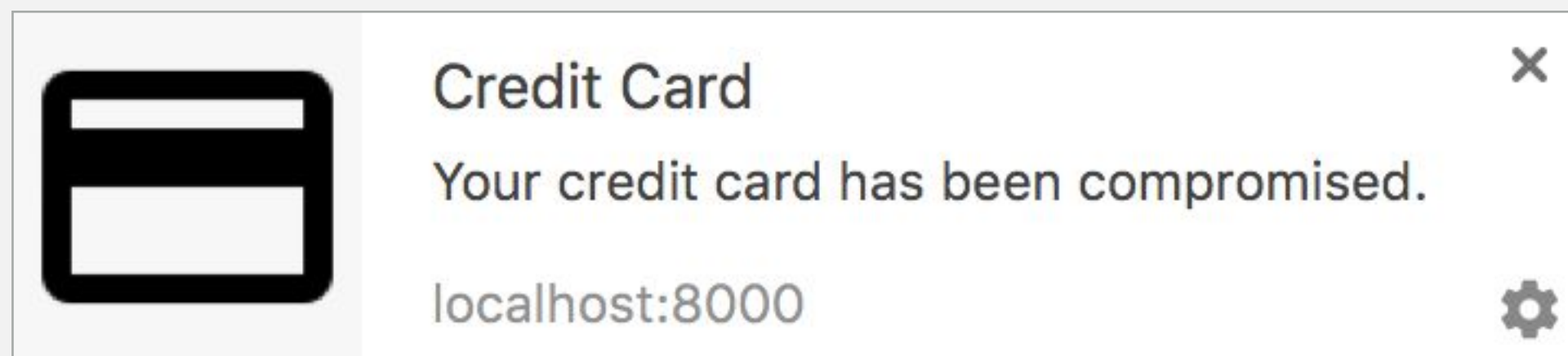
Let's try!




Anatomy of a notification



Anatomy of a notification



Anatomy of a notification




Credit Card

Your credit card has been compromised.

localhost:8000

✕ ⚙



Credit Card

Did you make a \$1,000,000 purchase at Dr. Evil Inc with VISA *1234?

localhost:8000

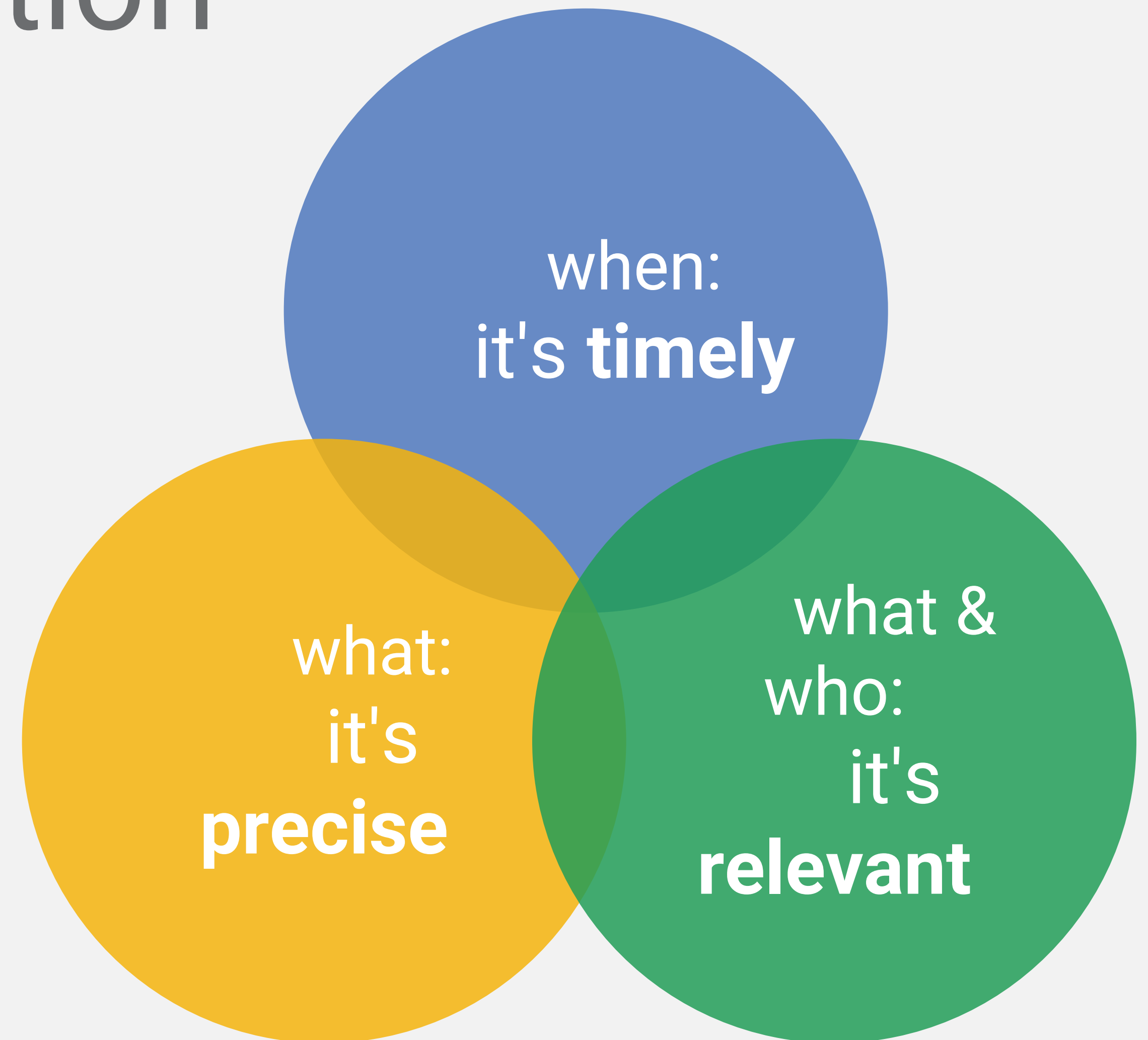
✕ ⚙

✓

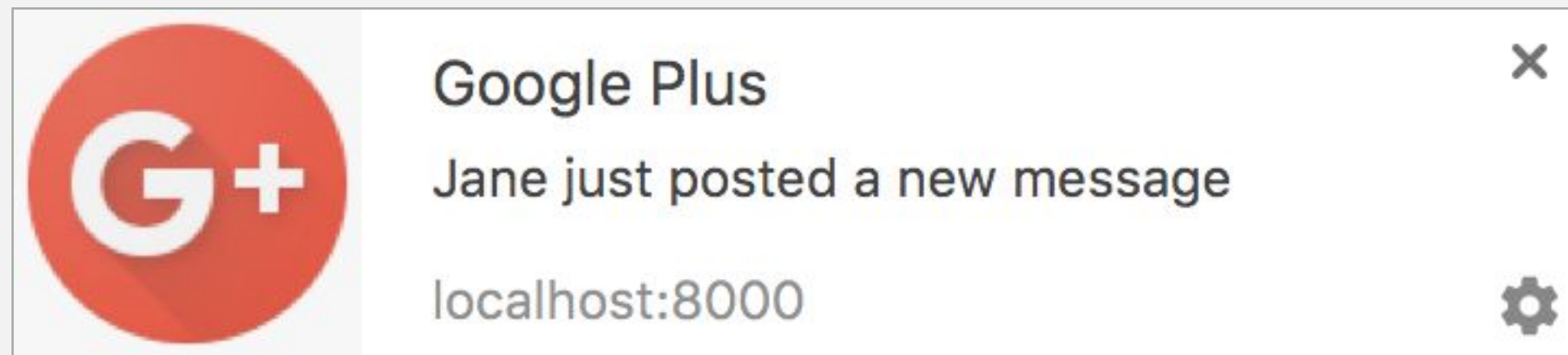
Yes

✕

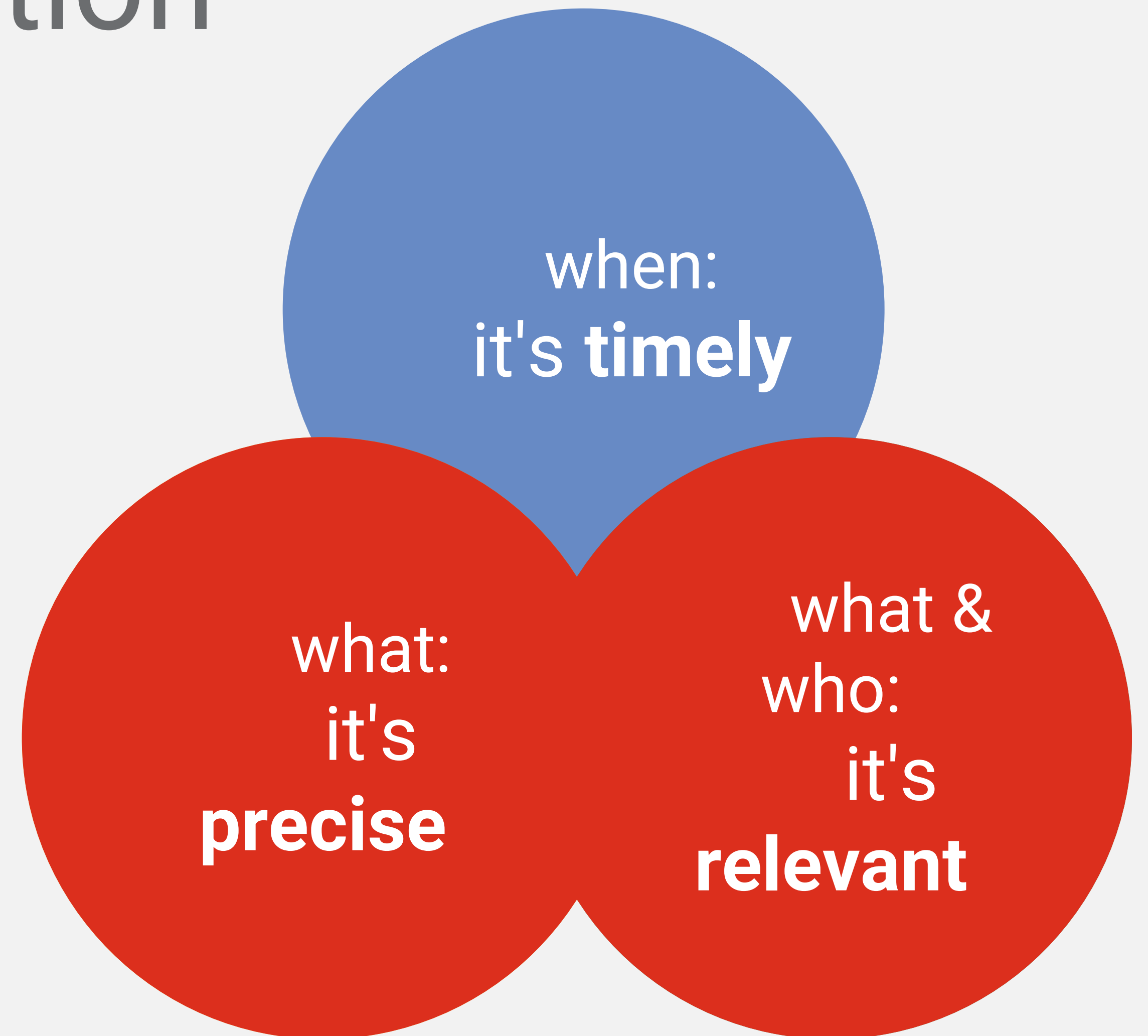
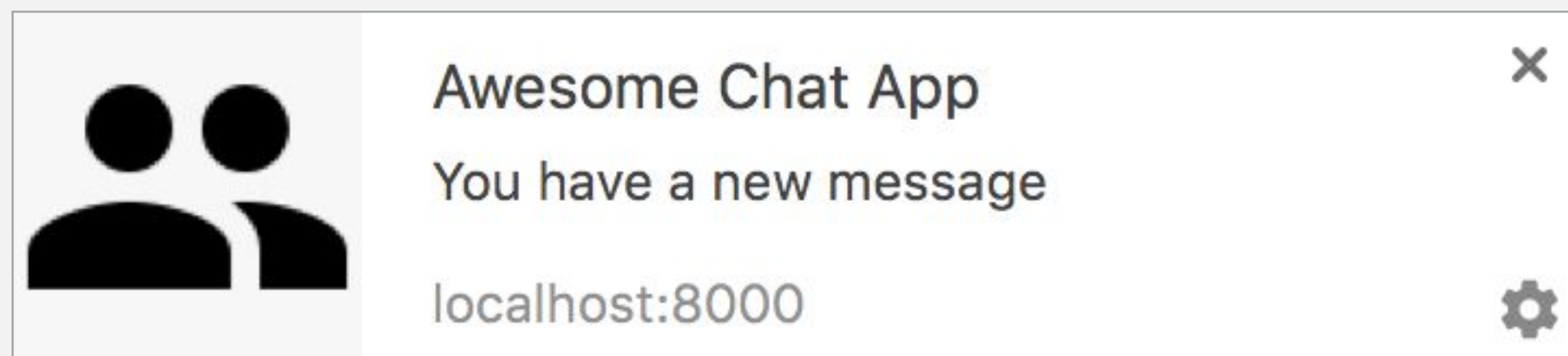
No



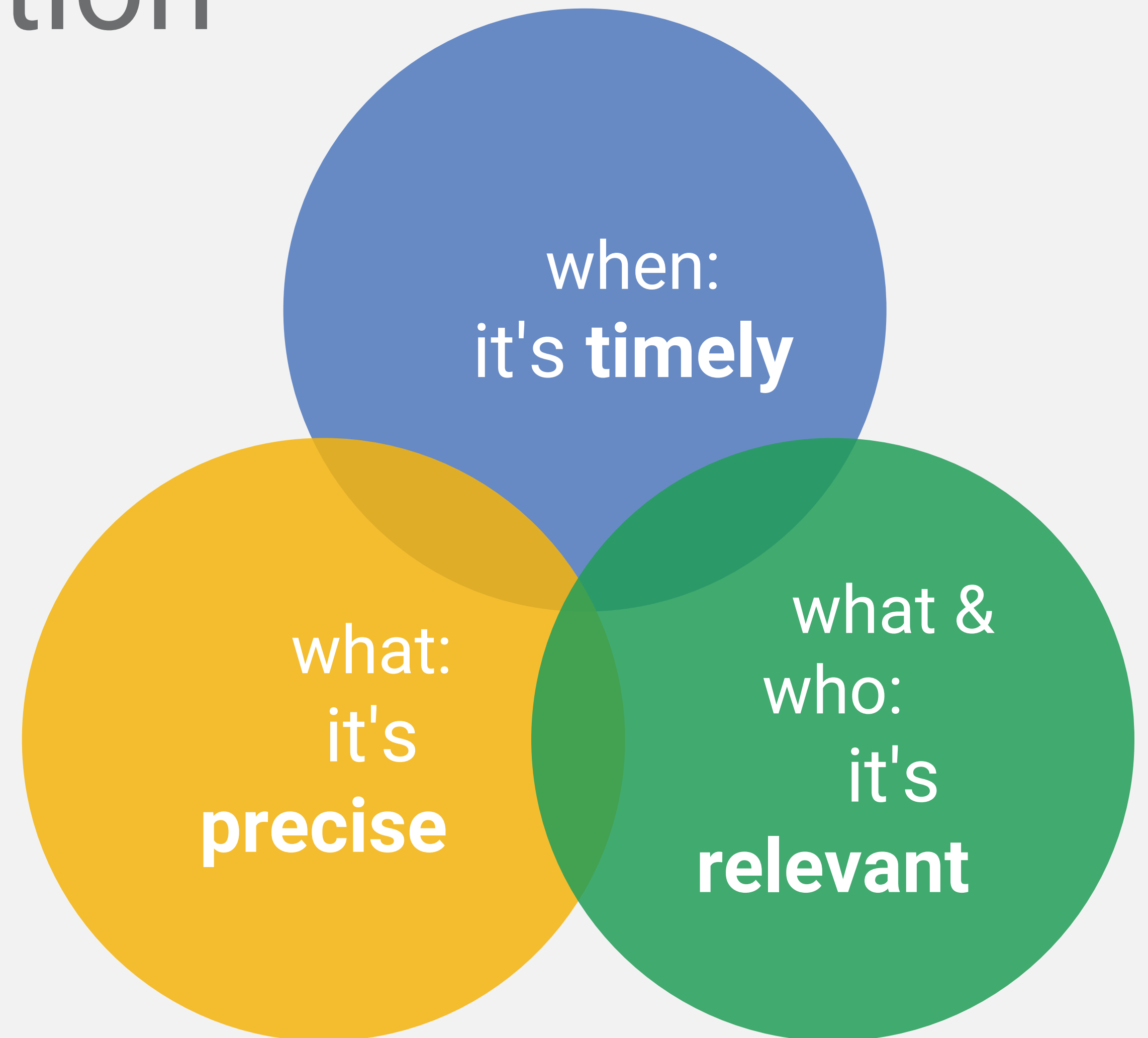
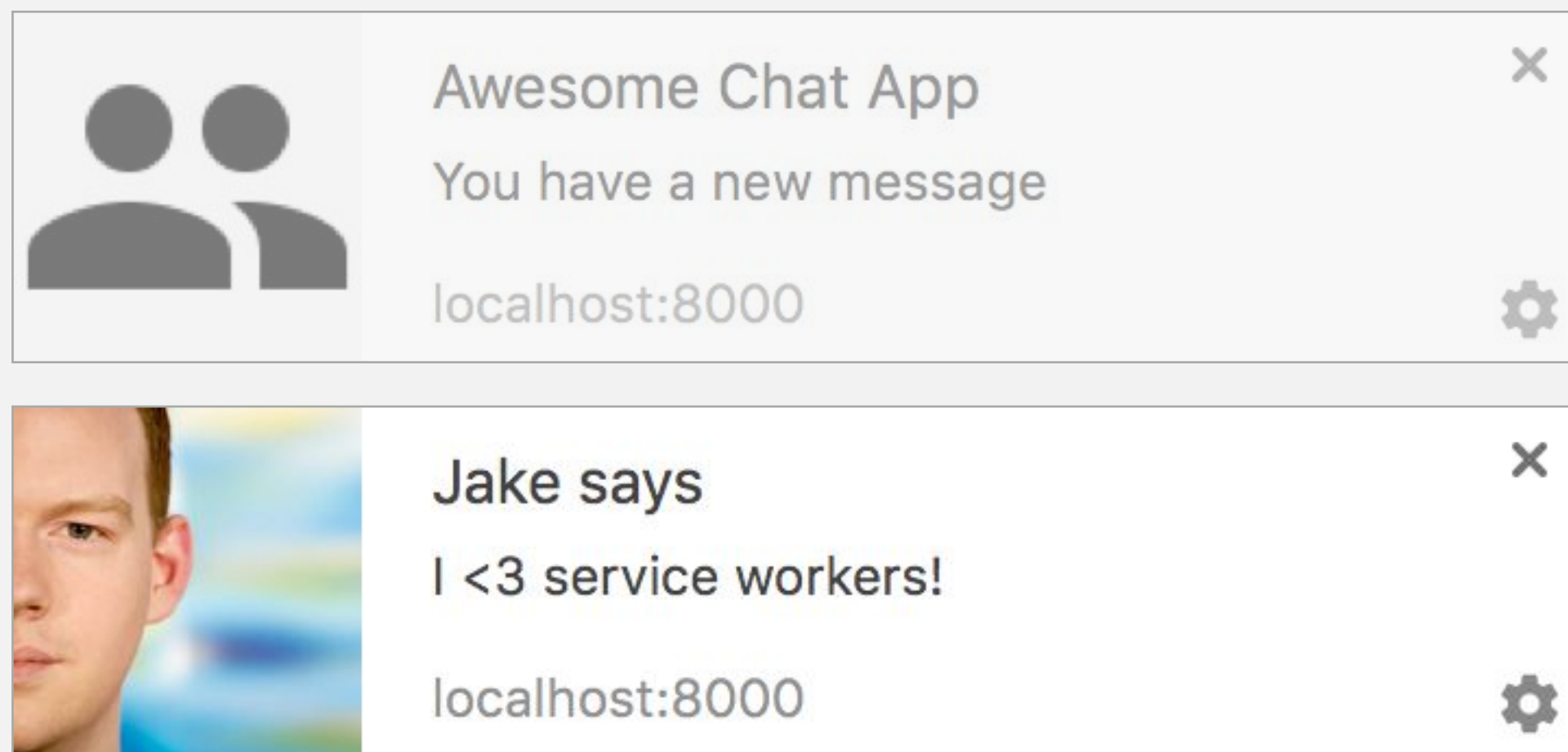
Anatomy of a notification



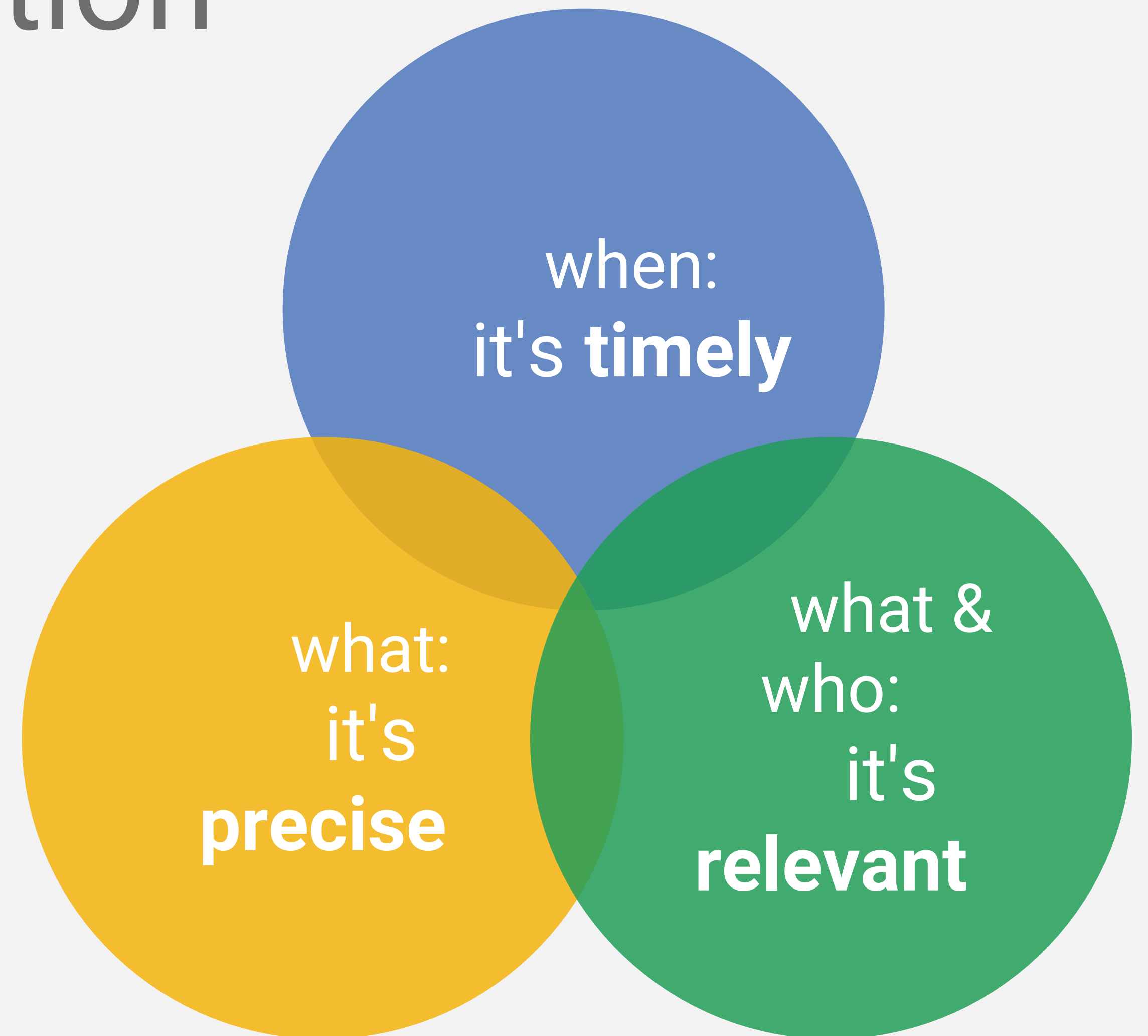
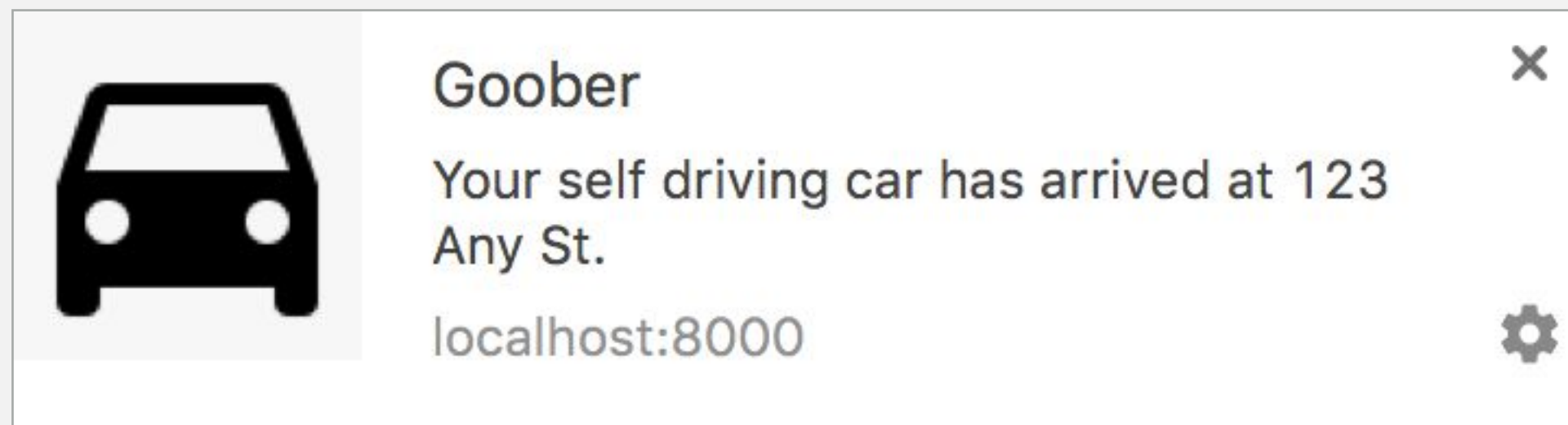
Anatomy of a notification



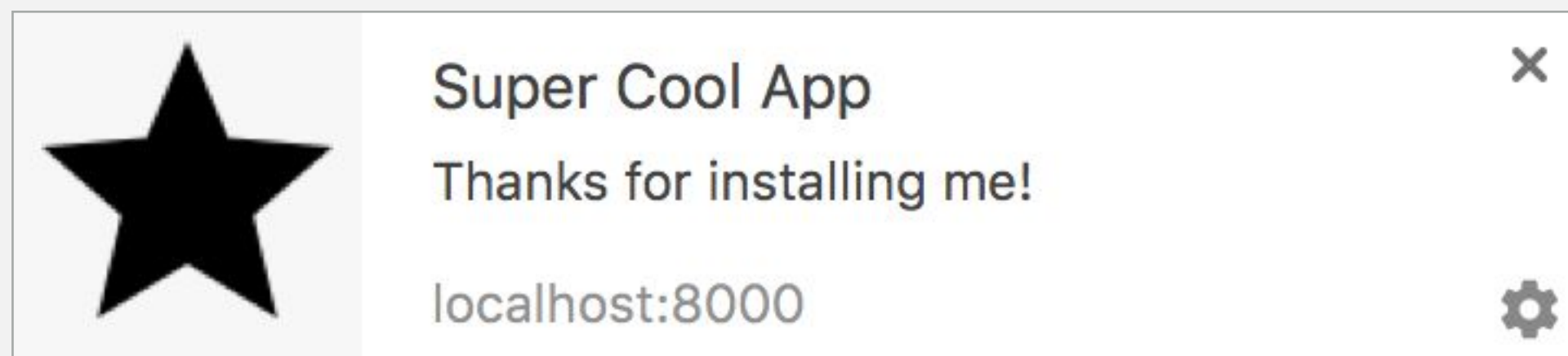
Anatomy of a notification



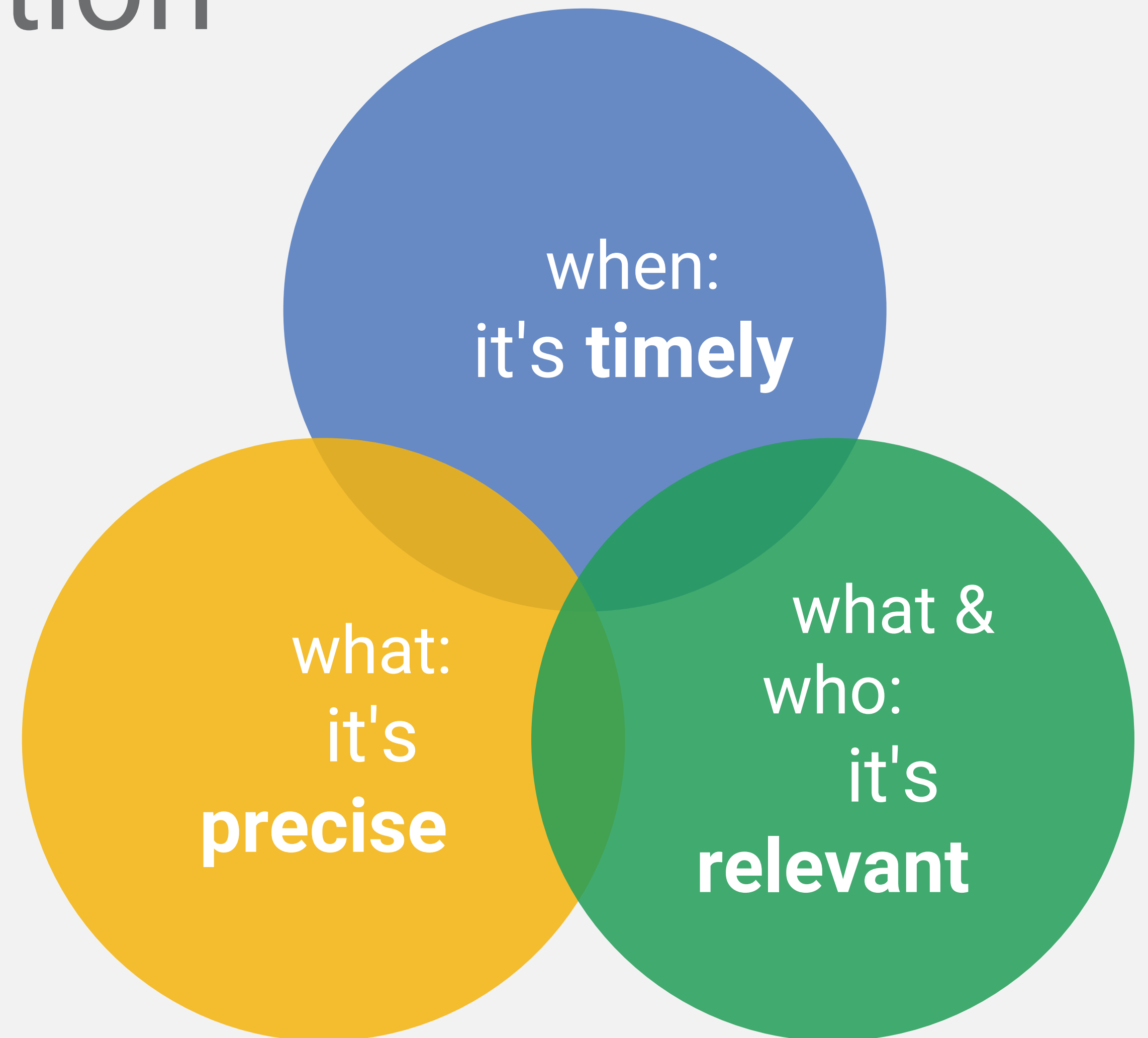
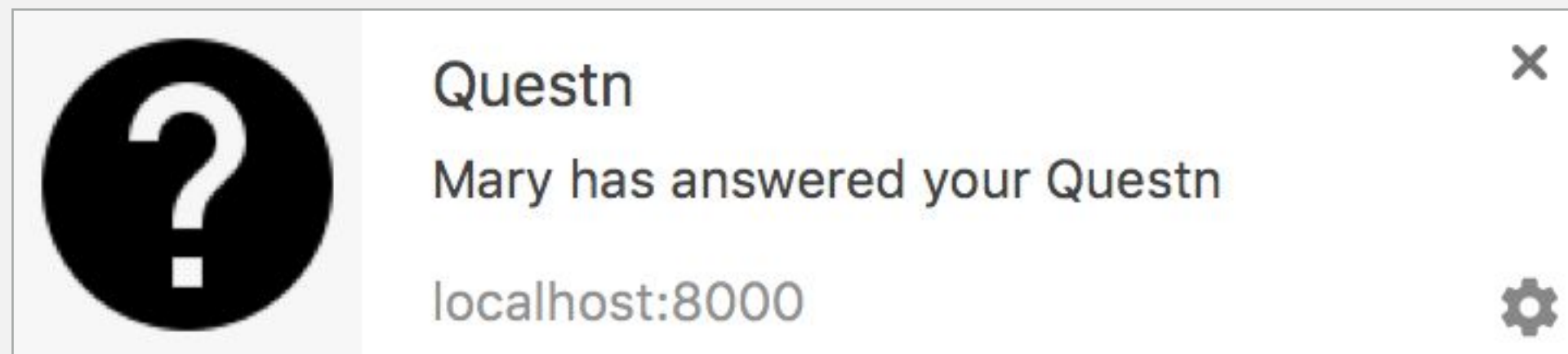
Anatomy of a notification



Anatomy of a notification



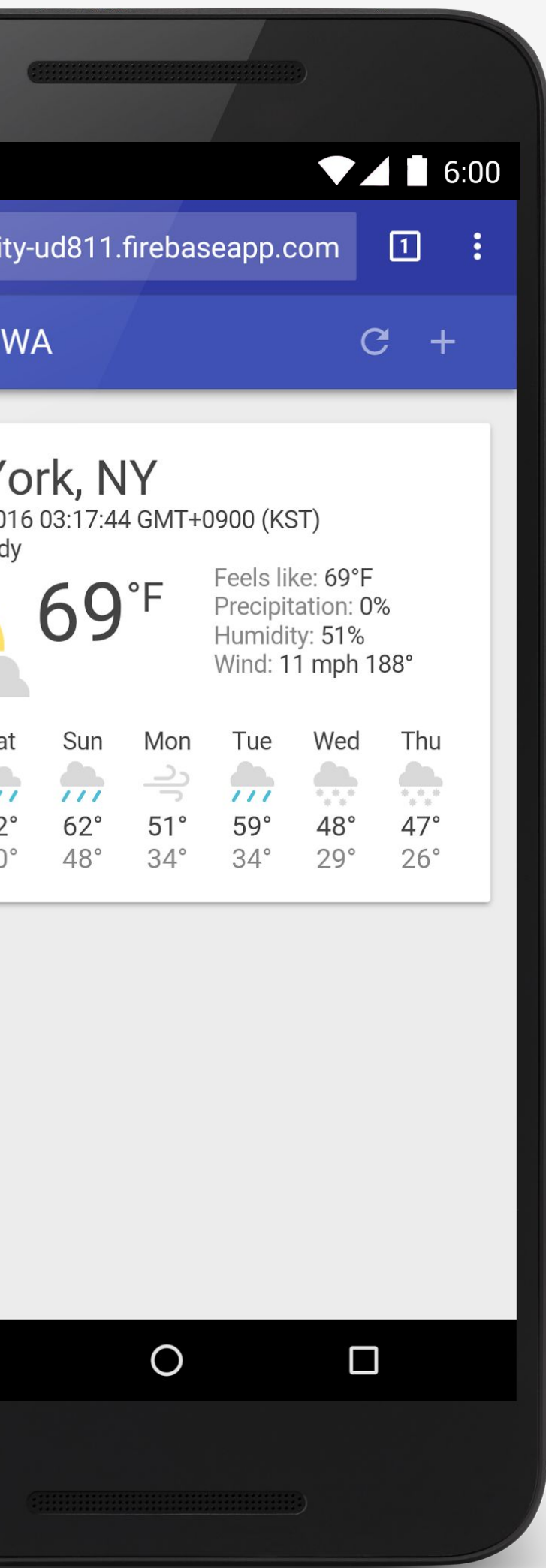
Anatomy of a notification



Push and Notification Flow

How it works

Built on Service Workers



GET /app.html HTTP/1.1
HOST example.com



GET /content.json HTTP/1.1
HOST example.com



/* ServiceWorker.js */

```
onfetch = function(e) {  
  if(e.request.url == "app.html") {  
    e.respondWith(  
      caches.match(e.request)  
    );  
  }  
  
  if(e.request.url == "content.json") {  
    // go to the network for updates,  
    // meanwhile, use cached content  
    fetch(...).then(function(r) {  
      r.asJSON().then(function(json) {  
        e.client.postMessage(json);  
      });  
    });  
  }  
};
```

GET /content.json HTTP/1.1
HOST example.com



Built on Service Workers



```
/* ServiceWorker.js */
```

```
onpush = function(event) {  
  var data = event.data.json();  
  var t = data.title;  
  var opt = {  
    body: data.body,  
    icon: data.icon,  
    tag: data.tag  
  };  
  self.registration  
    .showNotification(t, opt);  
};
```

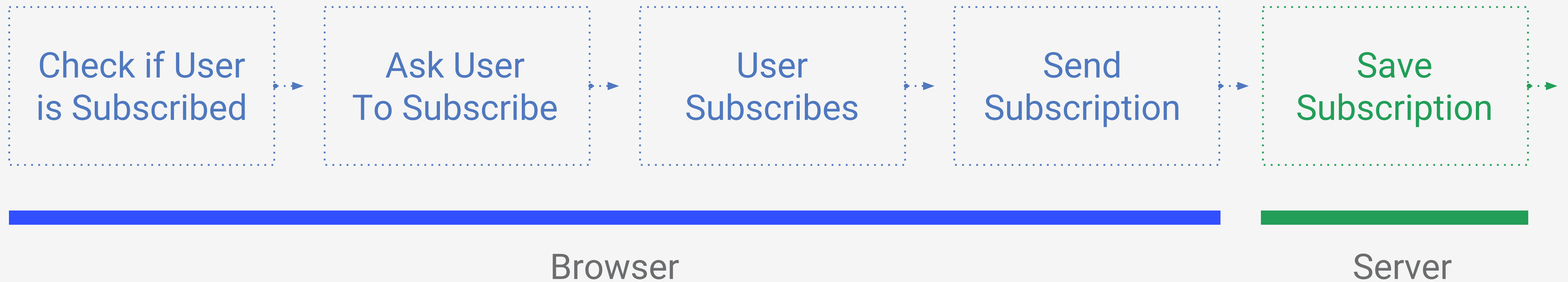


End
Point

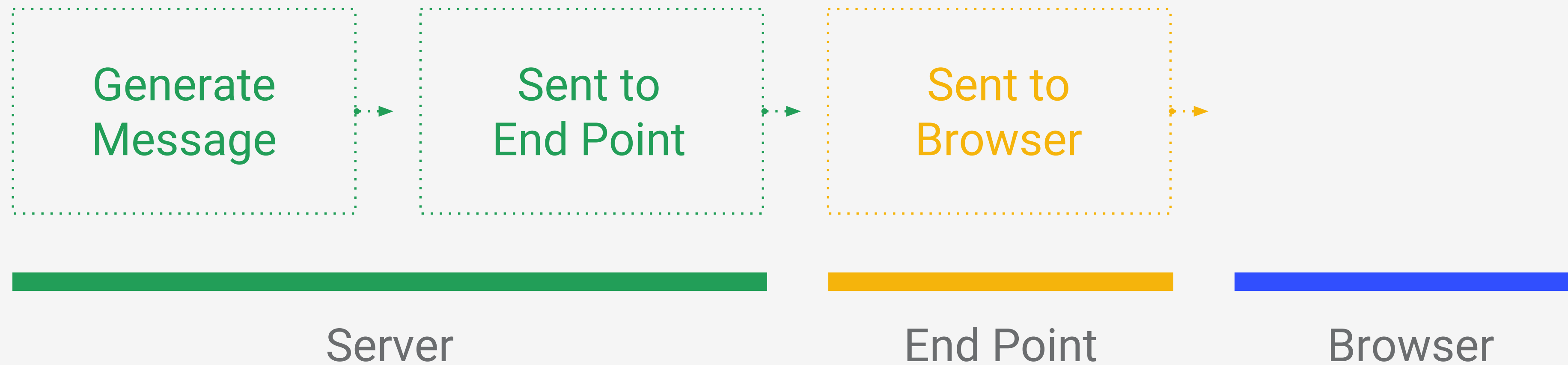


example.co
m

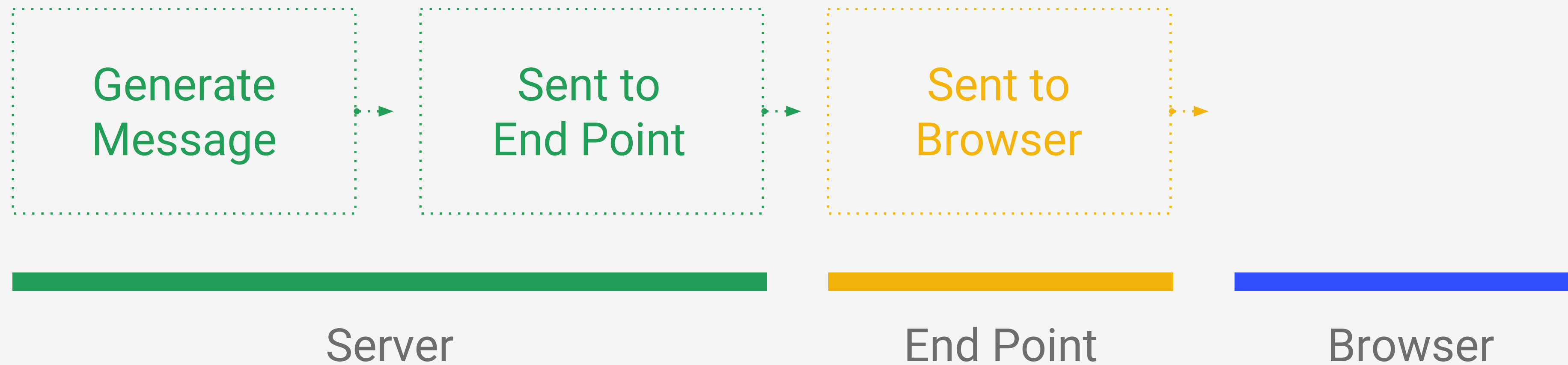
Subscribing Users



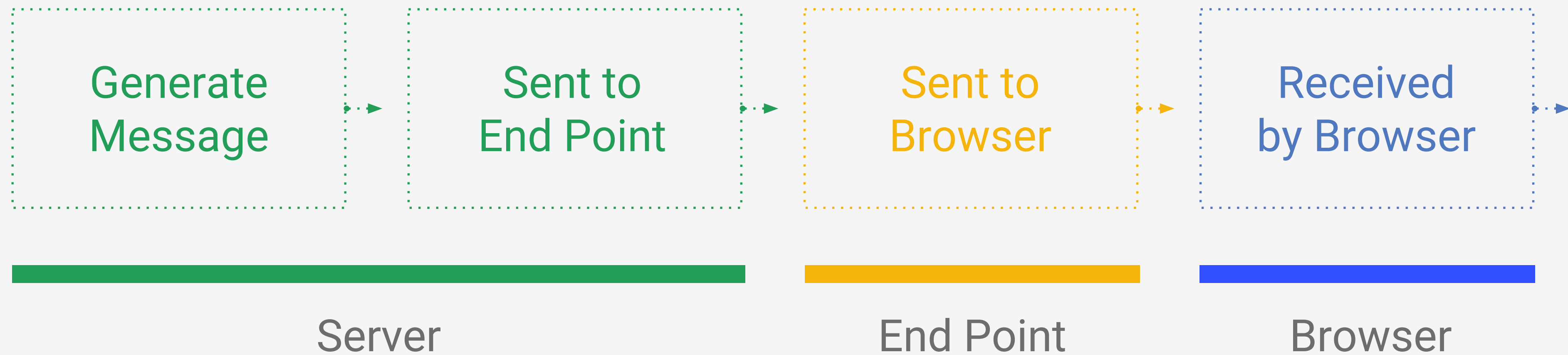
Sending Messages



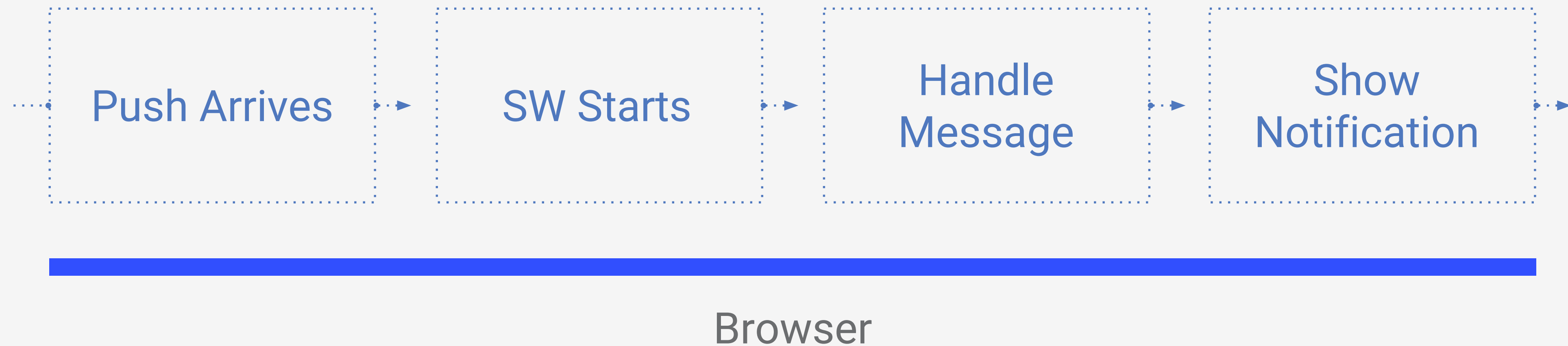
Sending Messages



Sending Messages



Receiving Messages



Setup

For the End Points

Web Push Protocol

Voluntary Application Service Identification (VAPID)

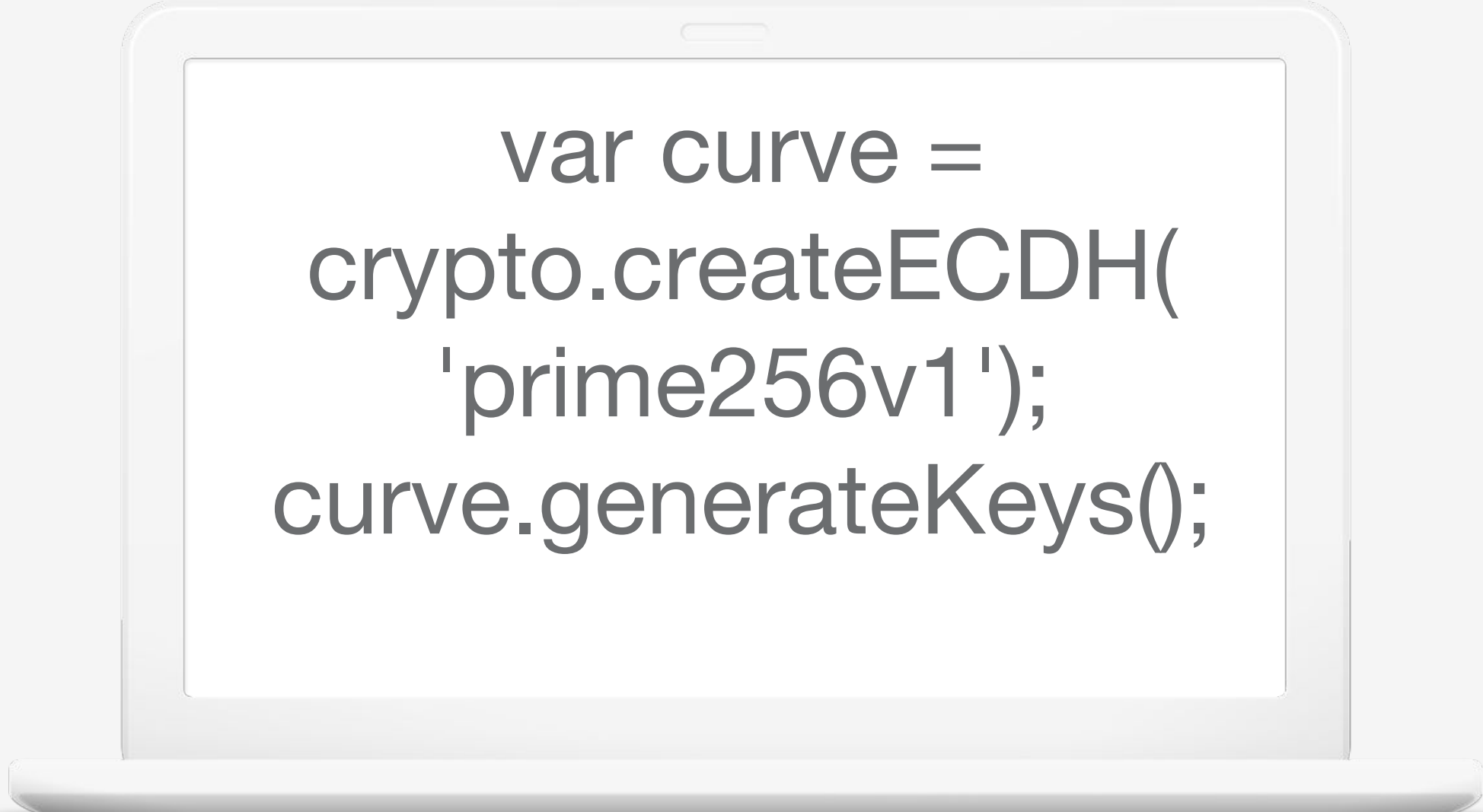
Public Key

Private Key

Required for
subscription

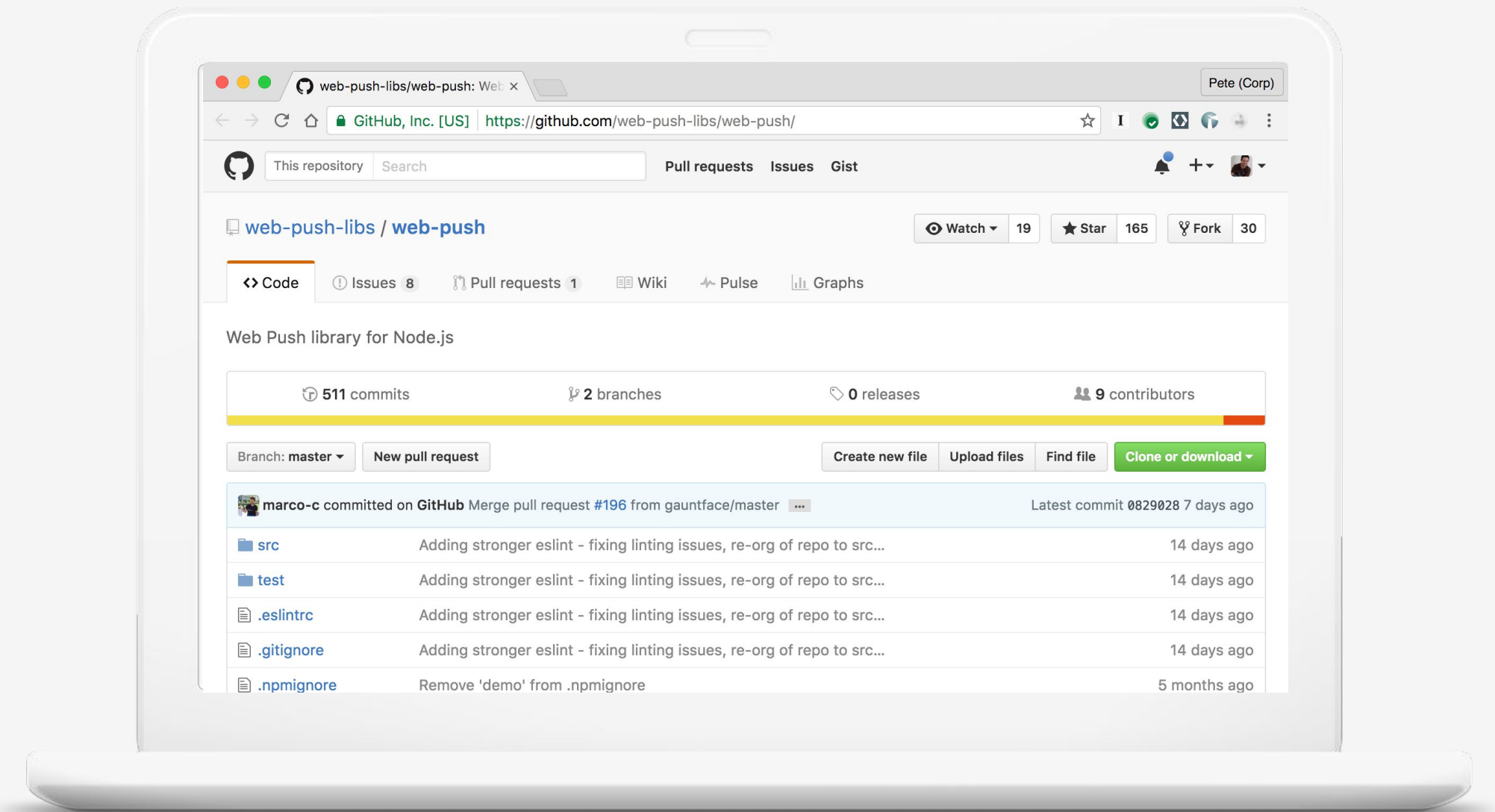
Required to
send message

Generating Vapid Keys

A white laptop with a silver base. The screen displays a code snippet for generating Vapid keys. Below the laptop is a thick red horizontal bar.

```
var curve =  
crypto.createECDH(  
  'prime256v1');  
curve.generateKeys();
```

Generate it yourself



Use a library

github.com/web-push-libs/web-push/

Subscribing and Unsubscribing

Checking for Subscriptions & Subscribing the User

Checking for Subscriptions

```
if ('serviceWorker' in navigator) {  
  navigator.serviceWorker.register('/service-worker.js')  
    .then(function(reg) {  
      reg.pushManager.getSubscription()  
        .then(function(sub) {  
          console.log('Subscription Info', sub);  
        });  
    });  
} else {  
  console.log('Subscription Info', 'Not Supported');  
  enableEmail();  
}
```

Checking for Subscriptions

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if ('serviceWorker' in navigator) {  
  navigator.serviceWorker.register('/service-worker.js')  
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} else {  
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  enableEmail();  
}
```


Subscribing the User

```
function subscribe() {  
  var opts = {userVisibleOnly: true, applicationServerKey: pubKey};  
  navigator.serviceWorker.getRegistration().then(function(reg) {  
    reg.pushManager.subscribe(opts)  
      .then(function(sub) {  
        console.log('Update Server with sub obj', sub);  
        updateServerWithSubscription(sub);  
      }).catch(function(error) {  
        console.log('Unable to subscribe user', error);  
      });  
  });  
}
```

Subscribing the User

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        console.log('Unable to subscribe user', error);  
      });  
  });  
}
```

Subscribing the User

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        console.log('Update Server with sub obj', sub);  
        updateServerWithSubscription(sub);  
      }).catch(function(error) {  
        console.log('Unable to subscribe user', error);  
      });  
  });  
}
```


Subscribing and Unsubscribing

The Subscription Object

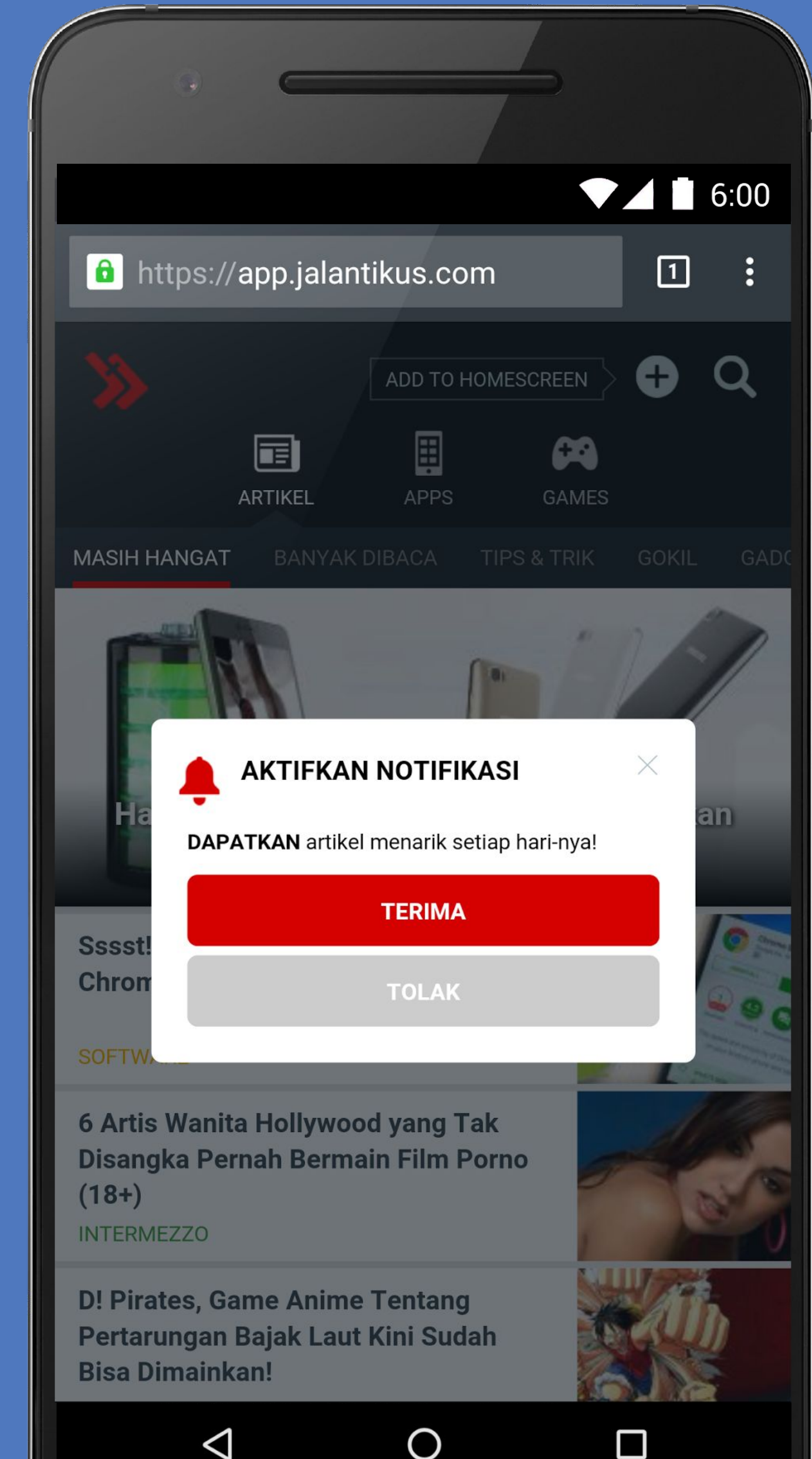
JSONified Subscription Object

```
{  
  "endpoint": "https://example.com/push/ddj4Sk3abw:A49b...",  
  "keys": {  
    "auth": "qLAYRzG9TnUwbprns6H2Ew==",  
    "p256dh": "BILXd-c1-zuEQYXH_tc3qmLcqZclw7-Xs0Nlu/sG..."  
  }  
}
```

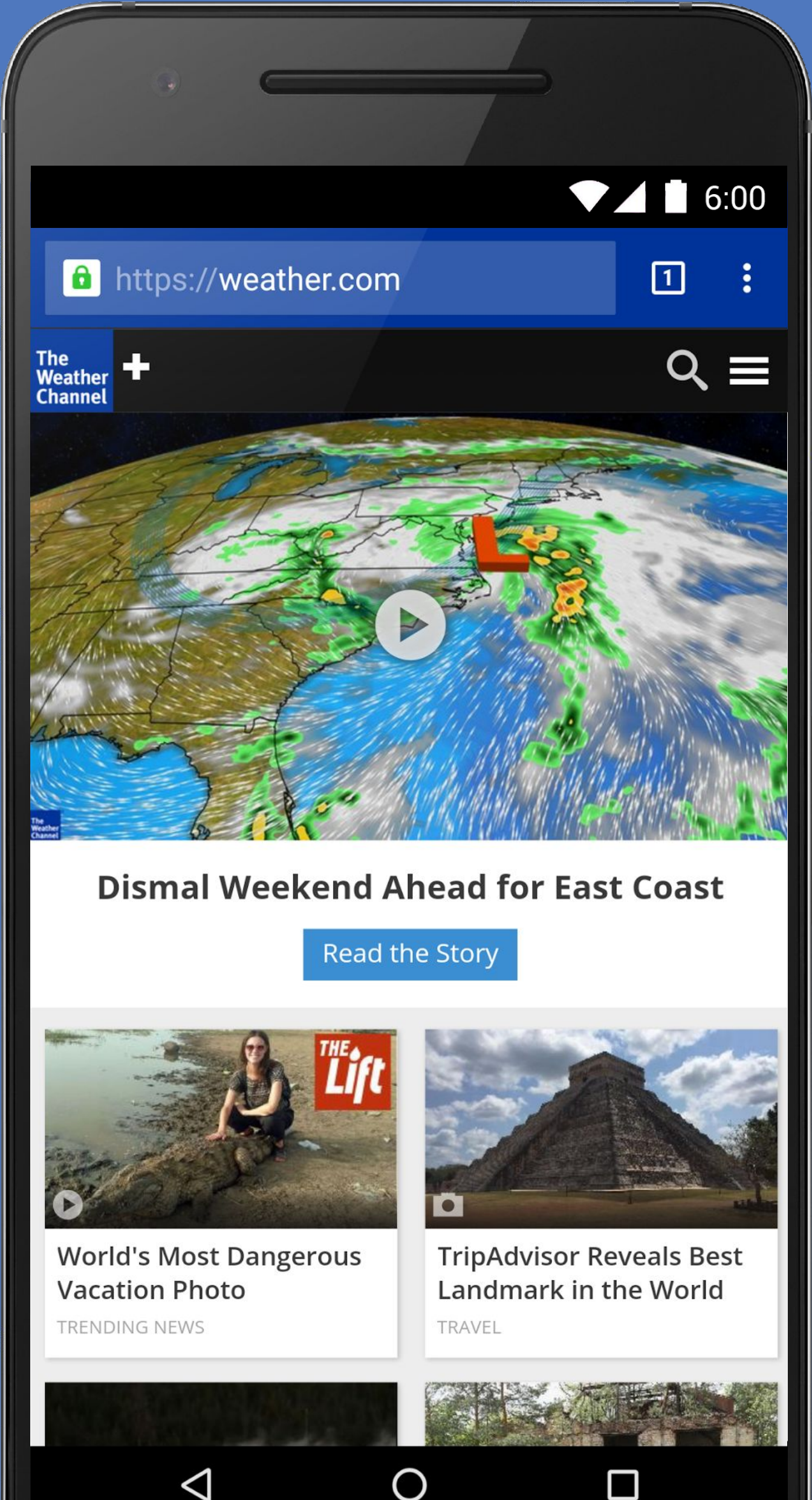
Subscribing and Unsubscribing

When To Prompt

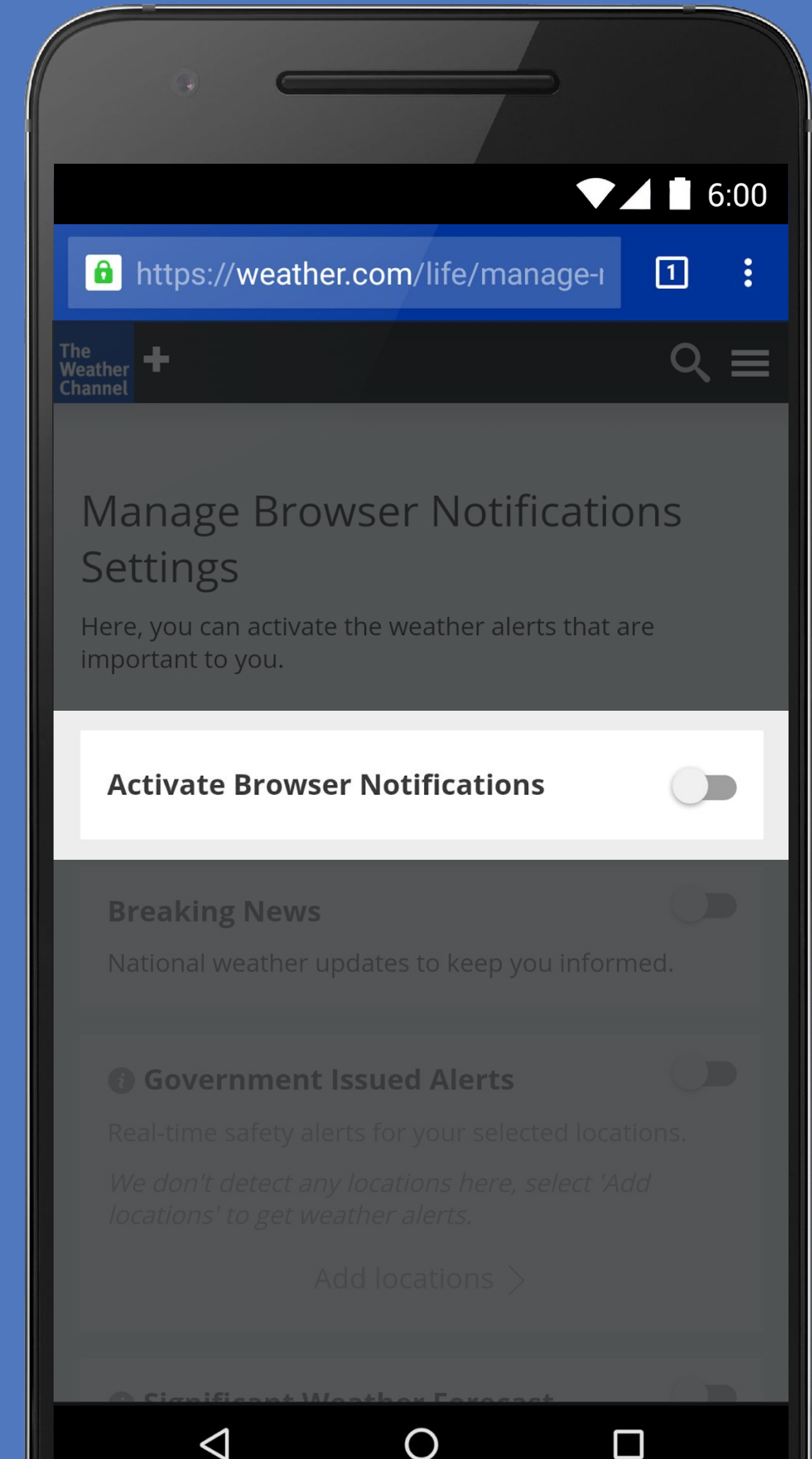
When to prompt?



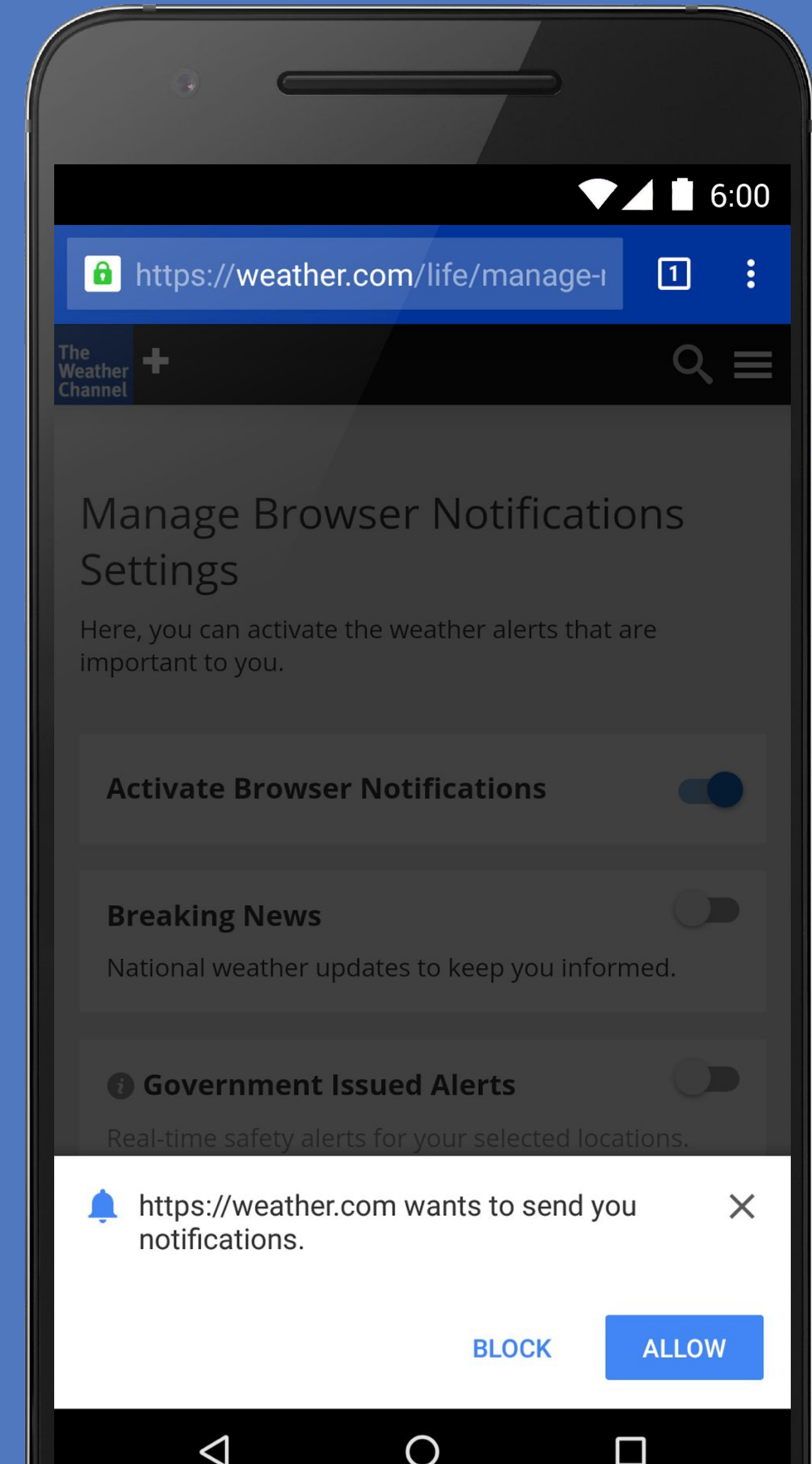
www.weather.com



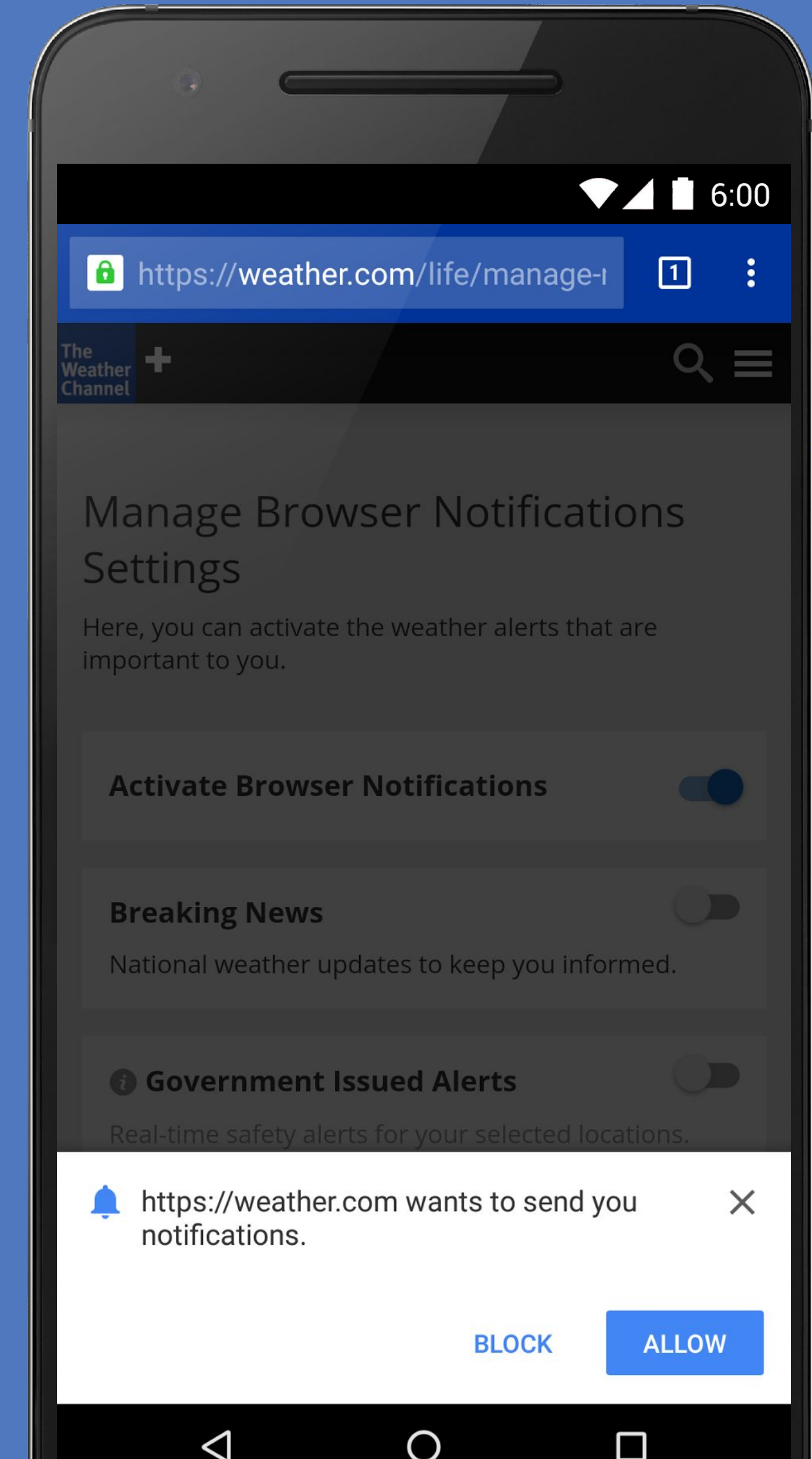
Specific,
contextual -
user initiated



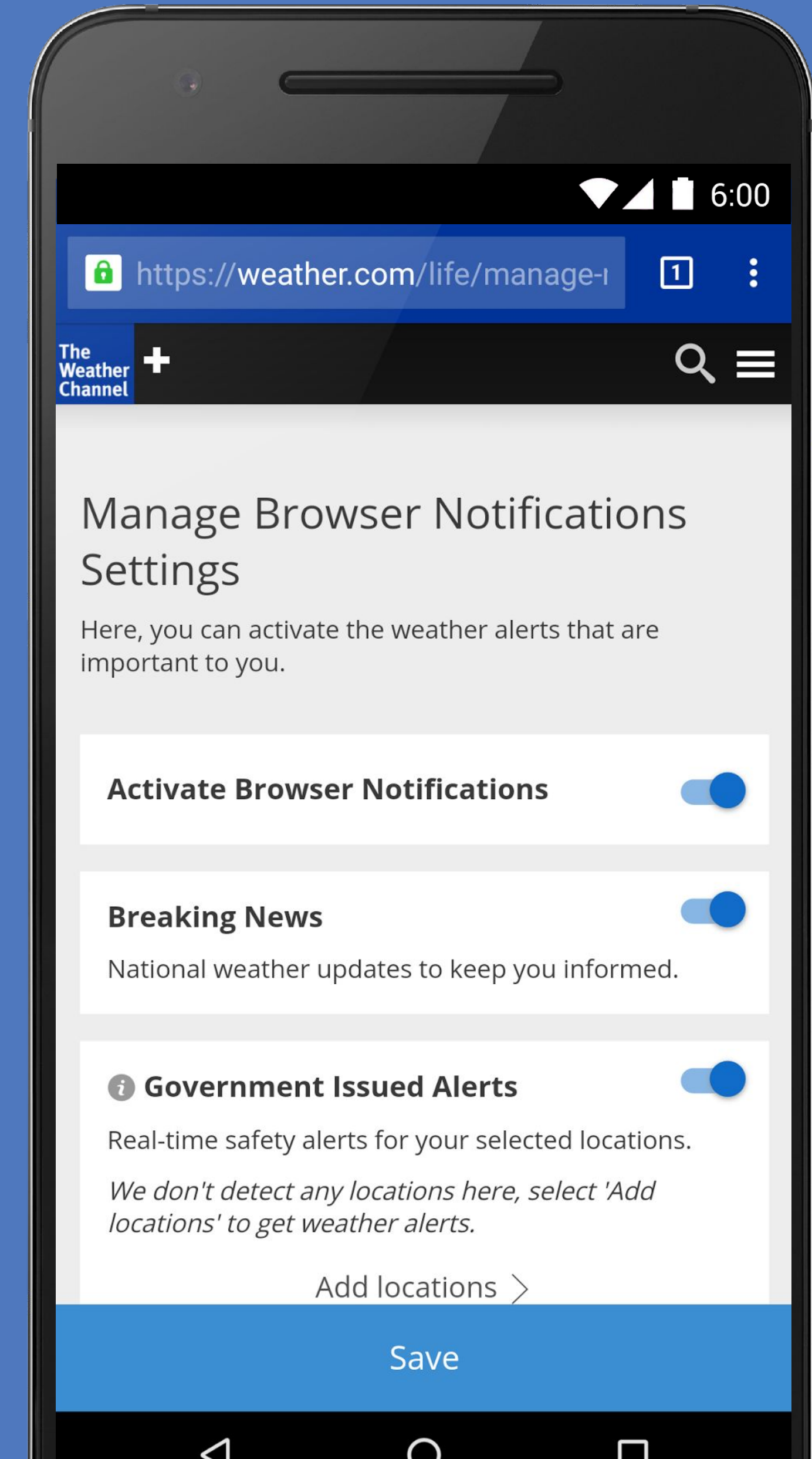
Specific,
contextual -
user initiated



No surprises!



Give users options



Subscribing and Unsubscribing

Unsubscribing

Unsubscribing the User

```
function unsubscribe() {  
  navigator.serviceWorker.getRegistration().then(function(reg) {  
    reg.pushManager.getSubscription().then(function(sub) {  
      if (sub) {  
        sub.unsubscribe();  
        console.log('Update our server to remove subscription');  
      }  
    });  
  }).catch(function(error) {  
    console.log('Error while trying to unsubscribe', error);  
  });  
}
```

Unsubscribing the User

```
function unsubscribe() {  
  navigator.serviceWorker.getRegistration().then(function(reg) {  
    reg.pushManager.getSubscription().then(function(sub) {  
      if (sub) {  
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      }  
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  }).catch(function(error) {  
    console.log('Error while trying to unsubscribe', error);  
  });  
}
```

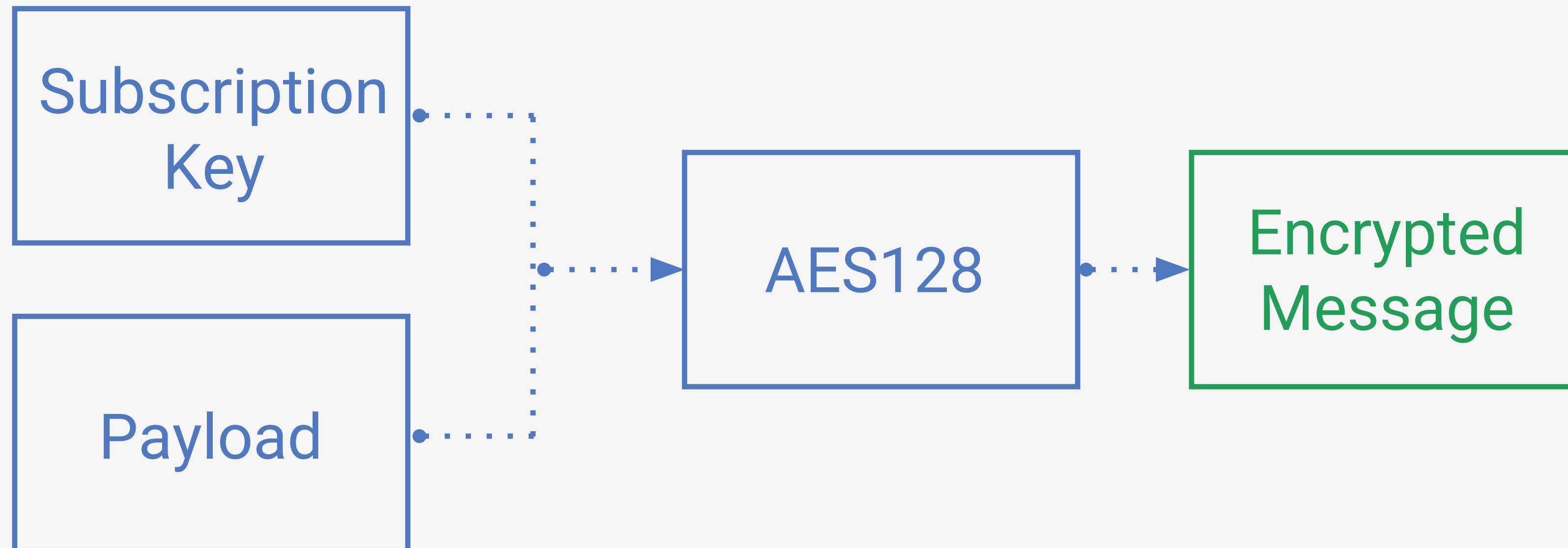

Unsubscribing the User

```
function unsubscribe() {  
  navigator.serviceWorker.getRegistration().then(function(reg) {  
    reg.pushManager.getSubscription().then(function(sub) {  
      if (sub) {  
        sub.unsubscribe();  
        console.log('Update our server to remove subscription');  
      }  
    });  
  }).catch(function(error) {  
    console.log('Error while trying to unsubscribe', error);  
  });  
}
```

Sending A Message

With the Web Push Protocol

Encrypted Messages



Remember: JSONified Subscription Object

```
{  
  "endpoint": "https://example.com/push/ddj4Sk3abw:A49b...",  
  "keys": {  
    "auth": "qLAYRzG9TnUwbprns6H2Ew==",  
    "p256dh": "BILXd-c1-zuEQYXH_tc3qmLcqZclw7-Xs0Nlu..."  
  }  
}
```


Sending A Message

PUT /push/ddj4Sk3abw:A49b... HTTP/1.1

HOST: example.com

TTL: 120

Content-Type: application/octet-stream

Content-Encoding: aesgcm128

Encryption: salt=xxxxxxx

Crypto-Key: dh=xxxxxxx; p256ecdsa=xxxxxx

Authorization: Bearer XXXXXXXXXXXXXXXX

@Ù ÐÒ\$TþÅ¼î ¾6XFXÄÙ...

Sending A Message

PUT /push/ddj4Sk3abw:A49b... HTTP/1.1

HOST: example.com

TTL: 120

Content-Type: application/octet-stream

Content-Encoding: aesgcm128

Encryption: salt=xxxxxxx

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Sending A Message

PUT /push/ddj4Sk3abw:A49b... HTTP/1.1

HOST: example.com

TTL: 120

Content-Type: application/octet-stream

Content-Encoding: aesgcm128

Encryption: salt=xxxxxxx

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Sending A Message

PUT /push/ddj4Sk3abw:A49b... HTTP/1.1

HOST: example.com

TTL: 120

Content-Type: application/octet-stream

Content-Encoding: aesgcm128

Encryption: salt=xxxxxxx

Crypto-Key: dh=xxxxxxx; p256ecdsa=xxxxxx

Authorization: Bearer XXXXXXXXXXXXXXXX

@Ù ÐÒ\$TþÅ¼î ¾6XFXÄÙ...

Sending A Message

PUT /push/ddj4Sk3abw:A49b... HTTP/1.1

HOST: example.com

TTL: 120

Content-Type: application/octet-stream

Content-Encoding: aesgcm128

Encryption: salt=xxxxxxx

Crypto-Key: dh=xxxxxxxx; p256ecdsa=xxxxxx

Authorization: Bearer XXXXXXXXXXXXXXXX

@Ù ÐÒ\$TþÅ¼î ¾6XFXÄÙ...

Remember: Vapid

Public Key

Private Key

Required for
subscription

Required to
send message

Sending A Message

PUT /push/ddj4Sk3abw:A49b... HTTP/1.1

HOST: example.com

TTL: 120

Content-Type: application/octet-stream

Content-Encoding: aesgcm128

Encryption: salt=xxxxxxx

Crypto-Key: dh=xxxxxxx; p256ecdsa=xxxxxx

Authorization: Bearer XXXXXXXXXXXXXXXX

@Ù ÐÒ\$TþÅ¼î ¾6XFXÄÙ...

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Web Push Libraries


web-push-libs/web-push: Web x

Pete (Corp)



← → ↺ 🏠


GitHub, Inc. [US] https://github.com/web-push-libs/web-push/


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Web Push library for Node.js

🕒 515 commits

🌿 2 branches

🏷️ 0 releases

👤 9 contributors

Branch: master ▾


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 marco-c Fix devDependencies URL Latest commit f9b8d32 3 days ago

 src	Adding stronger eslint - fixing linting issues, re-org of repo to src...	21 days ago
 test	Merge branch 'master' of github.com:marco-c/web-push	5 days ago
 .eslintrc	Adding stronger eslint - fixing linting issues, re-org of repo to src...	21 days ago
 .gitignore	Adding stronger eslint - fixing linting issues, re-org of repo to src...	21 days ago
 .npmignore	Remove 'demo' from .npmignore	5 months ago
 .travis.yml	Fixing merge conflict	3 months ago
 LICENSE	Add LICENSE file	11 months ago
 README.md	Fix devDependencies URL	2 days ago

Handling the Incoming Message

Browser

Listening For Messages

```
self.addEventListener('push', function(event) {  
  var data;  
  if (event.data) {  
    data = event.data.json();  
  } else {  
    // fetch data from server  
  }  
  self.registration.showNotification(data.title, {  
    body: data.body, icon: data.icon, tag: data.tag  
  });  
});
```

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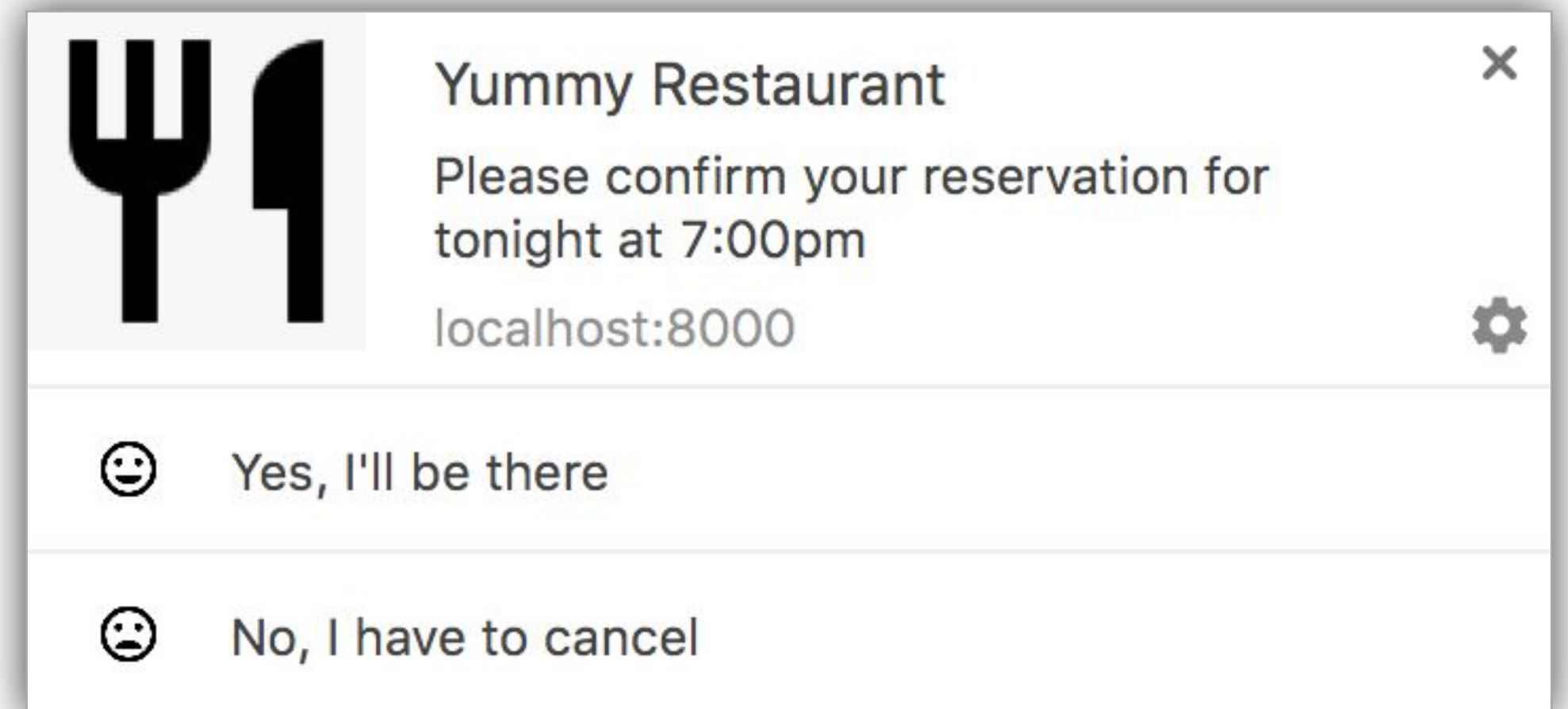
Action Buttons

**Make it easy to complete tasks,
without opening the app**

Like

Tweet

Confirm or cancel reservations



Adding Action Buttons

```
self.registration.showNotification(data.title, {  
    body: data.body,  
    icon: data.icons,  
    tag: data.tag,  
    actions: [  
        {action: 'like', title: 'Like', icon: ic_li},  
        {action: 'reshare', title: 'Reshare', icon: ic_re}  
    ]  
});
```

Adding Action Buttons

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    ]  
});
```

Responding To The User

```
self.addEventListener('notificationclick', function(event) {  
  if (event.action === 'like') {  
    event.waitUntil(fetch('/like-from-notification'));  
  } else if (event.action === 'reshare') {  
    event.waitUntil(fetch('/reshare-from-notification'));  
  } else {  
    clients.openWindow(event.srcElement.location.origin);  
  }  
});
```

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```


Build Better Engagement

Add a **manifest.json**
for Add to Homescreen

Make notifications
timely, precise and **relevant**

Ask permission in context

Be **awesome!**



What's Next?

More resources to help

Web Push Notification Getting Started Guide

g.co/WebPushNotifications

Encrypting Data Payloads

developers.google.com/web/updates/2016/03/web-push-encryption

Vapid in Chrome

developers.google.com/web/updates/2016/07/web-push-interop-wins

Thank You!

PROGRESSIVE WEB APP

ROADSHOW

2016

