



# Google Beacons and The Physical Web

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# What is a Beacon?

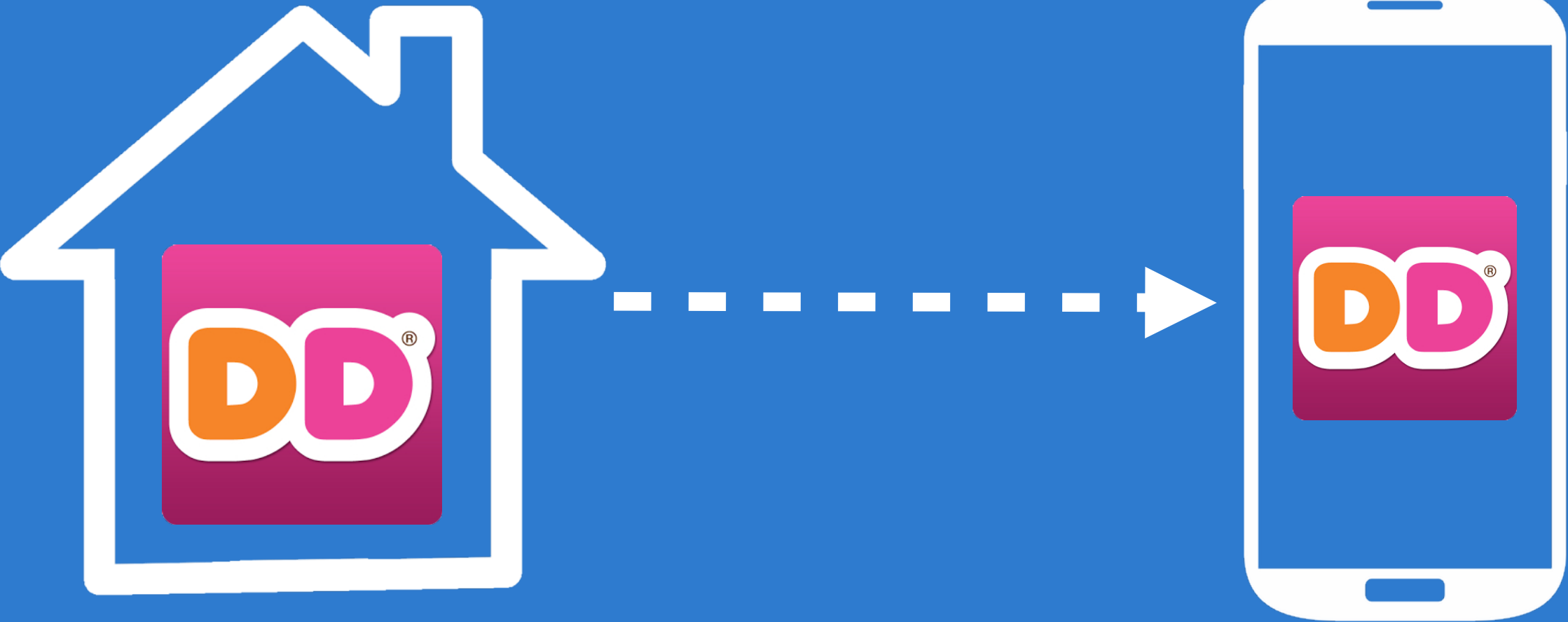


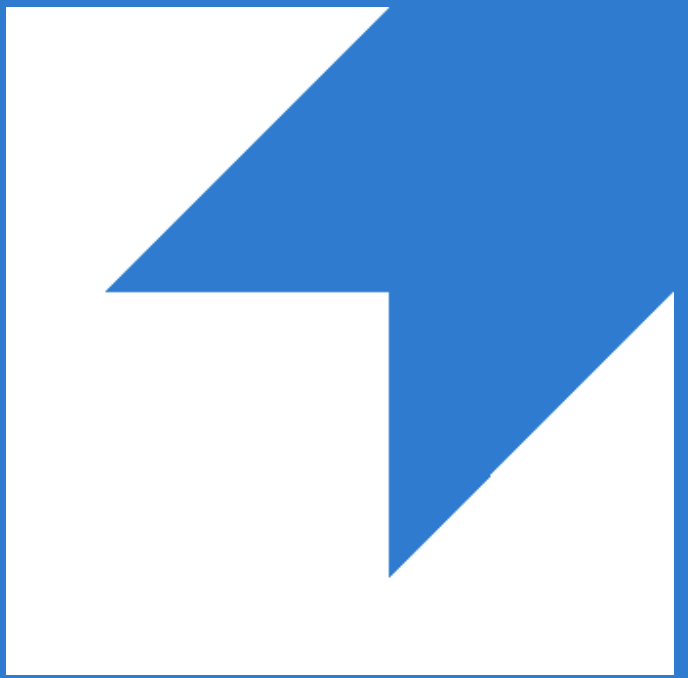


**iBeacon**



<<Manufacturer Specific Data>>





<<Service UUID>>

03	03	FEAA
----	----	------

<<Service Data>>

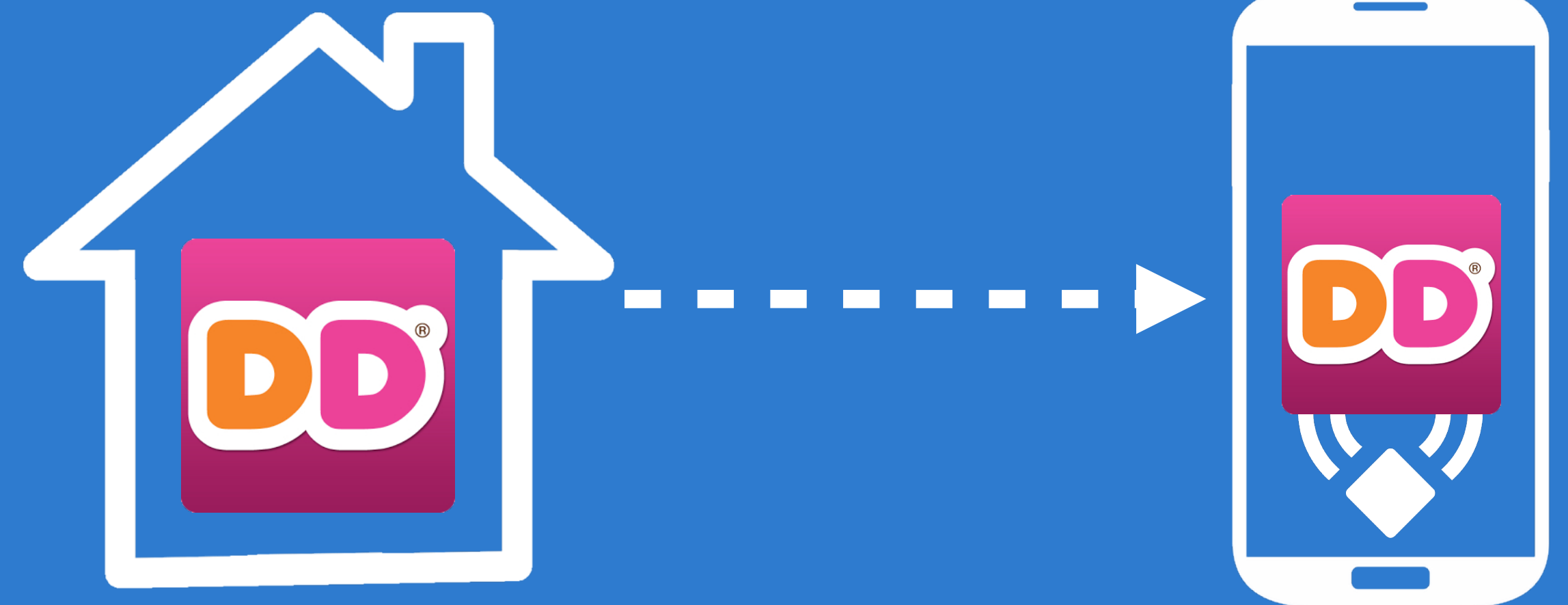
...	16	FEAA	00	TX	Namespace ID (10 bytes)	⋮	Instance ID (6 bytes)
-----	----	------	----	----	----------------------------	---	--------------------------

*UID*

...	16	FEAA	10	TX	⋮	Encoded URL (up to 18 bytes)
-----	----	------	----	----	---	---------------------------------

*URL*

  
~1-2s



# Eddystone-UID

`sha1(newcircle.com) = 442560da34bd204a9ed745628876485ee446d908`

# Eddystone-UID

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	Namespace ID										Instance ID					
Eddystone #1	44	25	60	DA	34	BD	20	4A	9E	D7	00	00	00	00	00	01
Eddystone #2	44	25	60	DA	34	BD	20	4A	9E	D7	00	00	00	00	00	02
Eddystone #3	44	25	60	DA	34	BD	20	4A	9E	D7	00	00	00	00	00	03
Eddystone #4	44	25	60	DA	34	BD	20	4A	9E	D7	00	00	00	00	00	04

# Eddystone Scanner

```
// Eddystone service uuid (0xfeaa)
private static final ParcelUuid UID_SERVICE =
    ParcelUuid.fromString("0000feaa-0000-1000-8000-00805f9b34fb");

// Include the namespace id to filter
private static final byte[] NAMESPACE_FILTER = {
    /* 0x0000d89bed6e130ee5cf1ba1000000000000 */ };

// Bitmask to apply filter just to namespace id
private static final byte[] NAMESPACE_FILTER_MASK = {
    /* 0xff00ffffffffffffffffffffffff000000000000 */ };

ScanFilter beaconFilter = new ScanFilter.Builder()
    .setServiceUuid(UID_SERVICE)
    .setServiceData(UID_SERVICE, NAMESPACE_FILTER, NAMESPACE_FILTER_MASK)
    .build();
List<ScanFilter> filters = Collections.singletonList(beaconFilter);

ScanSettings settings = new ScanSettings.Builder()
    .setScanMode(ScanSettings.SCAN_MODE_LOW_LATENCY)
    .build();
```



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```

# Eddystone Scanner



Nearby  
Messages  
API

```
BluetoothManager manager = (BluetoothManager) getSystemService(BLUETOOTH_SERVICE);  
BluetoothLeScanner scanner = manager.getAdapter().getBluetoothLeScanner();  
scanner.startScan(filters, settings, mScanCallback);
```

```
private ScanCallback mScanCallback = new ScanCallback() {  
    @Override  
    public void onScanResult(int callbackType, ScanResult result) {  
        byte[] data = result.getScanRecord().getServiceData(UID_SERVICE);  
        //...parse UID namespace + instance...  
    }  
    ...  
};
```

# Eddystone-TLM

<<Service UUID>>

03	03	FEAA
----	----	------

<<Service Data>>

...	16	FEAA	20	...	<i>BATT</i>	<i>TEMP</i>	<i>ADV_CNT</i>	<i>ELAPSED</i>
-----	----	------	----	-----	-------------	-------------	----------------	----------------

**Battery  
Voltage**

**Beacon  
Temperature**

**Advertisement  
Count**

**Elapsed Seconds  
Since Power-On**

# Proximity Beacon API



**Beacon Metadata  
(Attachments)**

**Beacon  
Provisioning**

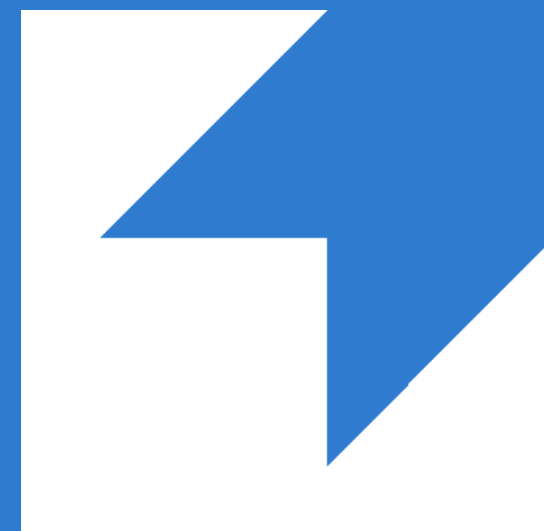
**Beacon  
Diagnostics**

# Proximity Beacon API

**Beacon Metadata  
(Attachments)**

**Beacon  
Provisioning**

**Beacon  
Diagnostics**



# Eddystone-URL

<http://newcircle.com/android>

# Eddystone-URL

h	t	t	p	:	/	/	n	e	w	c	i	r	c	l	e	.	c	o	m	/	a	n	d	r	o	i	d
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

02	6E	65	77	63	69	72	63	6C	65	00	61	6E	64	72	6F	69	64
----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----

<http://newcircle.com/android> → <http://goo.gl/BhqDJb>

# The Physical Web



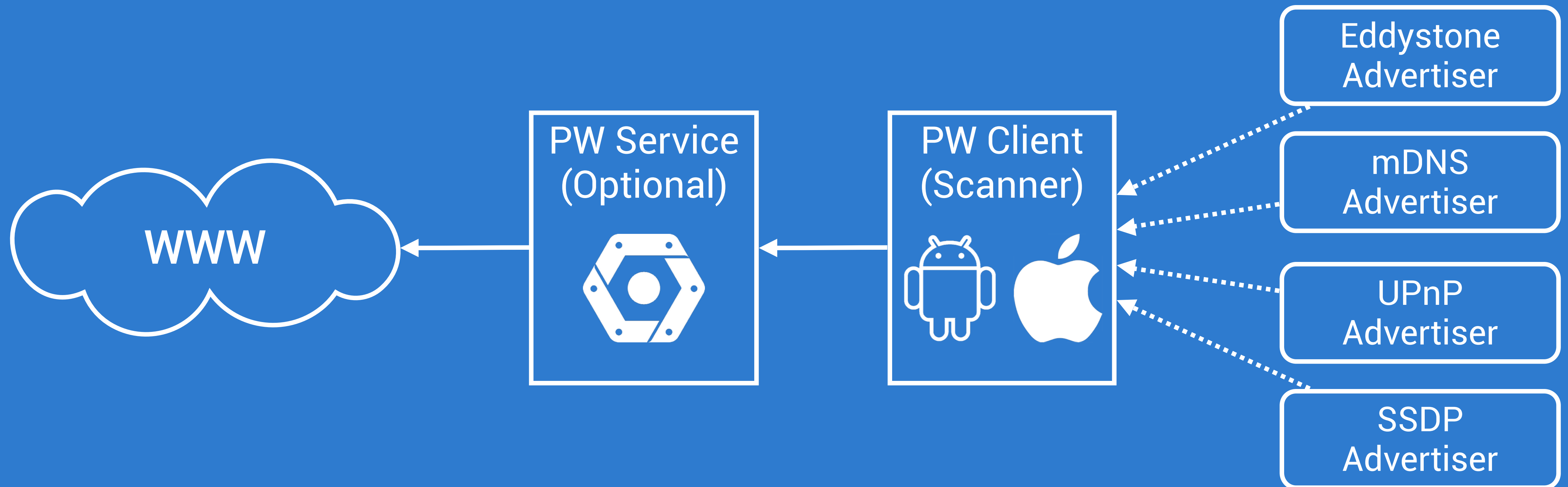


# The Physical Web



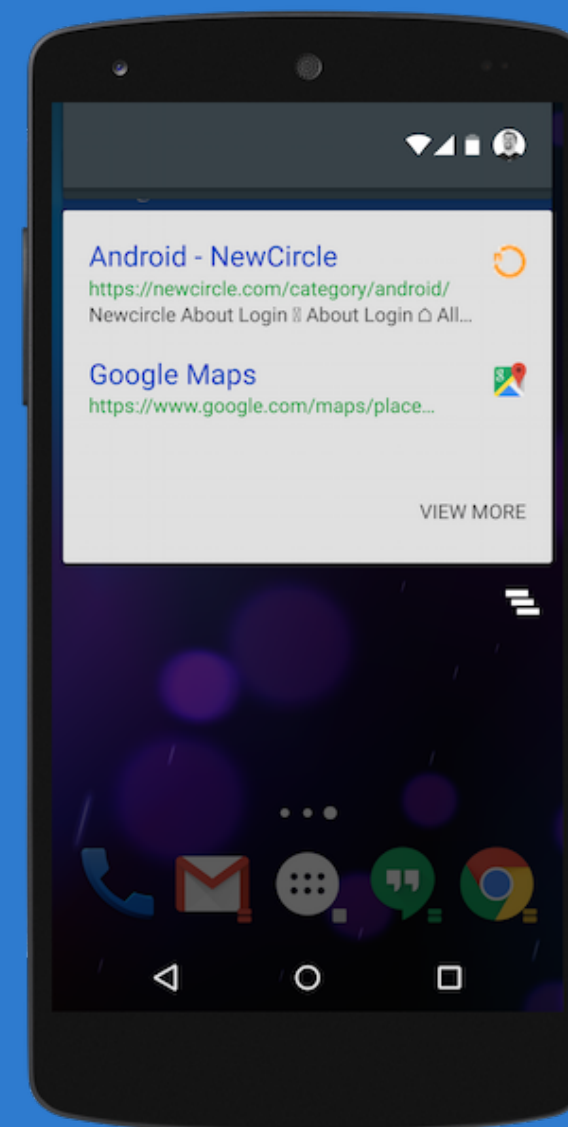
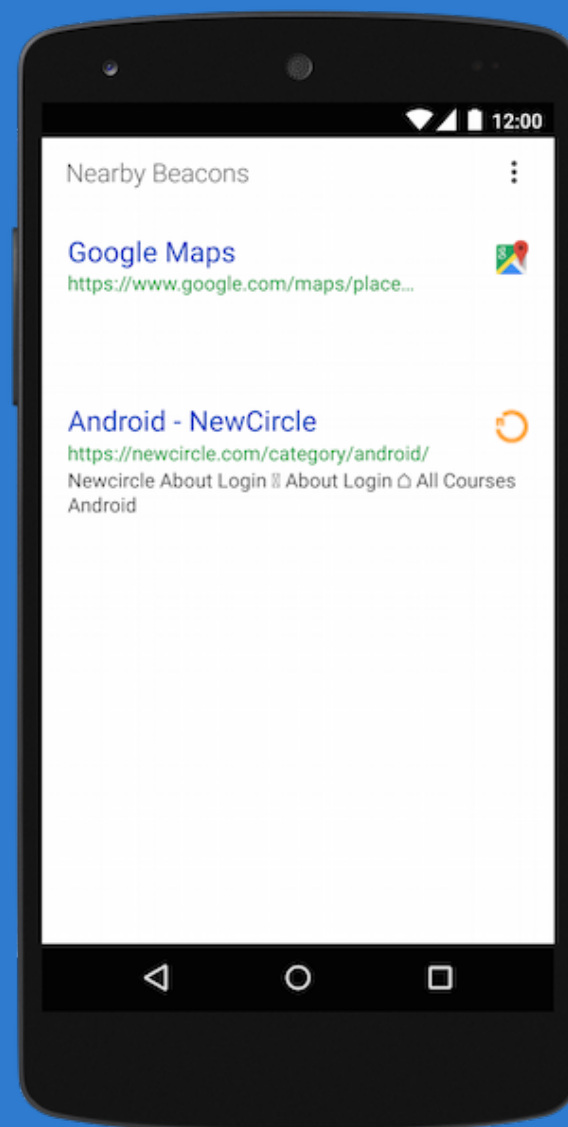
"Walk up and use anything"

# Physical Web Architecture



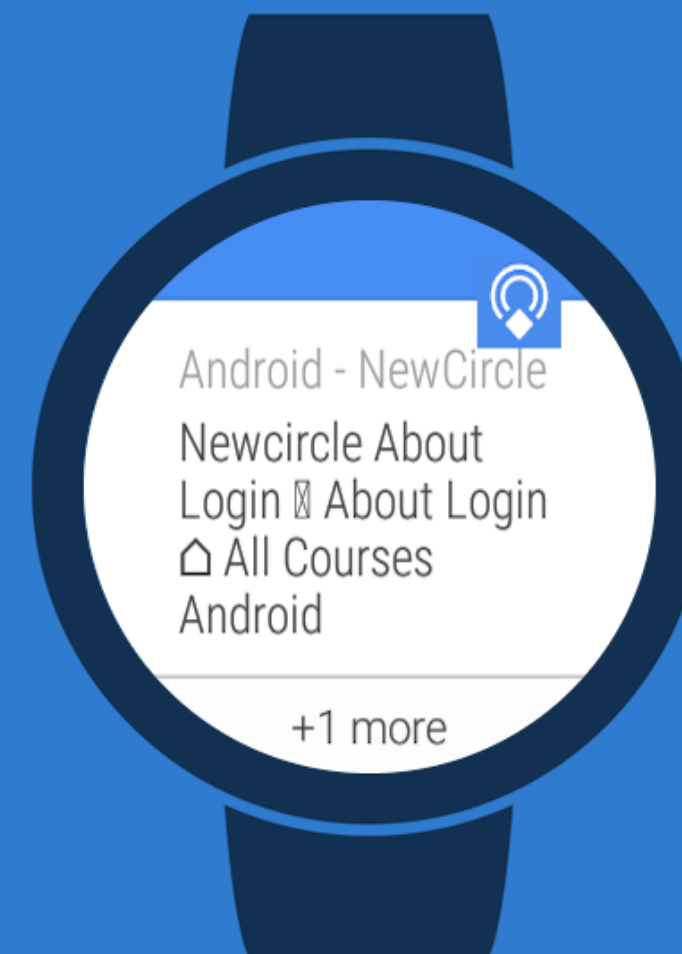
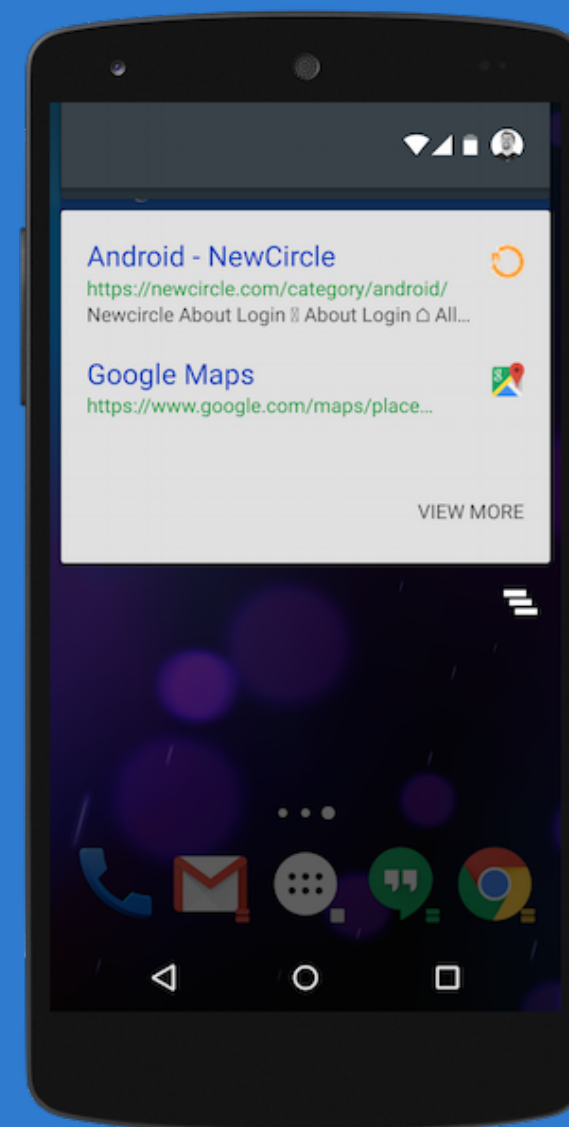
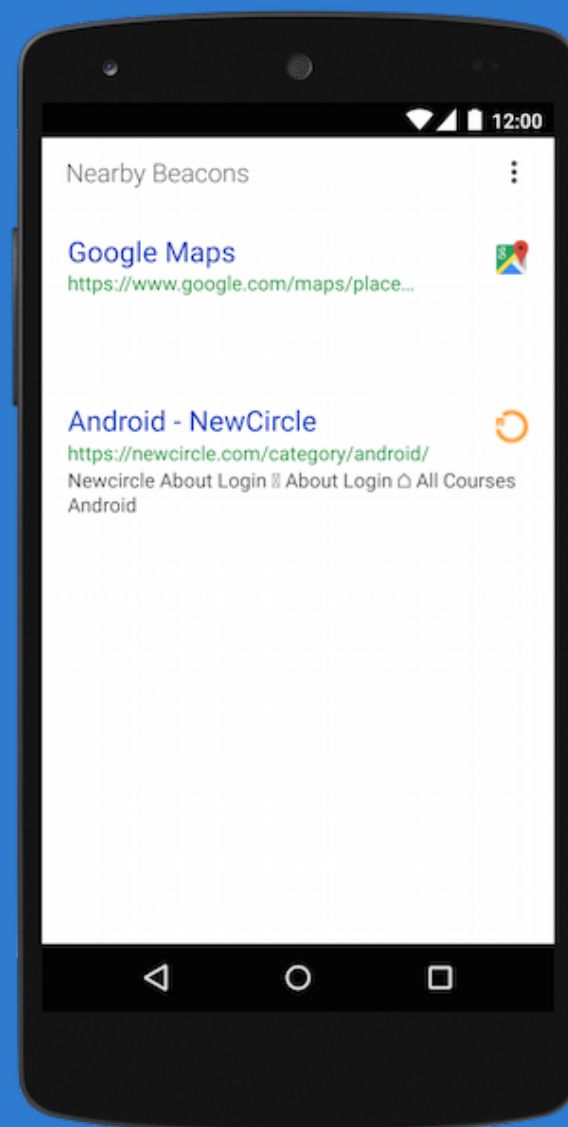
# Physical Web Architecture

PW Client  
(Scanner)

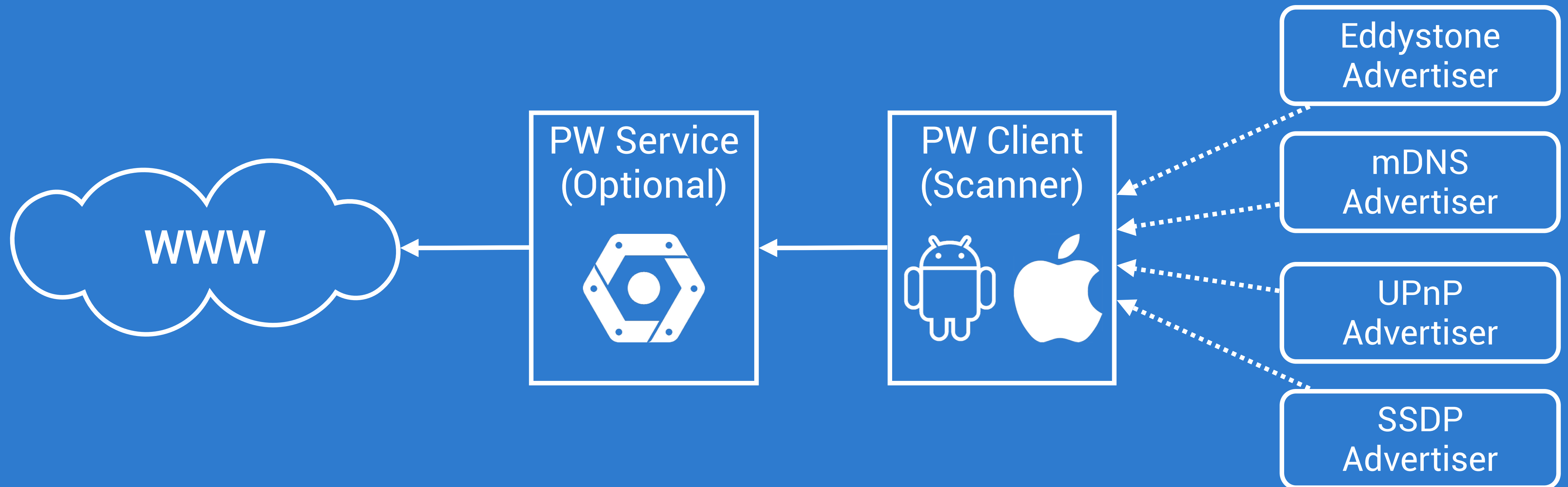


# Physical Web Architecture

PW Client  
(Scanner)



# Physical Web Architecture



# Physical Web Architecture

PW Service  
(Optional)

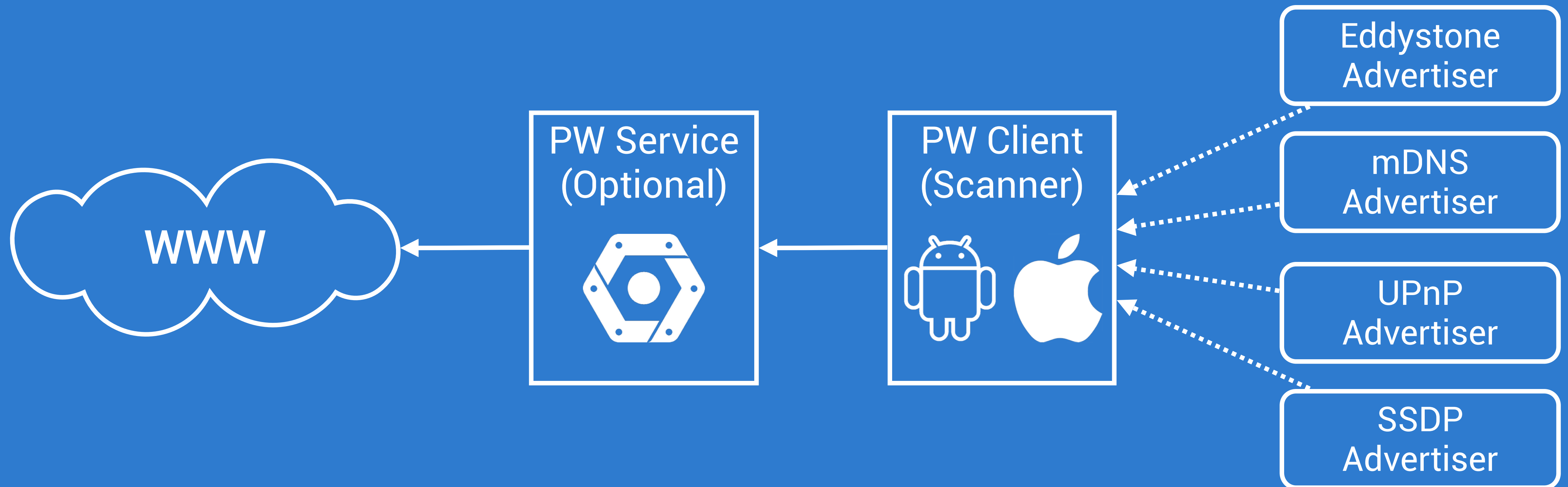


**Fetches URL  
Metadata**

**Potentially Filter  
Malicious URLs**

**Proxy Link  
Follows**

# Physical Web Architecture



# Deep Linking

```
<intent-filter>
  <action android:name="android.intent.action.VIEW" />
  <category android:name="android.intent.category.DEFAULT" />
  <category android:name="android.intent.category.BROWSABLE" />

  <!-- Accepts URIs that begin with "gizmos://example" -->
  <data android:scheme="gizmos"
        android:host="example" />
</intent-filter>
```



# App Indexing

```
<html>
<head>
  ...
  <link rel="alternate" href="android-app://com.gizmos.android/gizmos/example" />
  <link rel="alternate" href="ios-app://123456/gizmos/example" />
  ...
</head>
<body> ... </body>
```

<http://goo.gl> → Provides automatic follows of indexed URLs

# App Invites (Beta)

- Shareable direct links to download/install application
  - G+ link that redirects to the appropriate app store
- Acts as a deep link if already installed

# Learn More

- Physical Web demo apps + documentation: <https://github.com/google/physical-web>
- Google beacon specifications: <https://github.com/google/eddystone>
- Additional Samples: <http://milehighandroid.com>
- Videos/Tutorials:
  - NewCircle BLE Android Tutorial: <https://goo.gl/IFzQ3Y>
  - NewCircle BLE Lollipop Tutorial: <https://goo.gl/Md9ZkA>
  - Google Using Nearby with Beacons: <https://www.youtube.com/watch?v=7InjJGqP15E>
  - Google Developing with Beacons: <https://www.youtube.com/watch?v=s-4J7cijPAo>

# Grab Some Beacons

