

Introducing ARCore

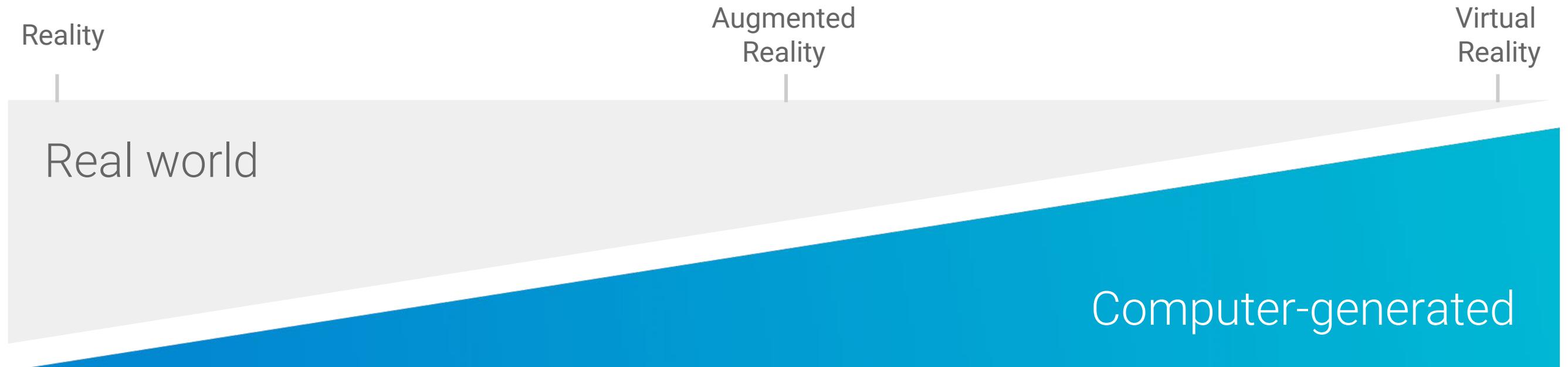
Augmented Reality at Android Scale

How AR and VR fit together



AR + VR = Immersive Computing

AR and VR are points on a spectrum of **immersive computing**. When digital imagery completely replaces what you see, you have VR. And when you add digital objects to what you're already seeing, you have augmented reality.





VR can take you anywhere.

VR can **take** you anywhere. It lets you explore new places and experience new things.



AR can bring anything to you.

AR can **bring** anything to you. It adds computer-generated information and objects to your everyday world.





Immersive computing is the future

TECHNOLOGY THAT WORKS MORE LIKE WE DO

AR and VR make computing more intuitive and natural. When computers work more like we do, they're easier to use and more accessible.

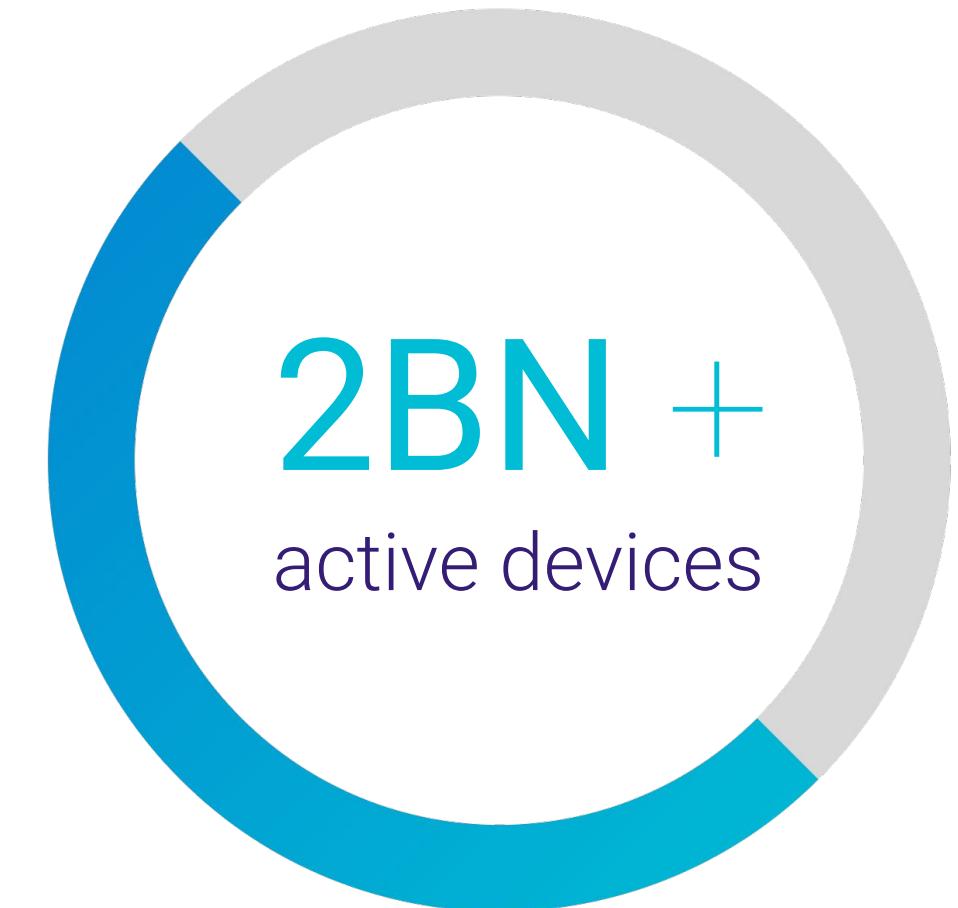
INVESTMENTS IN VR AND AR COMPOUND

By investing in both AR and VR, we've made more technical advances than by focusing on just one.

Augmented reality at Android scale

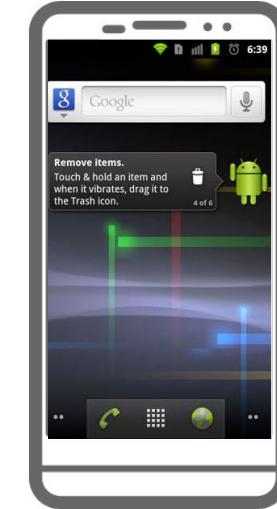
Android Scale

Android is the world's most popular mobile platform



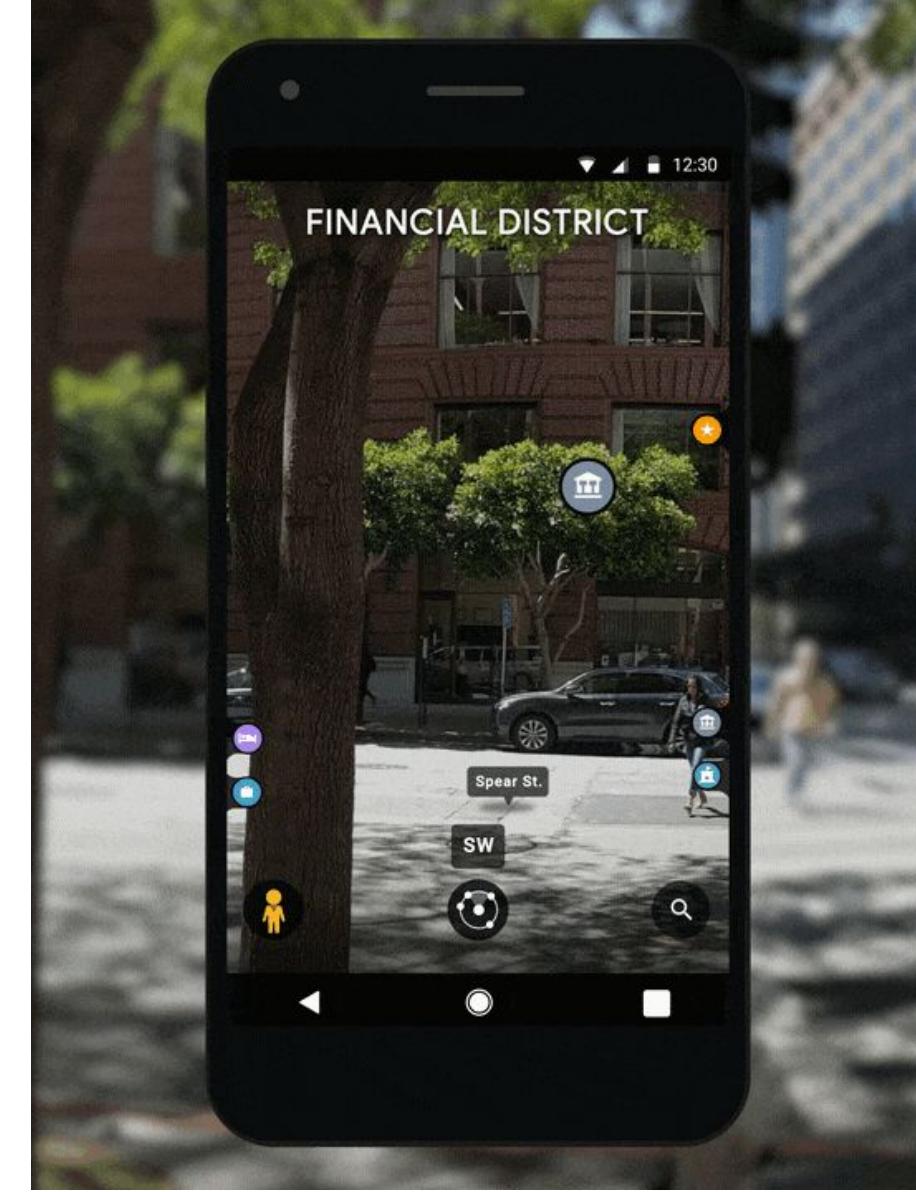
Since Android's launch in 2008, phones have become more useful

Mobile devices have gotten more powerful and easier to use. They have touch interfaces, they understand voice commands, and they have sensors which infer context from our surroundings.



AR marks the next big shift in what's possible with mobile devices

AR can bring digital information to you in the context of the real world, right where it's most accessible and useful.



Google

Google has been developing AR technology since 2014, with Tango

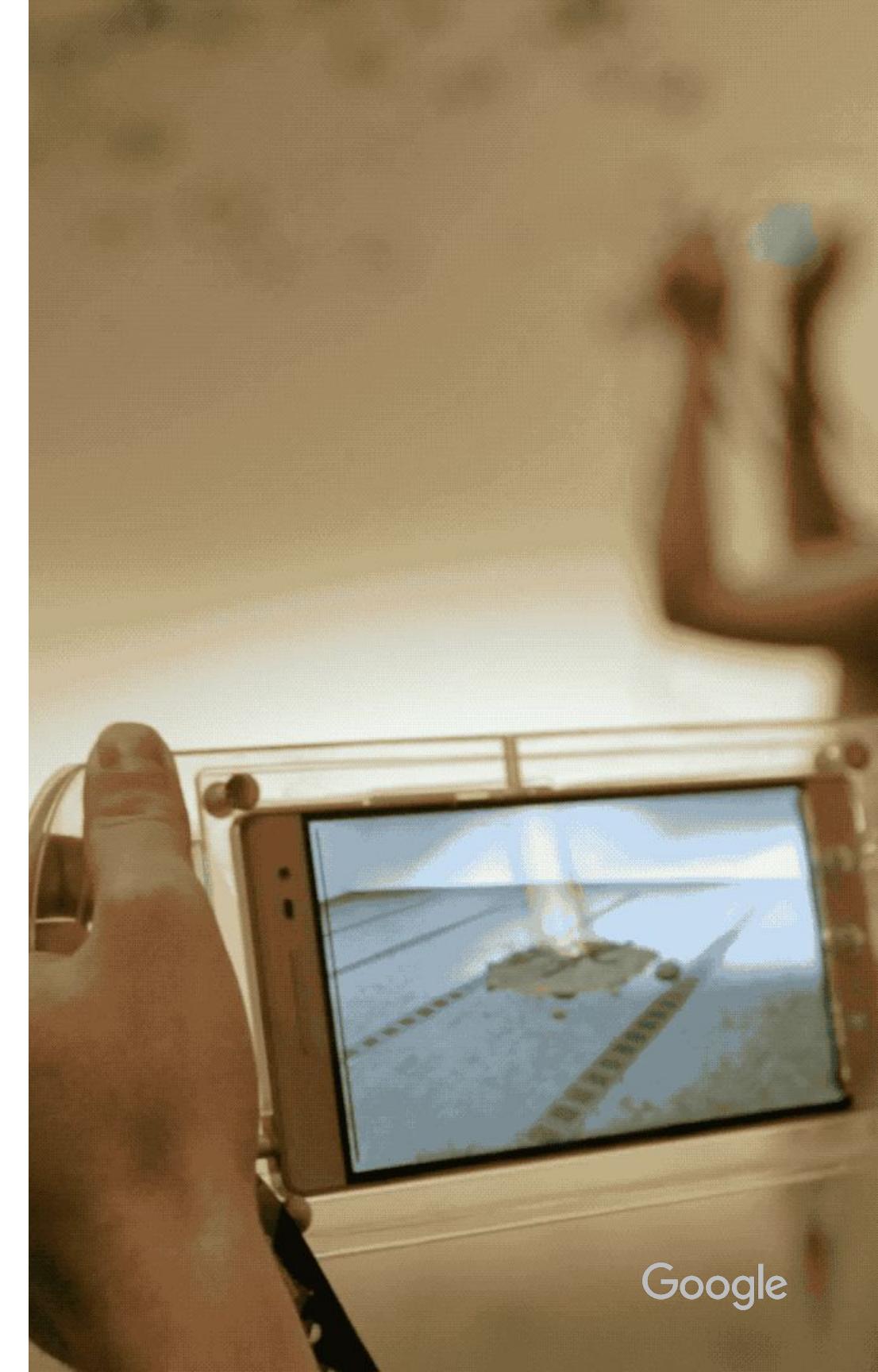
Tango uses extra
sensors to see the
world in 3D



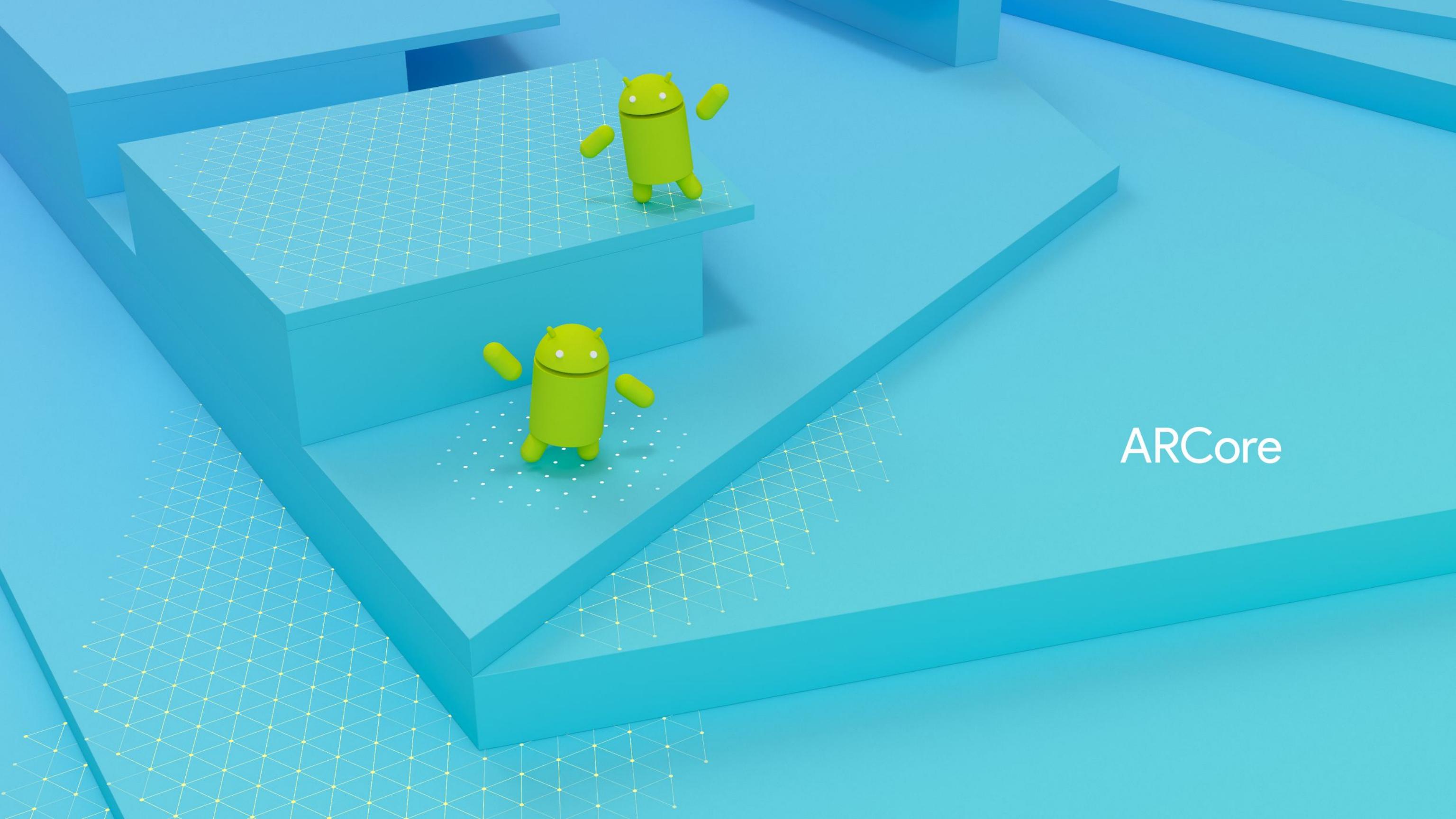
It maps indoor
spaces with high
accuracy



Enables virtual
objects to behave
as if they were real



Google

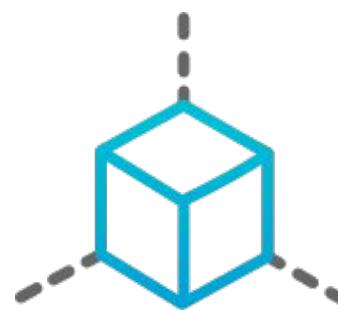


ARCore

**We've taken everything we learned
from Tango to begin making AR
available at Android scale, without
special hardware**



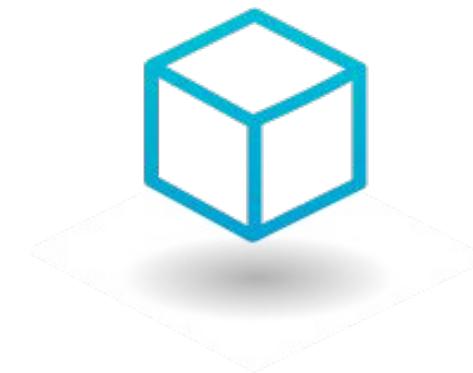
ARCore Fundamental Concepts



MOTION TRACKING



ENVIRONMENTAL
UNDERSTANDING



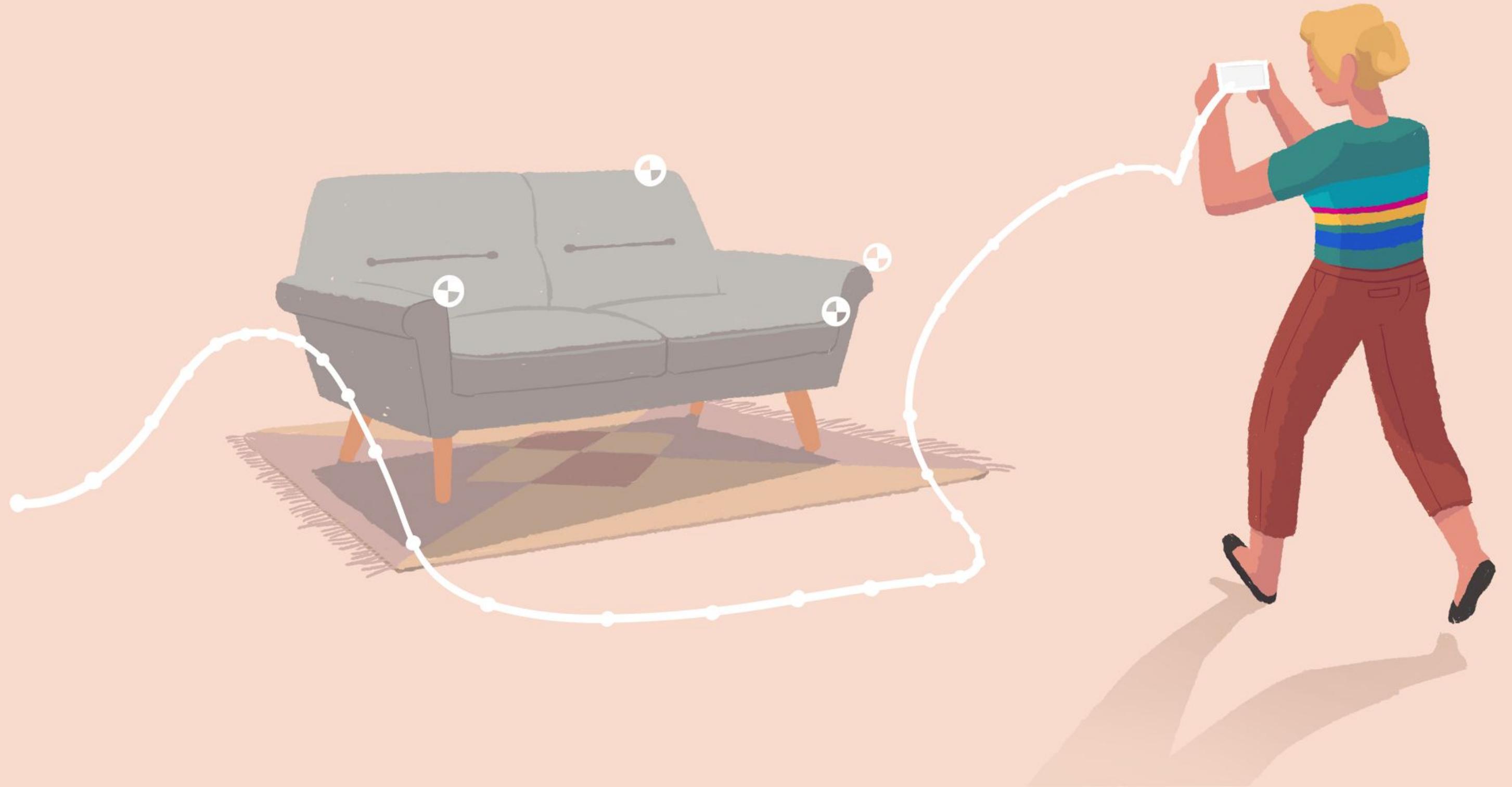
LIGHT
ESTIMATION

Motion Tracking

As your **mobile device moves through the world**, ARCore combines visual data from the device's camera and inertial measurements from the device's IMU to estimate the pose (position and orientation) of the camera relative to the world over time.

This process, called **concurrent odometry and mapping (COM)**, lets ARCore know where the device is relative to the world around it, and recover gracefully when the world changes rapidly.



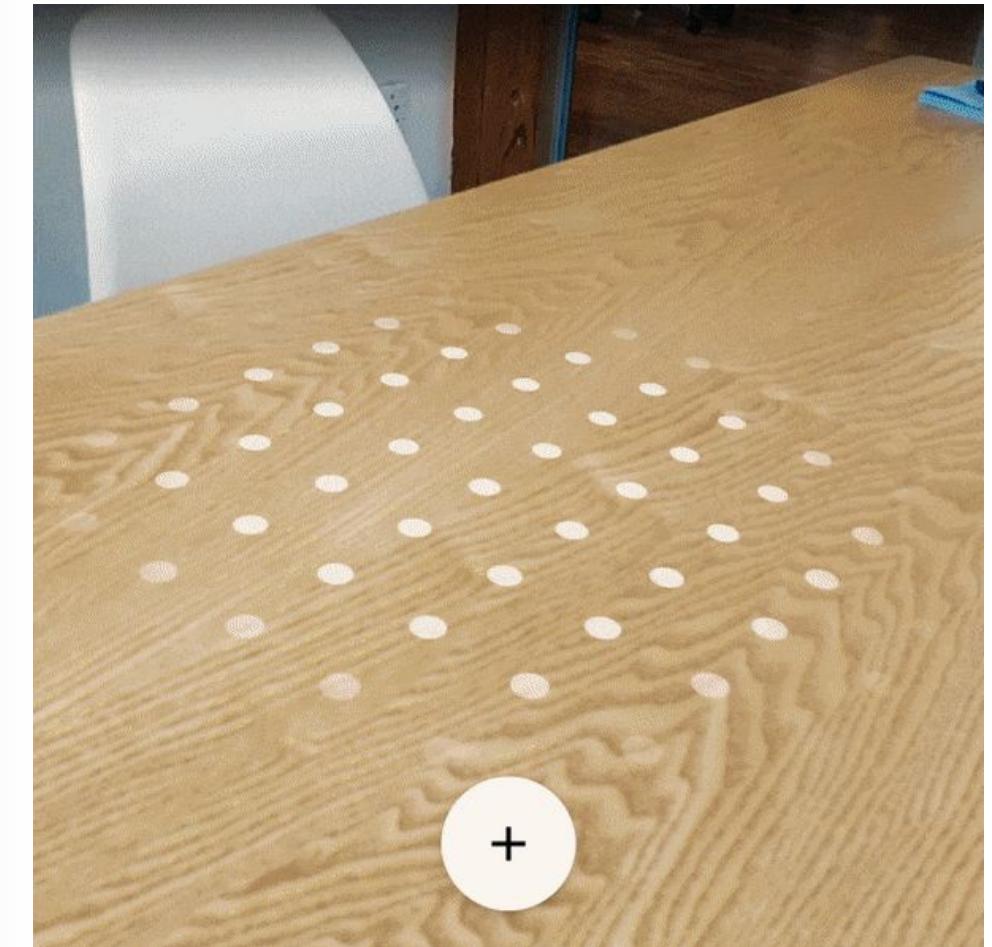


Environmental Understanding

ARCore is constantly improving its **understanding of the real world** environment by detecting feature points and planes.

Feature points are visually distinct features in the captured camera image that ARCore can recognize even when the camera's position changes slightly.

ARCore looks for clusters of feature points that appear to lie on common horizontal **surfaces**, like tables or the floor, and makes these surfaces available to your app as planes.

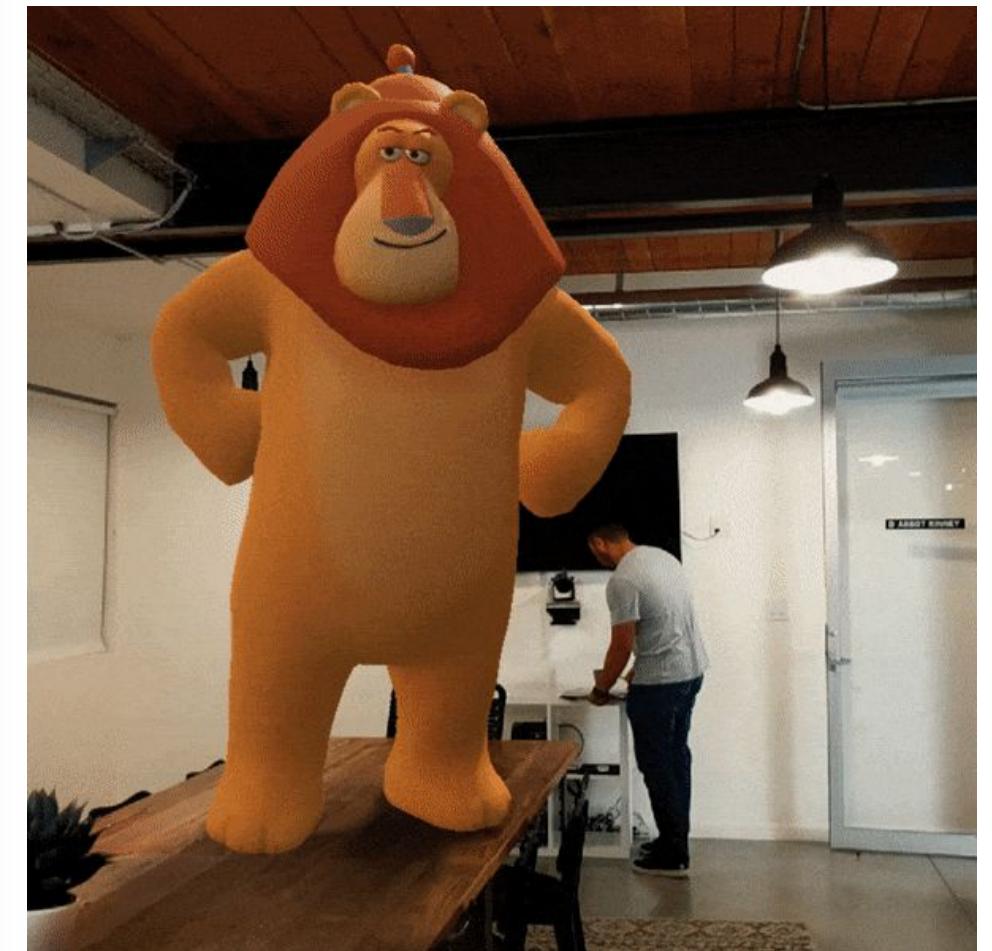




Light Estimation

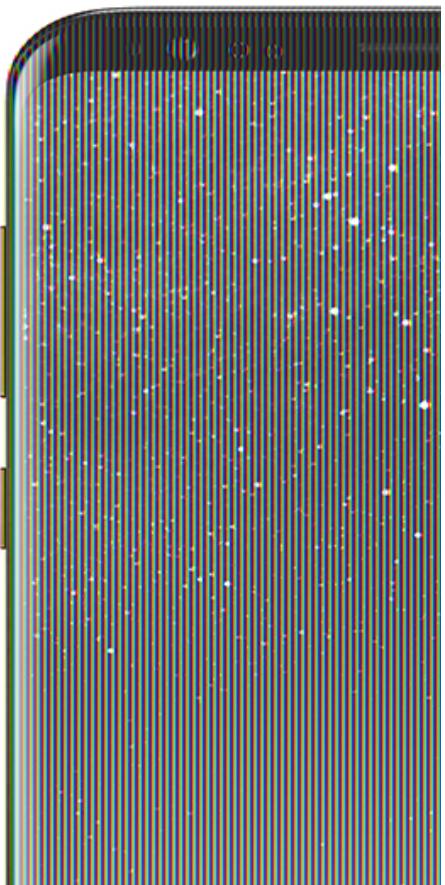
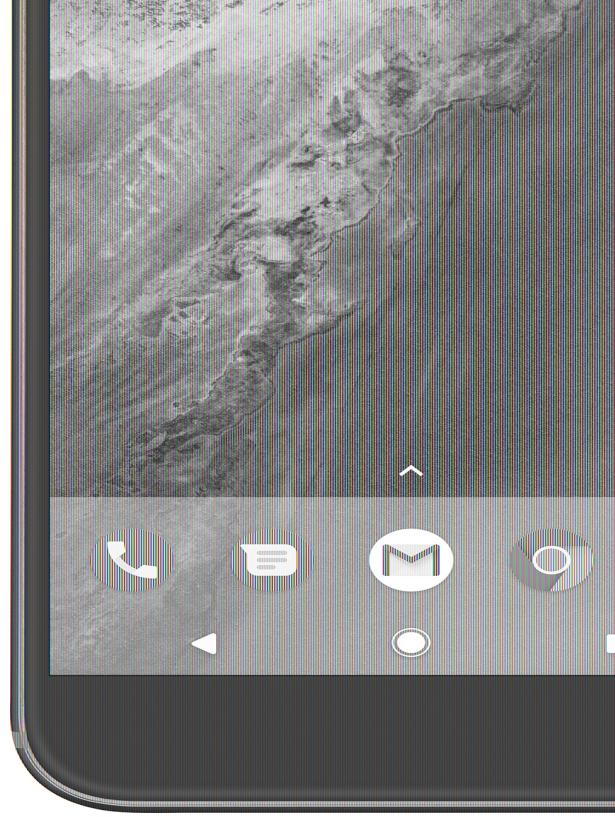
ARCore can detect information about the **lighting of its environment** and provide you with the average intensity of a given camera image.

This information lets you light your virtual objects under the same conditions as the environment around them, **increasing the sense of realism**.



ARCore runs on qualified devices running Android 7.0 Nougat and above

Today, for the ARCore Preview, that's **Pixel** and **Pixel XL**, and the Samsung **Galaxy S8**.



Google

**By the end of the preview
phase, ARCore will run on
100 million Android devices**

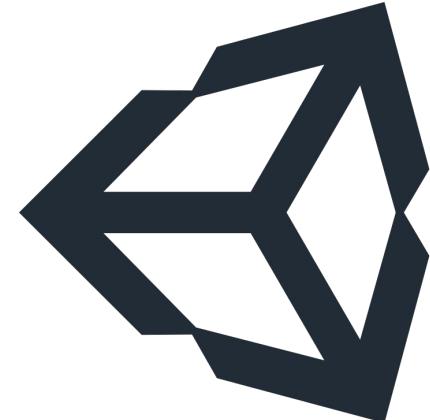
We're working with a number of Android manufacturers to bring ARCore to as many devices as possible in 2017, 2018, and beyond.



Google

Native SDKs for both app developers and game developers.

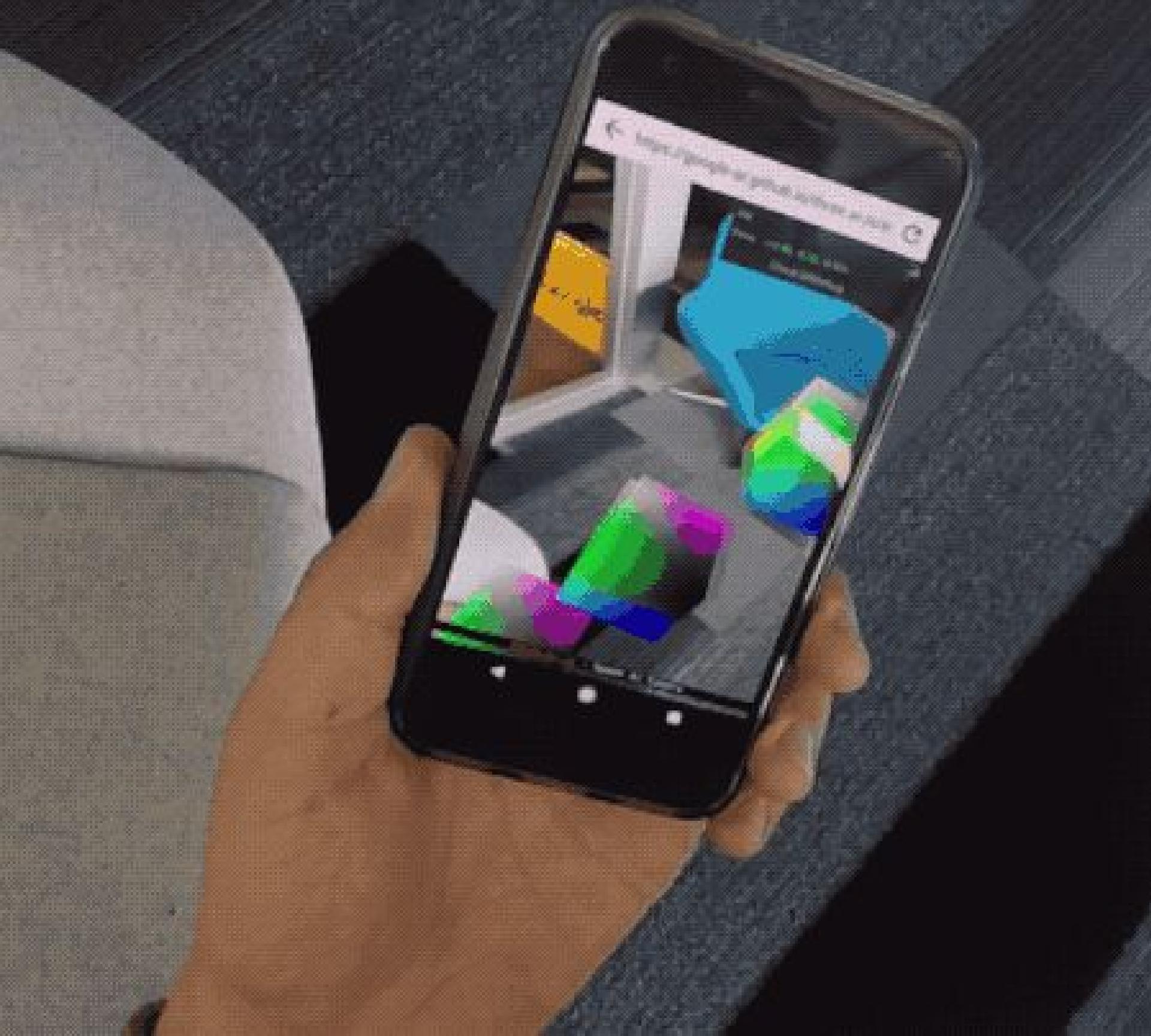
ARCore includes easy to use, high performance
SDKs for developers in **Unity**, **Java**, and **Unreal Engine 4**.



Google

WebXR

Available in
experimental browsers
for iOS and Android.





developers.google.com/ar

#ARCore

Thank You!