# Quantum Plus Technologies

## intelo

**Flexible Hardware
Data-Stream Aggregation and
Rendering Solutions**

**www.quantumplus.tech**

# The *Intelo* Ecosystem

Qu+ *Intelo* range of advanced devices and accessories provide a complete ecosystem for synchronized aggregation of data of varied formats from multiple sources, streaming the aggregated data on IP (Internet Protocol) networks and rendering the streamed data for further processing/analytics.

The ecosystem segregates the complexities of data collation from data processing, enabling you to rapidly design, prototype, develop and deploy data hungry applications. The devices take-up the task of capturing, digitizing, encapsulating, aggregating, synchronising, encrypting, and rendering data streams which are seamlessly distributed over secure IP networks, be it wired or wireless, leaving your resources free to develop the actual applications to process the data streams in centralised, distributed or hybrid architecture.

Support for a wide range of data stream types, from low bandwidth serial protocols to MIL STD (Military Standard) communication to CCTV (Closed Circuit Television) feed over IP to ultra-high bandwidth 8K video display streams, *Intelo Aggregators* have it all covered, making them the *Swiss Army Knife* in your data handling tool-kit. Similarly, the *Intelo Renderers* can handle a multitude of HMI (Human Machine Interface) types, from simple character displays to large data walls, used to present data collated from multiple *Aggregators*.

## Applications of *Intelo* - The Swiss Army Knife

**Industrial Automation**

**CCVT Feed Aggregation**

**Remote Monitoring**

**Video Feed Consolidation**

**Sensor Grid Integration**

**Cloud, AI, ML & Data Analytics**

**INDUSTRY 4.0**

## Versatile & Flexible

Wide compatibility with multi-format inputs and outputs. E.g., all types of video feeds including analogue, digital, IP based, CCTV etc., from archaic 160*120p resolution to latest 8K, all connectors and signal formats are covered.

## Secure & Reliable

Designed for sensitive government and military applications with advanced security features. Reliability ensured by top-quality components, best practices in manufacturing and testing, innovativeness, and a complete rugged line-up.

## Efficient & Cost-Effective

Industry leading efficiency, allowing to scale to large numbers without power, heating and noise issues. Low acquisition, running and maintenance costs resulting in most competitive TCO (Total Cost of Ownership) in industry.

## Customisable & Supportable

Ground-up modular despite diminutive dimensions. Can be customised for special needs or upgraded on-field to meet future requirements. Being home-grown with resident expertise, long-term support is assured.
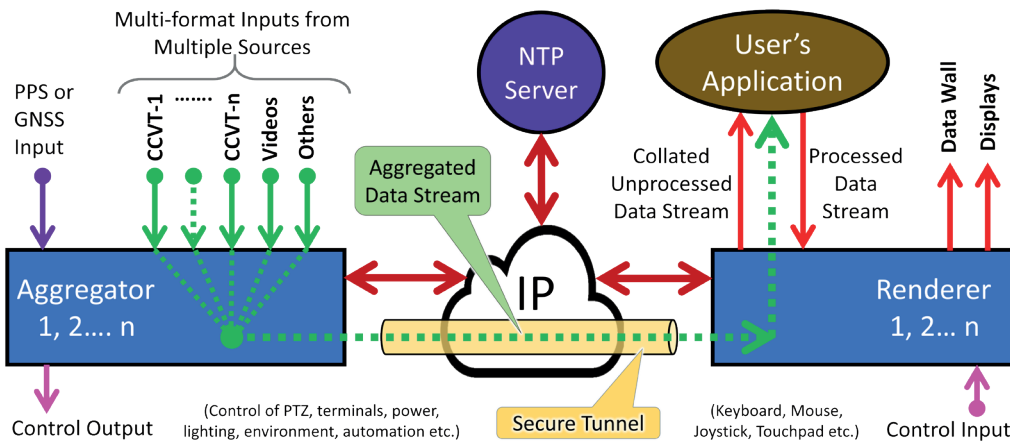
**MAKE IN INDIA**

## Innovation Unparalleled

Each *Intelo* device is designed and optimized to solve real world problems, and meet practical use cases in the industry. Range of innovative features ensure usability and performance even in the most demanding applications.
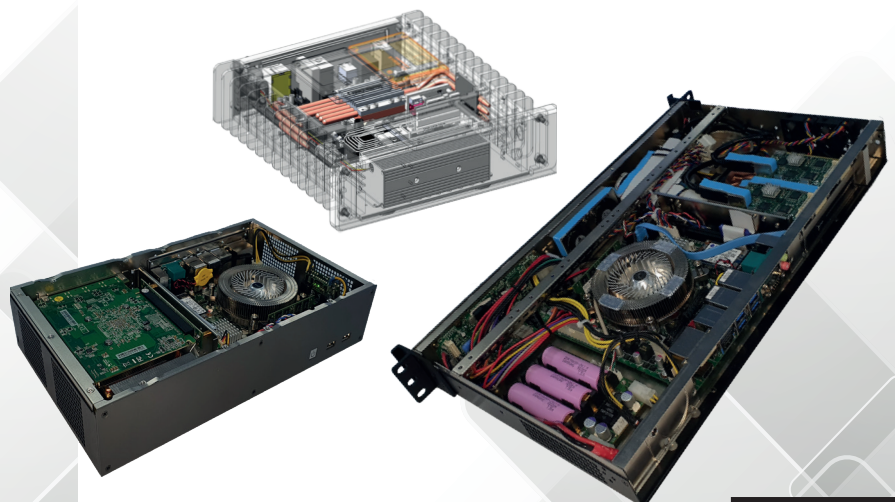
# *Intelo*: The Concept

The concept behind *Intelo* ecosystem is to have two complementary range of devices; viz. *Aggregators* and *Renderers*, which seamlessly work together to provide comprehensive data-handling and presentation capabilities. This leaves the user free to focus on processing the data, e.g. using the *Qu+ Titan* range of specialized computing workstations. The *Aggregators* collect data on-field from a large heterogeneous mix of interfaces, ports and standards. This data is captured, encapsulated, encrypted and streamed with low latency on IP (Internet Protocol) networks. The streams are centrally collated from multiple *Aggregators* by *Renderers*, which route them to processing elements running user's algorithms or directly present extracted data on any HMI (Human Machine Interface) or screen in any desired format. The *Intelo* line-up includes NTP (Network Time Protocol) servers, with multiple alignment sources like built-in GNSS (Global Navigation Satellite System) receivers, for time-aligning all devices on network for synchronised input-output. This is particularly useful for distributed aggregation of video streams, e.g. from CCTV (Closed Circuit Television) cameras, equipment displays, sensors etc., for security or AI (Artificial Intelligence) based applications. In addition, *Intelo* devices can be fitted with add-ons to directly receive GNSS or PPS (Pulse Per Second) inputs for improved synchronization for time-sensitive and mission critical applications. *Intelo* devices can also be added with remote-control functions like KVM (Keyboard-Video-Mouse) for classical applications like remote IP based KVM console management, but with very-high reliability and customised encryption. Built-in features of these KVM enabled devices, like aggregation of additional data streams, can provide unparalleled automation solutions in *Industry 4.0* setups.

**Up to 16 x86/IA-64 Physical Cores even in Fanless Config**

**Up to 256GB ECC RAM & 32TB SSD Storage Capacity**

**GPU, Co-processor, ASIC etc. even in Fanless Config**

**Built-in Micro-UPS with Dual-Redundant Option**

**Flexible Power : Mains, Grid, Solar, Battery, Fuel-Cell**

**Time Sync : Central NTP or Local GNSS/PPS**

**EMI & RFI Compliant Hi-grade Alloy Chassis**

**Rugged Fanless and Outdoor IP (up to IP-68) Options**

Multi-format Inputs from Multiple Sources

PPS or GNSS Input

CCVT-1 ...... CCVT-n Videos Others

NTP Server

User's Application

Data Wall Displays

Aggregated Data Stream

Collated Unprocessed Data Stream

Processed Data Stream

IP

Aggregator 1, 2.... n

Renderer 1, 2... n

Secure Tunnel

Control Output

(Control of PTZ, terminals, power, lighting, environment, automation etc.)

(Keyboard, Mouse, Joystick, Touchpad etc.)

Control Input

## Aggregation of CCTV and Display Feeds

# Designed for Reliability

As a typical application, *Intelo Aggregators* may be used in highly sensitive environment to collate CCTV camera feeds. The *Intelo* devices feature very-reliable design and construction, including ingenious power solution, to ensure survivability and availability. A total of four power sources (two each internal batteries and external), each capable of independently running the device, can be engaged simultaneously! Even more demanding setups can be custom built, including solar panels, methanol based fuel cells, HV grids etc., or any combination of multiple external and built-in power sources thereof.

## Custom Configs

In addition to the feature rich standard configurations, a range of customisation options are available to meet even the most demanding technical, security and aesthetic requirements.

# Rugged Fanless and IP (68) Rated Options

Whilst all *Intelo* devices are fairly rugged and have very good EMI (Electromagnetic Interference) and RFI (Radio Frequency Interference) shielding properties, two line of variants provide extreme level of environmental, dust and water protection.

The **Fanless** variants do not use a fan or forced air from outside for cooling. They employ special metal alloy chassis with carved out fins which acts as multiple heat-sinks for the electronics inside, thereby diminishing mesh area in contact with outside environment for improved EMI/RFI and dust/particle protection.

Despite being fanless, as an industry leading feature, these devices can be configured with high-end professional GPU (Graphics Processing Unit) and other co-processors for front-end/distributed mathematics, AI, vision processing etc. Again as a unique feature, these chassis can accommodate a special SMPS (Switch Mode Power Supply) for direct AC mains operation.

The **IP-rated** variants are hermetically sealed for up to IP-68 rated ingress protection, enabling outdoor use, whilst retaining most features of the *Intelo* range, and adding some.

As a typical use case, a compact variant has ~20 LAN ports, and is designed to aggregate feeds of outdoor CCTV cameras in a mega scale deployment. The device is pole mountable, has built in micro-UPS and can be powered redundantly from existing AC supply, solar panels etc. The CCTV cameras can be provided PoE (Power-over-Ethernet) via CAT cables directly terminating inside the chassis through hermetically sealed glands resulting in a low-cost, simple and clean install. The device can also be configured with wireless (WiFi, 4G etc.) for base-station connectivity and GNSS receiver for position/time alignment.
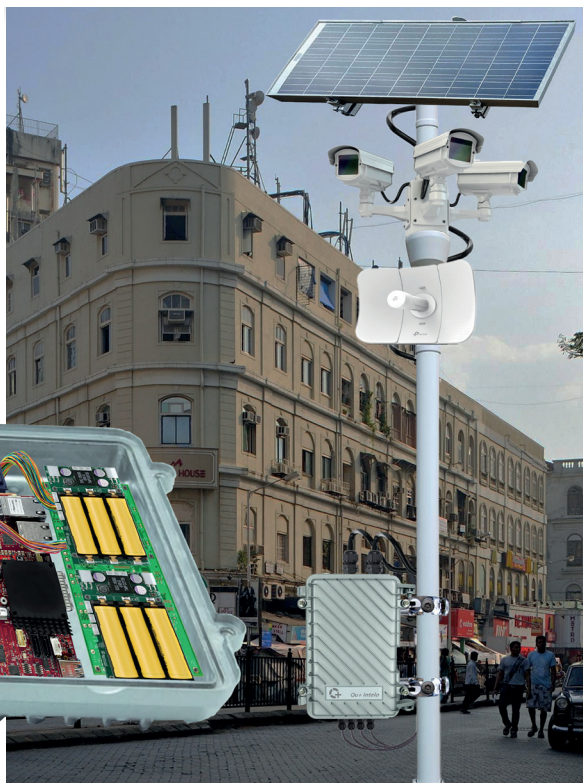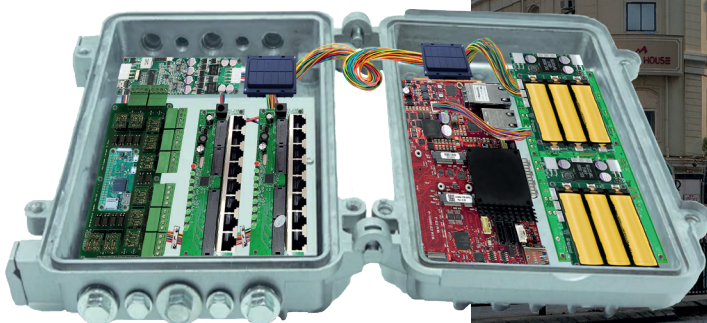
## SPECIFICATIONS

**Processing :** Intel x86 and IA64 processor with two to sixteen physical cores. From 2GB to 256GB DDR3/DDR4 ECC/non-ECC RAM in single/dual channel configuration. Option for adding GPU (or other co-processors/ASICS for maths, AI, hashing, vision etc.) including in fanless and IP rated configurations. Wide temperature range (-40°C to +85°C) options.

**Storage :** From 128GB to 16TB industrial-grade/enterprise-class Solid State storage on SATA/PCI-e/NVMe. Option for housing up to eight 2.5inch or up to four 3.5inch electromechanical hard drives for bulk storage of up to 48TB.

**Chassis :** Forced air cooled EMI/RFI protected double edge folded Nickel plated steel chassis line-up with rack-mount option. Fanless convection cooled Aluminium alloy chassis line-up from mini-ITX to full-ATX with pro GPU support and built-in SMPS. IP rated chassis line-up, up to IP-68, for outdoor applications with CCTV specific optimisations like sixteen (expandable) Ethernet ports and multi-port PoE option.

**Cooling :** Use of PWM controlled variable RPM fans with high MTBF and RPM monitoring, multi-point temperature monitoring, high-grade electrically non-conductive thermal compounds and interface materials, Aluminium and Copper alloy heat-sinks and heat-pipes (as per respective chassis configuration).

**Built-in HMI :** Option of built-in LCD display with integrated keypad, both customisable for wide range of functions from health monitoring to displaying status of computing resources to specific input-output including from-to user applications.

*Aggregator* **Interfaces :** Configurable for IP stream (CCTV, video, audio etc.) over Ethernet, display inputs (VGA, RGB, SDI, DVI, Display-Port, HDMI etc.), RS-232/422/485 serial, MIL STD, ARINC, NMEA, CAN-bus, SCADA, coaxial, MIDI, AVB etc.

*Renderer* **HMI :** Option of single and multi line character displays, DLV monitors, up to 8K LED displays, fully configurable data-wall with up to 64 monitors, keyboard, mouse, tablet, pen, touch, joystick, motion and other controllers.

**Power Supply :** Configurable for multiple power sources including LV DC, HV DC, AC mains, HV AC, methanol fuel cell, photovoltaic solar panel/array etc., and combinations thereof with redundancy. Up to two built-in micro-UPS with rechargeable batteries, voltage/temperature monitoring for each cell and signalling to device OS. Option of built-in programmable variable DC source for peripherals like CCTV cameras, sensors, actuators etc.

**Synchronisation :** Option for NTP, GNSS or PPS based.