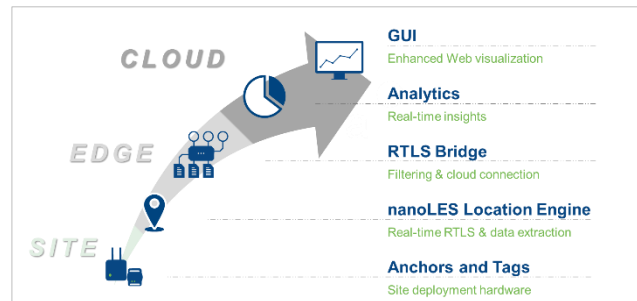**nanotron**
An Inpixon Company

nanoLES

Real-time Location System (RTLS) Engine

nanoLES is nanotron's location engine software for both Chirp and UWB, taking RTLS deployments to the next level.

With Time Difference of Arrival (TDoA) locations and real-time sensor data nanoLES enables sensor fusion with our IoT Platform and any custom application. A two-way communication with tags provides an end-to-end loop from data ingestion to tag functionality.

Its proven scalability qualifies *nanoLES* for industrial applications requiring longer range and cm-level positioning accuracy for up to thousands of IoT devices.

CLOUD

GUI
Enhanced Web visualization

Analytics
Real-time insights

EDGE

RTLS Bridge
Filtering & cloud connection

nanoLES Location Engine
Real-time RTLS & data extraction

SITE

Anchors and Tags
Site deployment hardware

nanoLES connects RTLS infrastructure with IoT

Real-time

► *nanoLES* ingests the complete location and sensor data-stream in real-time.
► Automated performance adaption to available CPU cores
► *nanoLES* is directly connected to the edge anchors and collects sensor data and location-based ToAs.
► From blink reception to result port, we guarantee position results in less than 100ms (Intel® AVX presupposed).
► A two-way communication with the IoT hardware infrastructure provides transparency.

Flexible

► *nanoLES* seamlessly supports nanotron's RTLS hardware portfolio for both, long range tracking (Chirp) and cm positioning (UWB) using one common API.
► *nanoLES* achieves higher location accuracy by synchronizing the anchors wirelessly with sub-nanosecond timing.
► *nanoLES* supports expanding deployments (IoT devices, anchors, tags, sensors) on demand and in stages.
► *nanoLES* allows push positions and data to the RTLS Bridge via connection to higher layers of the IoT Platform, as well as connects to any custom application.
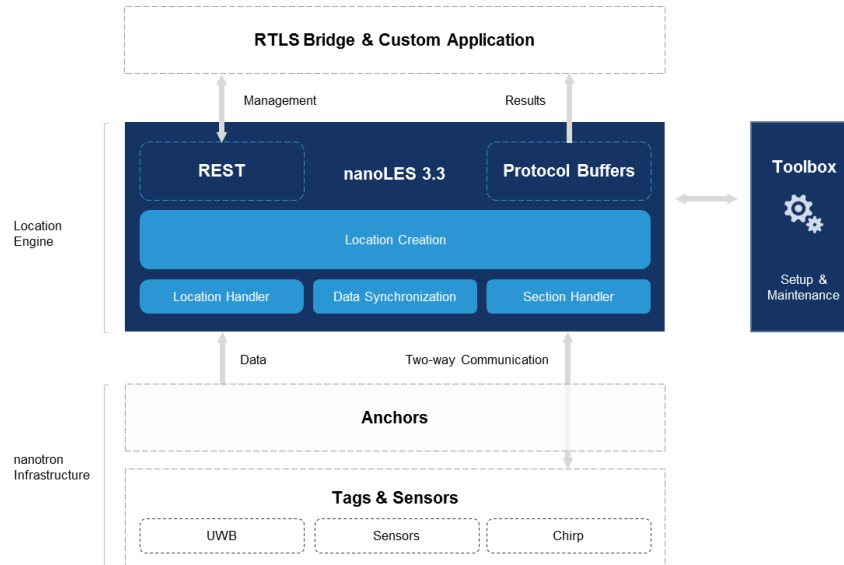
Scalable

► *nanoLES* provenly supports full site scalability beyond 10k tagged objects.
► *nanoLES' data* interfaces ensure lowest latency and high throughput to the application to allow mass device tracking.
► *nanoLES* calculates native TDoA-based positions for thousands of tags via precise time of arrival stamps (ToA) from the anchors.
► Through parallel processing of tag location data, *nanoLES* remains scalable and fully performant even when using geo-sections.

Simple to integrate

► RESTful API supports developers to integrate initialization, control, configuration and monitoring of *nanoLES*, anchors and tags.
► *nanoLES* can be fully controlled from the customer application - also remotely.
► Mixed use of RF-technologies supported in all interfaces allows technology related filters, sanity checks and configuration validations.
► *nanoLES* supports real-world sites with easy to manage geo-sections (0D, 1D, 2D, 3D)
► Sections directly support application related insights like 0D presence, 1D movement, 2D traces or 3D levels.

Stack Integration

Key Features

- ▶ Highly scalable RTLS with 2,500 blinks/sec
- ▶ Deployed scalability beyond 10,000 objects
- ▶ Supports push positions and data to higher IoT Stack layers and connects to custom applications
- ▶ Sub-nanosecond wireless anchor synchronization for highest positioning precision
- ▶ Position creation for Chirp and UWB
- ▶ Auto-performance adaption to CPU cores
- ▶ From blink reception to result, latency is less than 100ms (Intel® AVX required)
- ▶ Location, ranging, section and sensor data are processed and supplied
- ▶ Supports complete engine automation
- ▶ Supports multiple and mixed geographical sections (0D, 1D, 2D, 3D)
- ▶ Supports RESTful API & Google Protocol Buffers
- ▶ Runs stand-alone or as background service
- ▶ RTLS Tools for setup and maintenance available
- ▶ Supports infrastructure parametrization (e.g. antenna positions, cable lengths, tag wearing height)
- ▶ ISO Compliant: 24730-1 (API), 24730-5 (Chirp air interface))

Ordering Information

Order No.	Description
SNLES03	*nanoLES 3* 3.3 Location Engine
KN01TB3	RTLS Tools

About nanotron, An Inpixon Company
Nanotron Technologies GmbH, an Inpixon company (Nasdaq: INPX) is a leading provider of electronic location awareness solutions. If knowing what, where and when is mission-critical to your business, rely on nanotron with Location Running.
Nanotron's solutions deliver precise position data augmented by context information in real-time. Location Running means, reliably offering improved safety and increased productivity, 24 hours a day, 7 days per week: Location-Awareness for the Internet of Things (IoT).

Subject to change without notice.