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# nervousnet HUB - Android

## General Architecture

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- **Overview**

This document details the generic Architecture and Project structure of the nervousnet HUB Android project

- **Concept**

The Android nervousnet HUB mobile application is based on the concept of Bound Services and Android Interface Definition Language (AIDL).

*“A Service is an application component that can perform long-running operations in the background and does not provide a user interface. Another application component can start a service and it will continue to run in the background even if the user switches to another application. Additionally, a component can bind to a service to interact with it and even perform interprocess communication (IPC).”*

<https://developer.android.com/guide/components/services.html>

*“A bound service offers a client-server interface that allows components to interact with the service, send requests, get results, and even do so across processes with inter-process communication (IPC).”*

<https://developer.android.com/guide/components/bound-services.html>

*“AIDL allows you to define the programming interface that both the client and service agree upon in order to communicate with each other using interprocess communication (IPC). On Android, one process cannot normally access the memory of another process. So to talk, they need to decompose their objects into primitives that the operating system can understand, and marshall the objects across that boundary for you. The code to do that marshalling is tedious to write, so Android handles it for you with AIDL.”*

<https://developer.android.com/guide/components/aidl.html>

- **Architecture**

A conceptual architecture of the whole nervousnet platform and nervousnet HUB mobile application is shown in the images below:

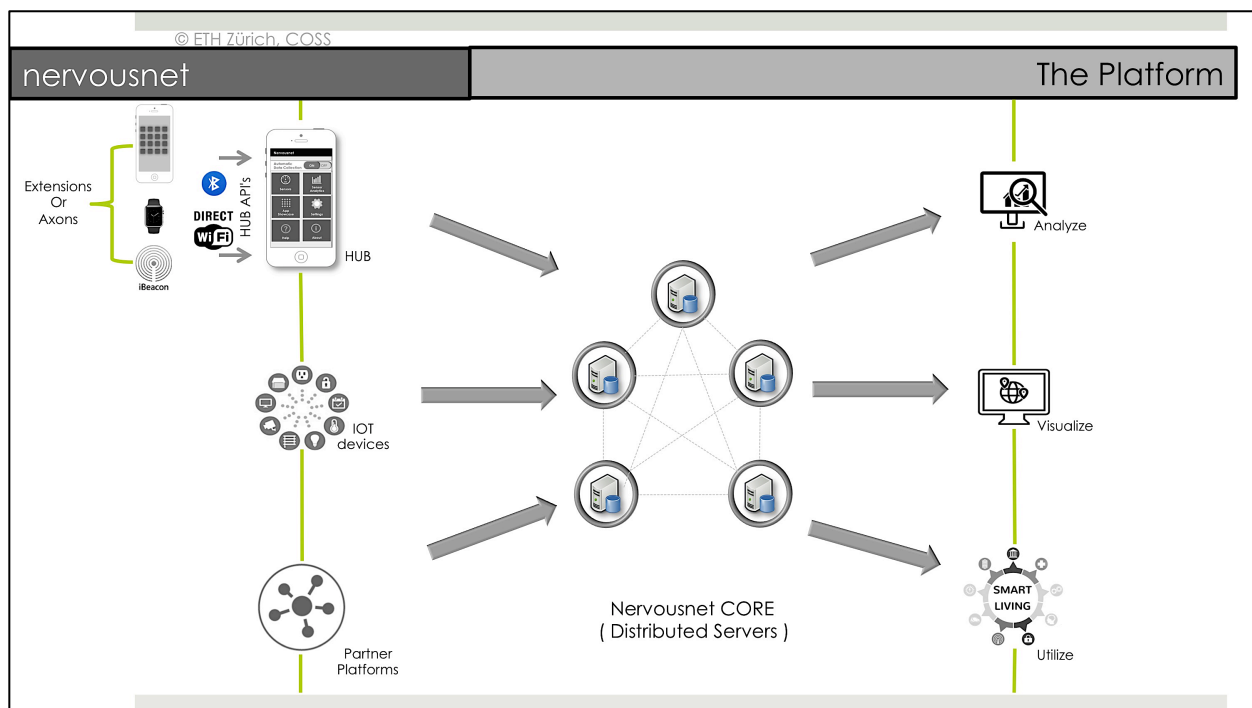


Figure 1: nervousnet Platform Architecture

## ○ Terminology

- **HUB** - Native Mobile Application built for Android and iOS platforms.
  - Allows users to view and share various Sensor related Data
  - Required to be installed for running external apps (Extensions and Axons) built using *nervousnet HUB API's*.
  - Acts like a connectivity hub for external products like smart watches, beacons and external sensors that want to share sensor data with the nervousnet platform.
  - Android version uses background **Services** to enable third party apps and extensions to connect and share data with the Nervousnet platform.
  - iOS version uses **WebViews** and allows for external Axons to run inside a WebView container.
- **Extensions** - Native Android apps, Smart devices, beacons that can connect to the nervousnet HUB mobile app.
  - Uses the nervousnet HUB API's to receive and share sensor data.
  - Works only in Android devices
  - Uses the Android background services feature.
  - Possibility of using Bluetooth, Wi-Fi Direct to do connect to the nervousnet HUB.
- **Axons** - HTML, JavaScript and CSS applications that run inside WebView containers inside the nervousnet apps.
  - Currently supported on the iOS platform.
  - Android Platform support in the next phase.
- **nervousnet CORE** – Distributed and Decentralized set of Servers
  - Used to store and collect Data shared by Clients (Mobile & Web), IOT Hardware sensors and devices, partner platforms and more.
  - Individual Servers are called **nervousnet Nodes**.
  - Mobile Clients will have the option of selecting a server from a list.

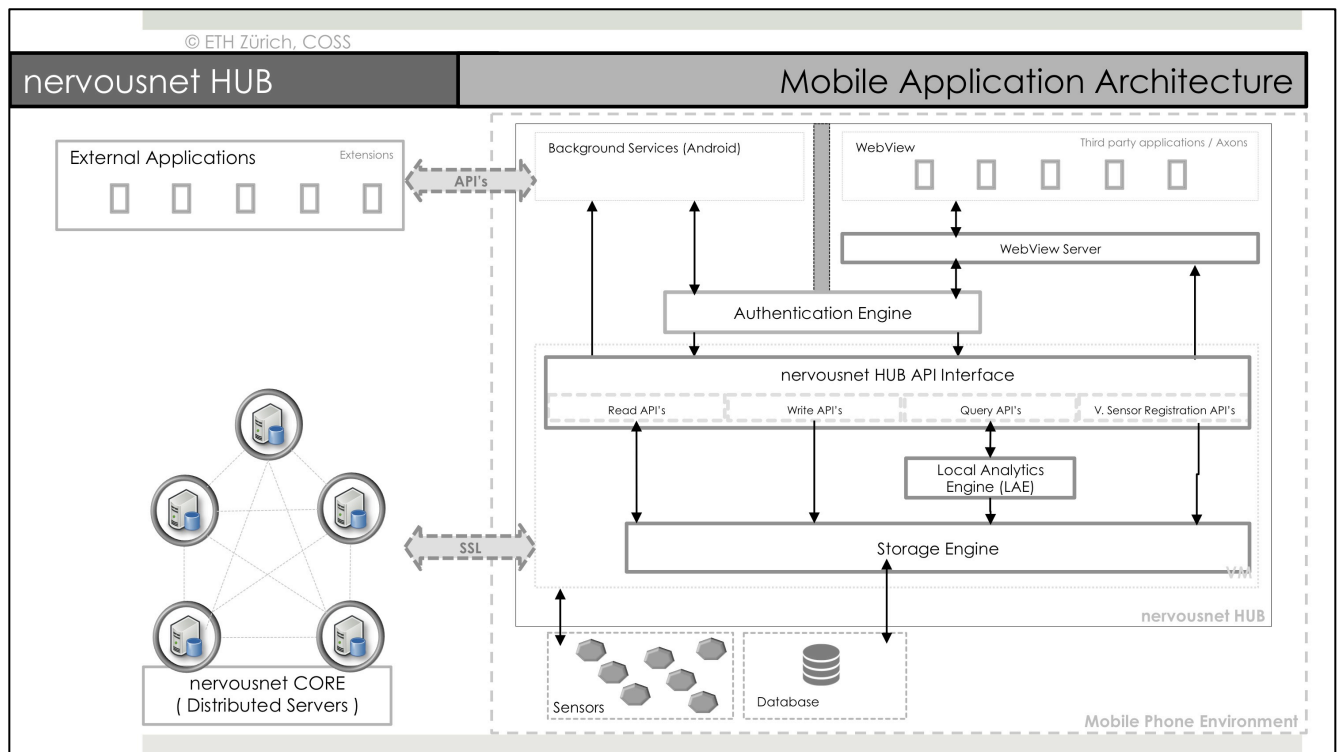


Figure 2: nervousnet HUB Mobile Application architecture

- **JavaDoc**

- <https://github.com/nervousnet/nervousnet/tree/master/Documents/Technical/Android/APIs>

- **Source Code**

- Nervousnet HUB Project
    - Android
      - <https://github.com/nervousnet/nervousnet>
    - iOS
      - <https://github.com/nervousnet/nervousnet-iOS>
    - Nervousnet Library Project (nervousnetLIB) for Android
      - <https://github.com/nervousnet/nervousnet/tree/master/MobileClients/Android/nervousnetLIB>

- Sample Extensions Project (LightMeter)

(Inside GitHub project -> Mobile Clients -> Android -> Sample Extensions -> \*)

<https://github.com/nervousnet/nervousnet/tree/master/MobileClients/Android/SampleExtensions/Lightmeter>  
<https://github.com/nervousnet/nervousnet/tree/master/MobileClients/Android/SampleExtensions/Accelerometer>  
<https://github.com/nervousnet/nervousnet/tree/master/MobileClients/Android/SampleExtensions/Nioisemeter>

- **Google Play Store Links:**

- 1) Nervousnet HUB

<https://play.google.com/store/apps/details?id=ch.ethz.coss.nervousnet.hub>

- 2) Nervousnet – Sample Extension App List

- LightMeter: <https://play.google.com/store/apps/details?id=ch.ethz.coss.nervousnet.extensions.lightmeter>
- NoiseMeter: <https://play.google.com/store/apps/details?id=ch.ethz.coss.nervousnet.extensions.noisemeter>
- Accelometer: <https://play.google.com/store/apps/details?id=ch.ethz.coss.nervousnet.extensions>.