

Synthesis™

Synthesis™ is a comprehensive visualisation and analytics platform, designed to take full advantage of the unique capabilities of Synaptec’s distributed sensing technologies. It allows the synchronised waveform outputs from Refase™ and Synchromerger™ sensor arrays to be conveniently visualised in real-time and analysed to provide long-term trend information – leading to powerful condition monitoring and operational insights at unprecedented scale and detail.

This platform provides wide-area, high-resolution, time-synchronised, and combined electrical and mechanical measurements. Synthesis™ is designed to better inform real-time control room decisions, reduce scheduled maintenance cost, and support long-term asset management plans.

Synthesis™ provides a platform for intelligent, data-driven applications within a substation and over a wide area, building on the powerful instrumentation capabilities of Synaptec’s products and other compatible digital systems.



Intrinsic, real-time synchronised waveform data and synchrophasors

Examine long-term trends and correlate with external data

Geographical overview of sensor locations

Harmonics automatically extracted from all electrical sensors

Live visualisation and analysis of each sensor location over a wide area

Applications

Synthesis™ can be used in a variety of ways to benefit real-time and long-term insights:

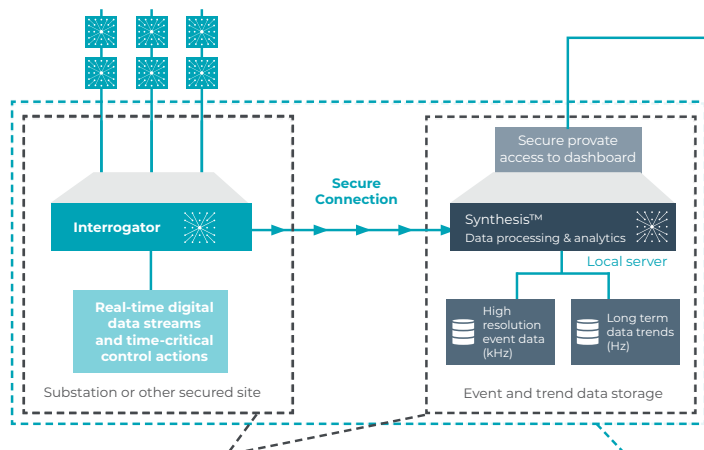
Applications	Benefits delivered by Synthesis™
Real-time thermal rating (RTTR) or dynamic line rating (DLR)	Provides the real-time state of conductor temperature and, through analysis of collected data over time, provides accurate instantaneous thermal headroom (i.e., how far the line or cable can be loaded) and forecasting of future capacity.
Asset health monitoring and early warning system	Synchronised waveform monitoring enables detailed capture of transient or unusual events (such as arcing and switching) that affect nearby power system assets, such as transformers, circuit breakers, cables, and capacitors. This level of monitoring allows accurate asset health history to be maintained and assists providing data for event classification.
Wide-area power quality	Detailed multipoint harmonic monitoring offers a significant advancement in cable health assessment, such as for offshore wind export and array cables. This can help identify and locate causes of cable hot spots, overvoltages, and other factors which may affect cable life – and consequently streamline maintenance whilst also avoiding costly outages following unanticipated failures.
Post-event analysis	Major incidents that threaten security of supply must be investigated and understood fully. Through wide-area, synchronised waveform monitoring, Synthesis™ provides the integrated tools to clearly visualise the exact timing and context of disturbances to learn from such events.

Flexible deployment

Synthesis™ offers flexible deployment options. It can be based within the operator’s private data network, supplied as a standalone hardware system, or delegated to an external secure cloud computing and storage environment. The integrated web-based interface offers customisable and secure access from multiple devices. Third-party data streams, such as weather information, can also be integrated.

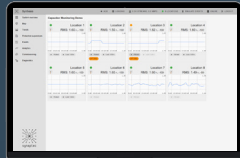
Synthesis™ records the full detail of synchronised waveform data whenever interesting or important events occur – such as changes in nominal voltage, current, frequency, and other parameters. This allows asset degradations and failures or system-wide phenomena such as oscillations to be properly detected and assessed. It also records a summary of the state of each monitored location, including full harmonic information every second. A lossless, compressed data format has been designed to efficiently transfer and store synchronised waveform data (requiring approximately 10% of the data bandwidth of the original data). A specialised database ensures that this information can be rapidly accessed, visualised, and analysed.

Multiple remote sensors over wide geographical area



Secure, cloud-based deployment or Private, internal network deployment

Secure web-based access



- Analysis of long-term trends
- New forms of predictive maintenance - and cost savings
- Visualisation of real-time status
- Granular visibility of each asset

Specifications

	Refase™	Synchromerger™	Synthesis™
Core functionality			
Up to 30 measurements per 60 km / 37 miles	✓	✓	
Multi-zone protection instrumentation	✓	✓	
Provides wide-area synchronous measurements		✓	
Data logging, visualisation, and analytics			✓
Supported sensor types			
PCT (current)	✓	✓	
PVT (voltage)		✓	
PTT (temperature)		✓	
PST (strain and sag)		✓	
Vibration		✓	
Features			
IEC 61850 / IEC 61869-9 output	✓	✓	
Auto-reclose (AR) block	✓	✓	
IEEE C37.118 synchrophasors		✓	✓
Real-time power quality (PQ)			✓
Correlated electro-mechanical data		✓	✓
Data visualisation			✓
High-quality data logging (private storage or cloud)			✓
Long-term trend analytics			✓