

Real Time Positioning Using Cell ID/Wi-Fi/Assisted-GPS

Positioning service and GPS assistance solution means fast determination of position in any location, even indoors.



XYbrid RT™ real-time

Overview

XYBRID RT™ is a real-time positioning service for devices equipped with any or all of: Wi-Fi, Cellular, or GPS.

XYBRID RT responds to mobile devices that make appropriately formatted HTTP position requests to the XYBRID RT server. The server then responds with a Cell ID/Wi-Fi derived position as well as location-specific Assisted-GPS (and/or Assisted-GLONASS) data. The user has a useful initial position, while the GPS aiding accelerates GPS signal acquisition and receiver sensitivity in challenging areas like urban canyons.

User location can be consistently determined within 2 to 5 seconds while the solution rapidly converges to GPS-level accuracy. The result: location based applications appear to start immediately.

Joining XYBRID RT as part of Rx Networks' XYBRID™ family of positioning and aiding solutions is XYBRID Synchro a standalone version of XYBRID RT. The addition of XYBRID Synchro means location can still be derived even when devices are disconnected from the data network (due to coverage or roaming). In fact, the performance can in many cases exceed that of the GPS, eliminating the need for a GPS chip in certain devices, particularly for machine-to-machine (M2M) applications.

Overcoming GPS Limitations

GPS is the most accurate and pervasive positioning technology available today, but its performance remains limited in dense urban areas or indoors where GPS signals are too weak for full satellite signal acquisition. XYBRID RT improves GPS performance through well-known Assisted-GPS techniques, but also incorporates terrestrial positioning sources to ensure a location can be determined when GPS is not available or the signal is still being acquired.

XYBRID RT is designed to work with virtually any GPS device as a result of Rx Networks' close technical relationships with the major GPS chipset vendors.

Improves GPS Receiver Sensitivity and Accelerates GPS Satellite Acquisition

Hybrid Positioning

The term "hybrid positioning" has been used somewhat inconsistently in the industry. Some solutions use it to mean that they select between discrete positioning techniques such

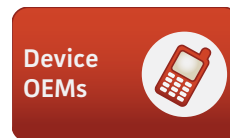


as GPS, cell tower, or Wi-Fi access point locations. By contrast, XYBRID RT integrates all of these observations to determine the best position. Due to Rx Networks deep technical relationships with GPS chipset vendors, XYBRID RT also integrates AGPS at the chipset level. True hybrid positioning yields the fastest location fixes, GPS fixes where they would otherwise be impossible, and provides a device location in all use cases.

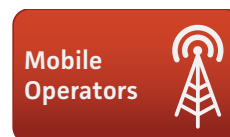
XYBRID RT™ is the new benchmark for hybrid positioning.



- Ubiquitous positioning for multi-function radio chipsets and modules (GPS/Wi-Fi/Cellular)
- Can be resold or licensed by OEM directly



- Reduced design-in times
- Wi-Fi/Cell positioning even without GPS.
- Vendor independence: Multi chipset support
- Consistent user-experience



- Complements existing AGPS infrastructure
- Service roaming subscribers using native or SUPL protocol.
- Improved LBS/E-911 user experience

Features and Benefits

Real-Time Ephemeris: XYBRID RT delivers real-time satellite ephemeris information from Rx Networks' proven GPStream GRN™ (Global Reference Network), a worldwide grid of GNSS reference stations with highly redundant, real time views of the entire GPS and GLONASS constellations. Real-time ephemeris can be provided using native protocols or in SUPL 1.0 format (Cell ID/GPS only).

Wi-Fi and Cell ID Location Almanac: Rx Networks has an extensive global almanac of cell tower and Wi-Fi access point locations. The almanac database is dynamically populated and updated by client devices using the service. This cost effective approach ensures that the database is self-learning and self-adapting to wireless network changes.

Globally Available, Operator Independent: The data service can be accessed over any HTTP connection enabling flexible, low-cost access. Operator independence means the service is always available, worldwide, ensuring a consistent high-quality user experience. XYBRID Synchro™ as a standalone client is able to obtain location data even when not connected.

Reliability: Backed by a carrier grade Service Level Agreement, XYBRID RT maintains 99.999% availability through a highly redundant, global delivery infrastructure. This ensures the highest performance and subscriber satisfaction, whether for emergency or commercial LBS applications.

Specifications

Cell ID and WiFi Performance

Time To First Fix (TTFF)

6 – 176ms + network latency	TTFF is platform dependant. Typical fix is 2-5 seconds.
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Cell ID Horizontal Uncertainty

~200m – 1km	Influencing factors include visible sites and carrier.
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Wi-Fi Horizontal Uncertainty

~30m – 200m	Influencing factors include number of visible APs and density (urban vs. rural).
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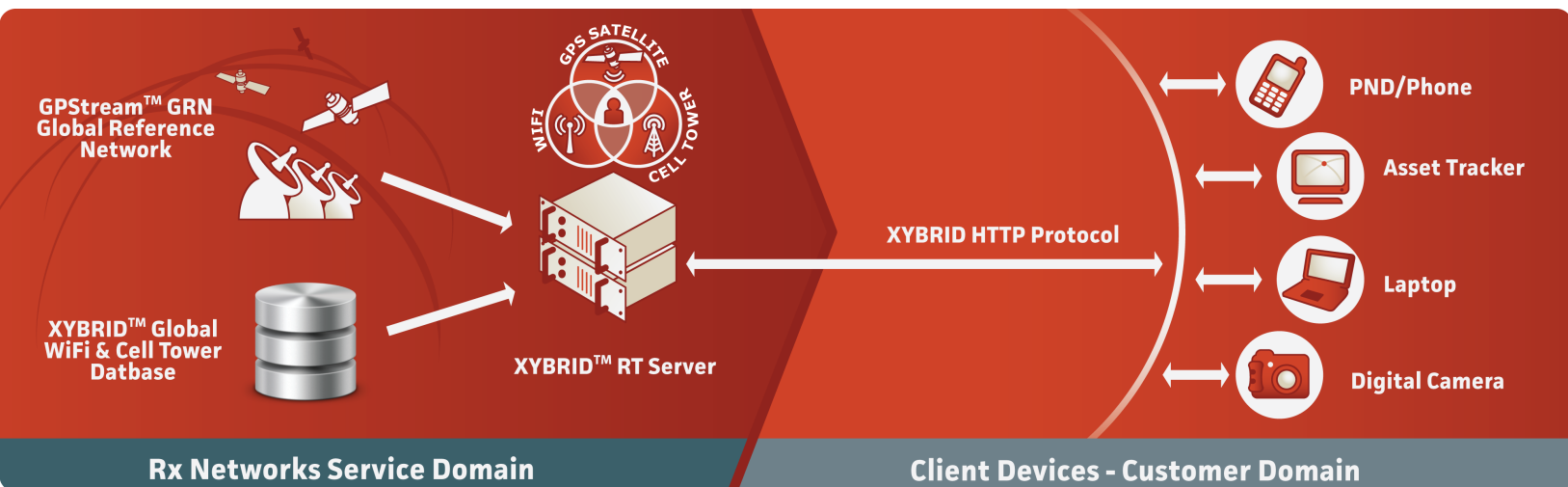
GPS Performance Improvements

Time To First Fix (TTFF)

Reset Condition	Assistance	TTFF
Delete: Ephemeris, Time, Position, Almanac	Ephemeris Only	8 – 15 seconds chipset dependent
Delete: Ephemeris, Time, Position, Almanac	Ephemeris, Coarse Position, Coarse Time	3 – 6 seconds chipset dependent

Receiver Sensitivity Improvements

10dB to 12dB measured improvements



About Rx Networks

Solving Every "Where". Rx Networks is a mobile positioning technology company that develops hybrid positioning and assisted-GPS solutions that unify any available GPS, GLONASS, cell tower or Wi-Fi information. These solutions, already licensed by leading GNSS semiconductor vendors, device OEMs, network equipment vendors, M2M service providers and mobile operators, bring instant location awareness and help deliver an unmatched mobile location user experience on any device and for any application. GPStream GRN™ provides global real-time and long-term prediction GPS/GLONASS reference data for use by any mobile network location server. GPStream PGPS™ adds GPS and GLONASS extended ephemeris support to increase the sensitivity and acquisition speed of any GNSS chipset, while XYBRID RT™ and XYBRID SUPL LE™ combine Wi-Fi/Cell positioning with real-time A-GPS/GLONASS support to extend the location performance of GNSS chips in difficult areas, such as indoors or urban cores.



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