ARDEXA

The Digital Control Platform for OT

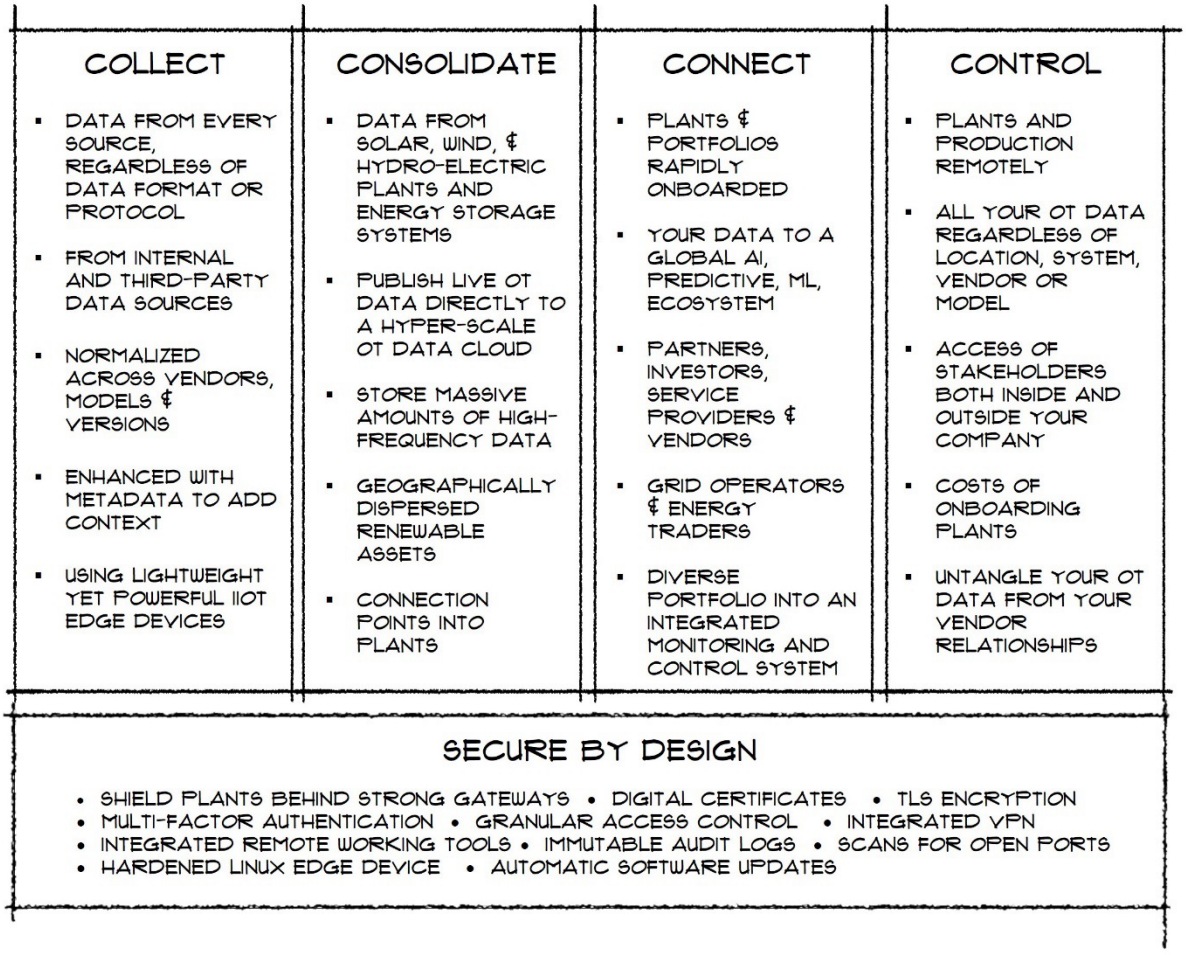
An Overview of Ardexa Services

WHAT IS ARDEXA?

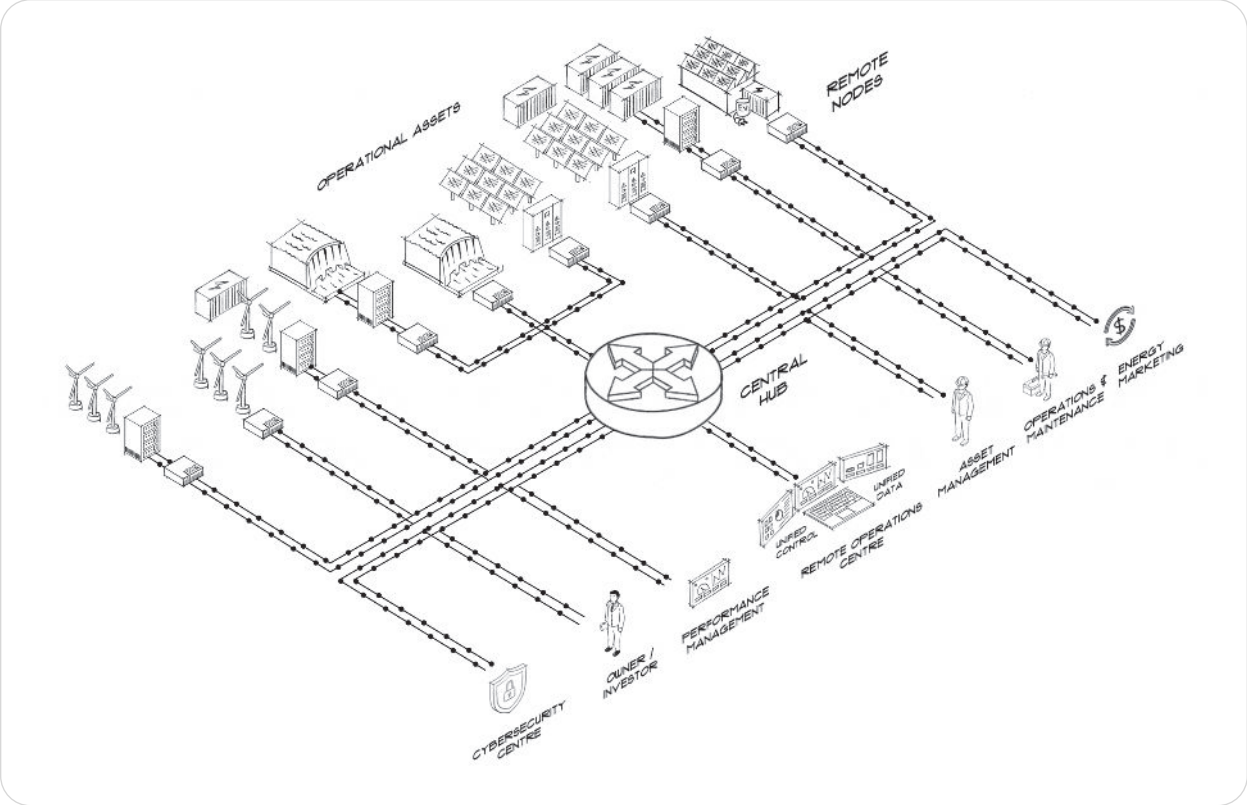
Ardexa puts you in complete control of your operational data. Our Digital Control Platform for OT establishes vendor independence and enables rapid scaling of diversified energy portfolios by accelerating the on-boarding of new plants and equipment. It facilitates new energy models (VPPs, energy trading, microgrids, aggregation etc.) and enables plant control capabilities at significantly lower cost and greater simplicity than legacy systems.

Ardexa also addresses the biggest barriers to realizing the benefits of digital transformation and industry 4.0. The most significant challenge to extracting actionable insights from your operational technology (OT) data is securely collecting, consolidating and preparing all data. Data analysts spend 80% of their time on such mundane tasks. Machine data stored in remote locations, in proprietary formats and accessed via diverse protocols creates obstacles that must be overcome before AI or machine learning technology can begin to deliver returns on investment--at any scale.

With Ardexa, ALL of your OT data will be collected securely, in real-time at the source, then reside in a centralized, normalized, vendor-independent OT data cloud that you control.

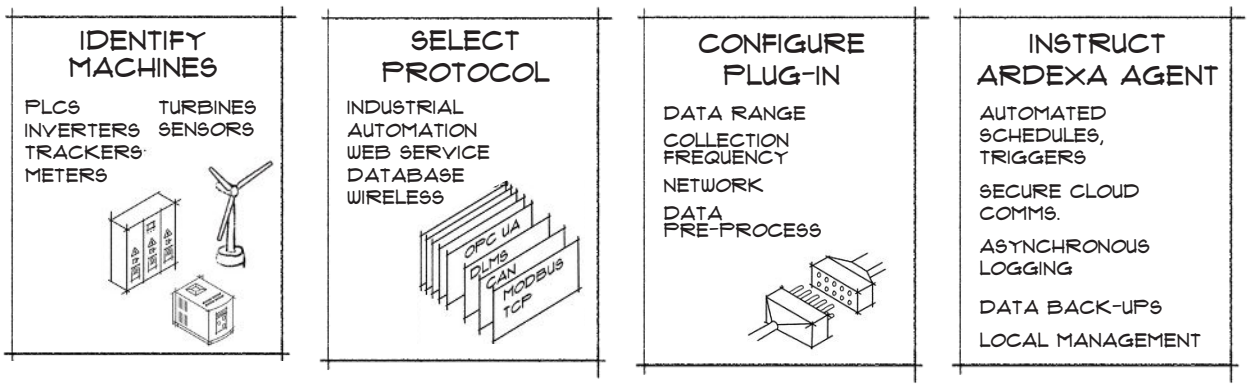


THE ARDEXA DIGITAL CONTROL PLATFORM



COLLECT

Imagine a highly secure and simple way to enable all your solar, wind, hydro and storage energy equipment to publish OT data directly to the Cloud. That capability begins with the Ardexa Agent—a tiny, compiled binary which runs on lightweight Intel or ARM based edge devices.
The Agent collects data via an extensive library of Machine Plugins supporting the broadest range of industrial protocols and hundreds of types of renewable energy equipment out-of-the-box.
The agent initiates a connection, then publishes OT data to your Ardexa OT data Cloud over an encrypted, resilient message bus. This intelligent connection manages the flow of data and will ensure no data is lost during Internet disruptions.



CONSOLIDATE

Why in the Cloud?

Cost – Over 12-year period Cloud data storage costs fell 86% - the trend continues today

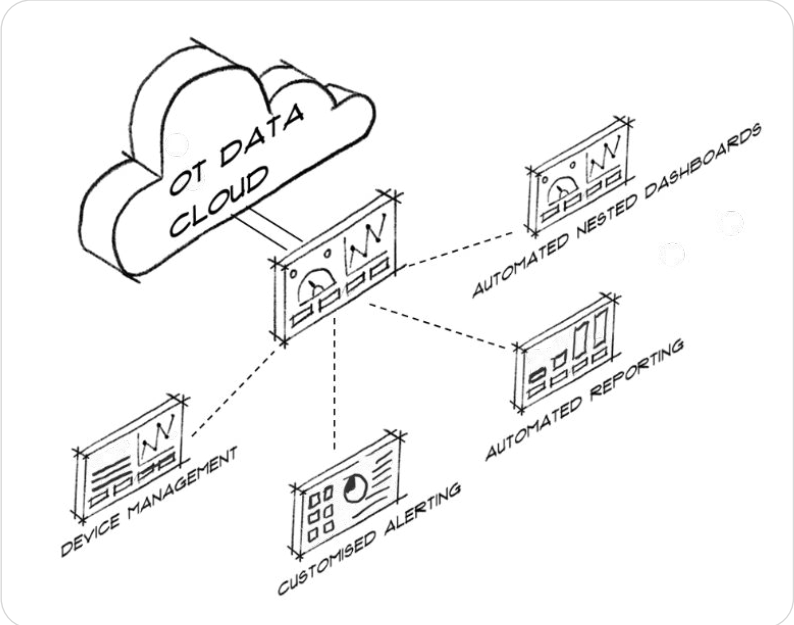
Scalability – The fastest growing, most data-intensive businesses run in the Cloud

Flexibility – No need to over-invest upfront to support future exponential portfolio growth

Simplicity – Ardexa's Digital Control Platform for OT is delivered as a fully managed service

Your Ardexa OT data Cloud includes capabilities to easily manage remote edge devices, Agents and Machine Plugins as well as store, access, analyze and share massive volumes of normalized and contextualized OT data. It hosts a modern and intuitive web interface that allows all permitted stakeholders to easily interact with your data via prebuilt/customizable queries, charts and industry-specific dashboards. Standard reporting is available for all types of plants, covering production, budget, efficiency and cybersecurity. Machine-initiated or logic-driven alerts are available for all types of operation.

ALL OF YOUR OT DATA UNDER ONE ROOF

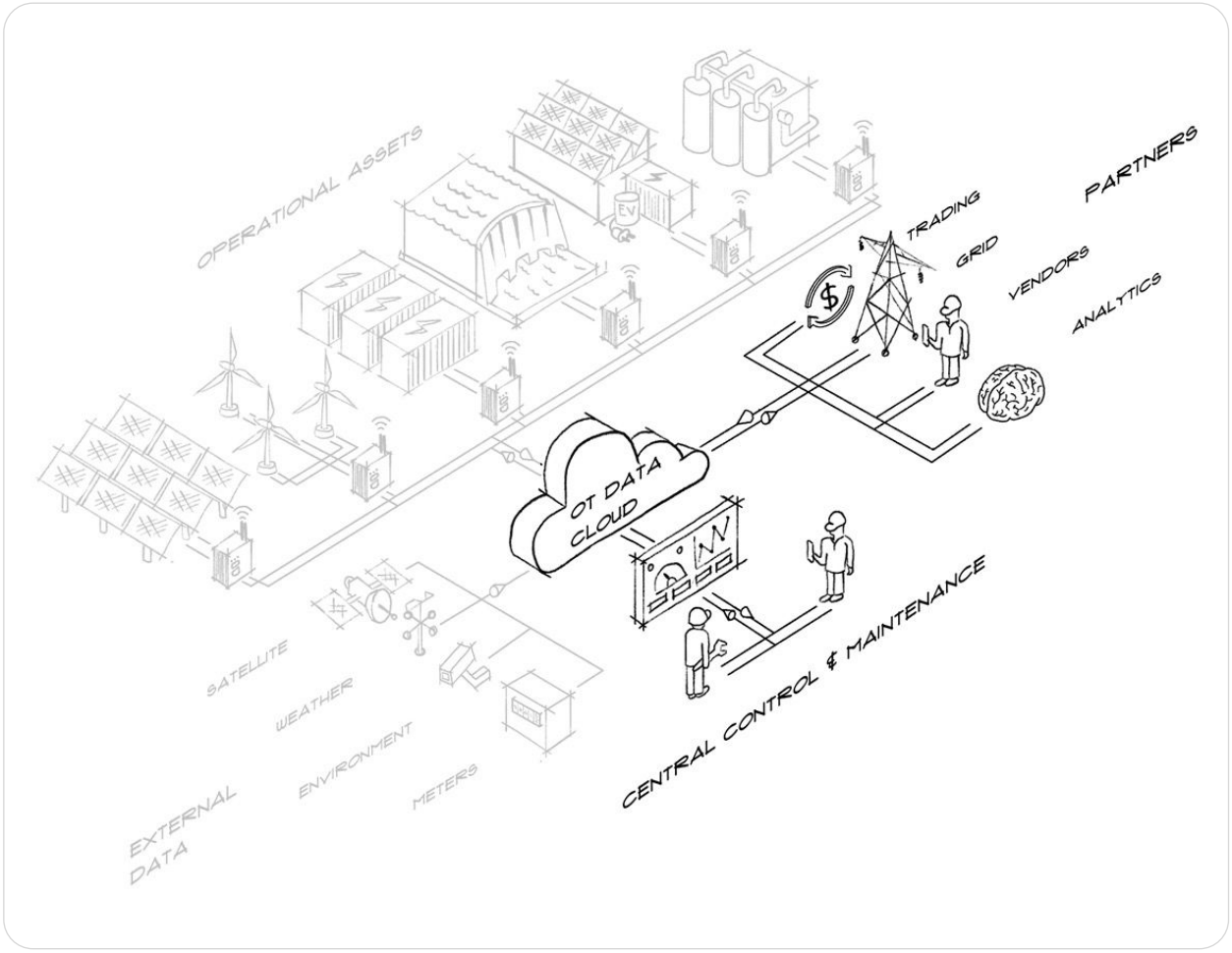


With your OT Data untangled from disparate machines, controllers and SCADA systems and consolidated in the Cloud, managing a diverse renewable portfolio is greatly simplified. Consolidating and normalizing your OT data across your portfolio allows you to simply, rapidly and cost-effectively onboard new solar, wind, hydro and storage plants anywhere in the world--remotely.

CONNECT

As Bill Joy (co-founder of Sun Microsystems) famously said; “No matter where you are, most of the smartest people work somewhere else.” He was highlighting the inherent disadvantage of relying on any vendor of closed, proprietary systems. Today, the ultimate open system is the Cloud. The imperative is to remove the barriers to accessing this source of innovation in renewable operations.

The Ardexa Digital Control Platform grants access to a Cloud-connected ecosystem of experts and service providers that can help extract value from your OT data—an ecosystem that includes your existing vendors and service providers. The ability to connect regulators, grid operators and energy traders for monitoring and production control, establishes new levels of flexibility and efficiency.



CONTROL – OT DATA

Why has the digital revolution taken longer than expected to transform the renewable energy sector? Amazingly, most asset owners and operators lack access to, and control of, their data. Most OT data is locked away in proprietary vendor systems. The heterogeneous nature of renewables (solar plants in particular) means data for even a single plant is often dispersed across numerous proprietary data stores. If the plant owner/operator has multiple plants built at different points in time, by separate EPCs with even slightly dissimilar equipment, the complexities grow exponentially. This complexity is exacerbated in mixed (PV/Wind/Hydro/Storage) portfolio operations.

The Ardexa Digital Control Platform for OT gives you complete control of all your OT data from the source machine to the cloud and throughout the entire asset life cycle. Ardexa normalizes data from machines with similar functions (e.g. inverters, trackers, turbines, etc.) across all vendors, models and versions. This is done with the aid of a configurable data structuring and visualization engine.

Most renewable energy projects result from collaboration across an ecosystem of players that change and evolve over the life cycle of the asset. Business partners, investors, developers, EPCs, asset managers, external analysts and O&Ms can create value from access to your OT data. While the value of your OT data grows in proportion to your ability to share it, whoever controls your OT data will reap the lion's share of the rewards. The Ardexa Digital Control Platform places you, rather than equipment vendors or service provides, in complete control of your OT data as your portfolio and business relationships evolve.

CONTROL – PLANT SYSTEMS

With Ardexa, your control extends beyond your data. The emerging integrated energy market requires control of equipment to be handed to the most appropriate party, within or external to your organisation. This requires careful control signal transfer to plant equipment, along with the necessary high levels of cybersecurity standards.

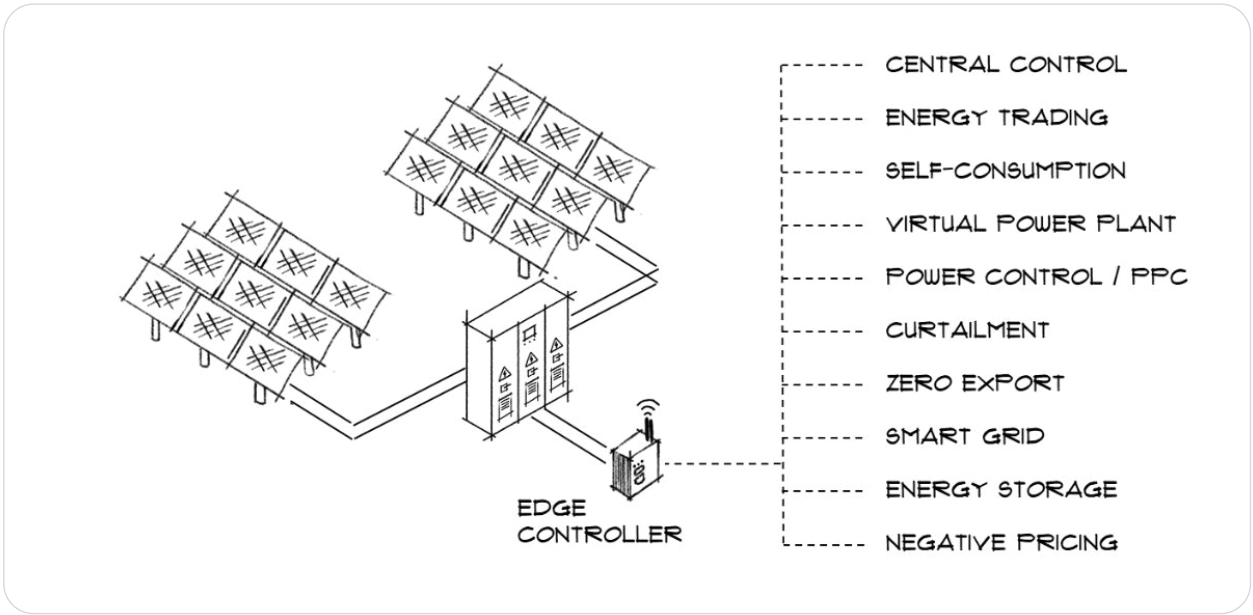
The Ardexa Digital Control Platform for OT facilitates the ability to control equipment, plant and production. Modern controllers, such as soft PLCs, enable any logic to be designed and implemented in a repeatable fashion at minimal cost. Cloud-connected controllers can be configured rapidly without the need for expensive customization, proprietary controllers or specialist internal resources.

Ardexa provides an array of Machines Plugins for control functions that can be deployed by clients with minimal technical support requirements. These Plugins can be rapidly updated when new grid regulations or industry standards arise, as the cloud native architecture means that remote software can be deployed simply and easily with very tight control. This provides significant efficiency in the use of highly skilled control engineers.

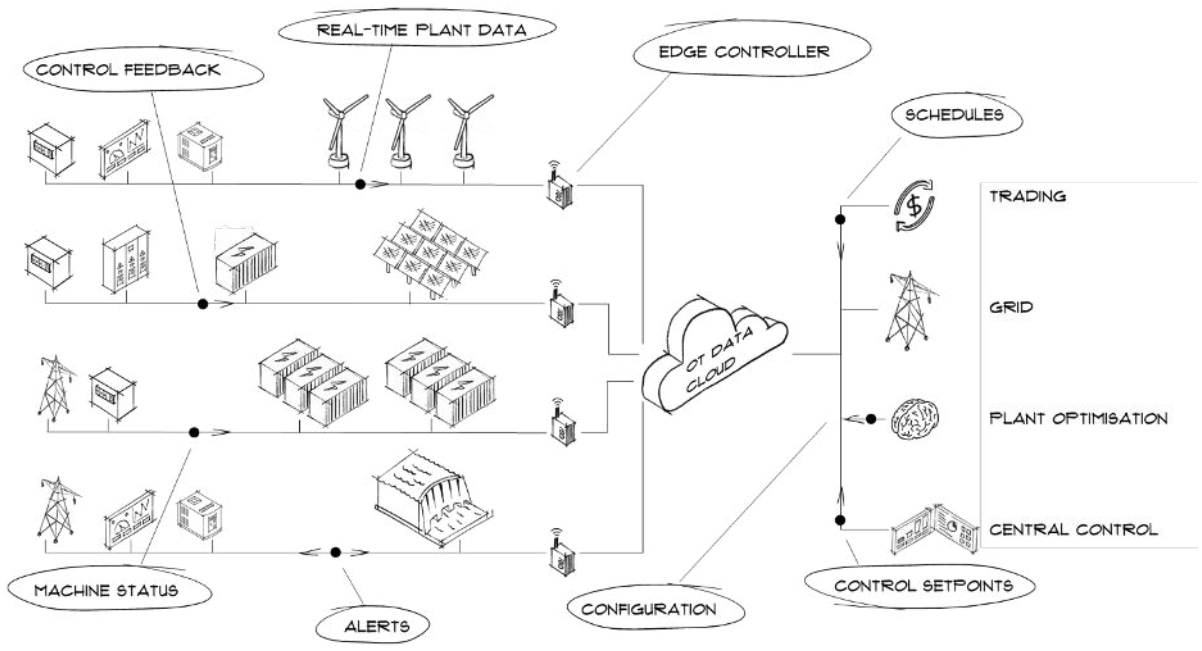
Ardexa delivers interoperability for large portfolios, complementing plant-based SCADA systems with intelligent cloud-managed control capabilities. A unified control platform enables seamless interoperability with disparate local control systems and third-party sources.

Ardexa provides affordable and practical control for smaller plants. Pre-configured controllers are ready to use out-of-the-box. Rapid deployment from the cloud complexity while delivering economically viable control solutions for the smallest of plants.

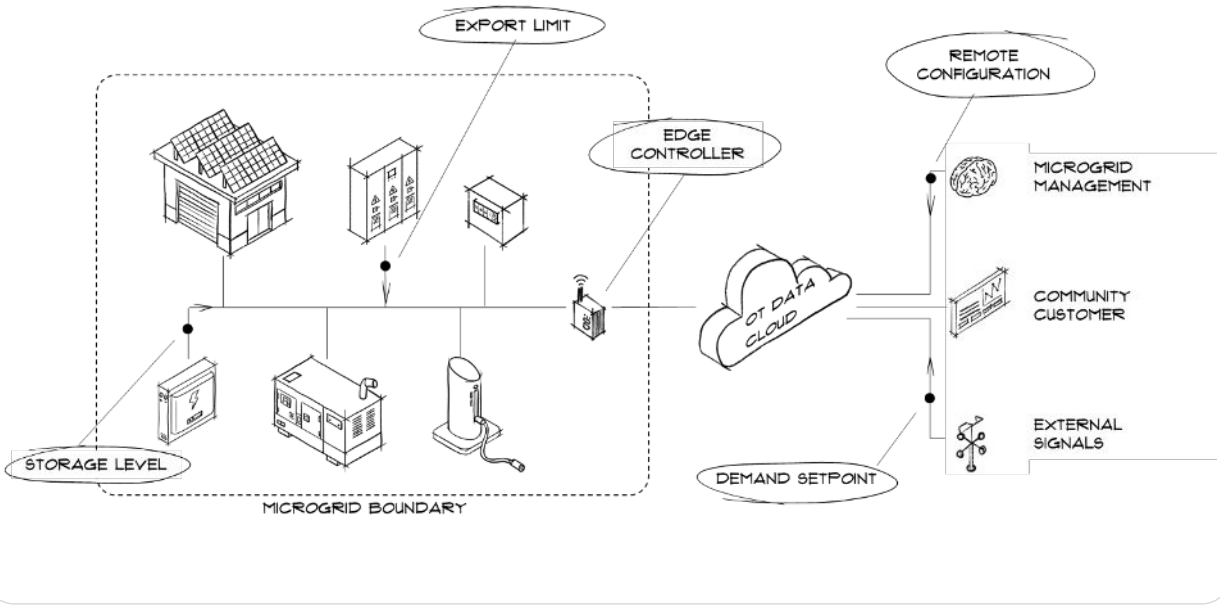
MULTIPLE CONTROL OPTIONS



INTEROPERABILITY FOR LARGE PORTFOLIOS



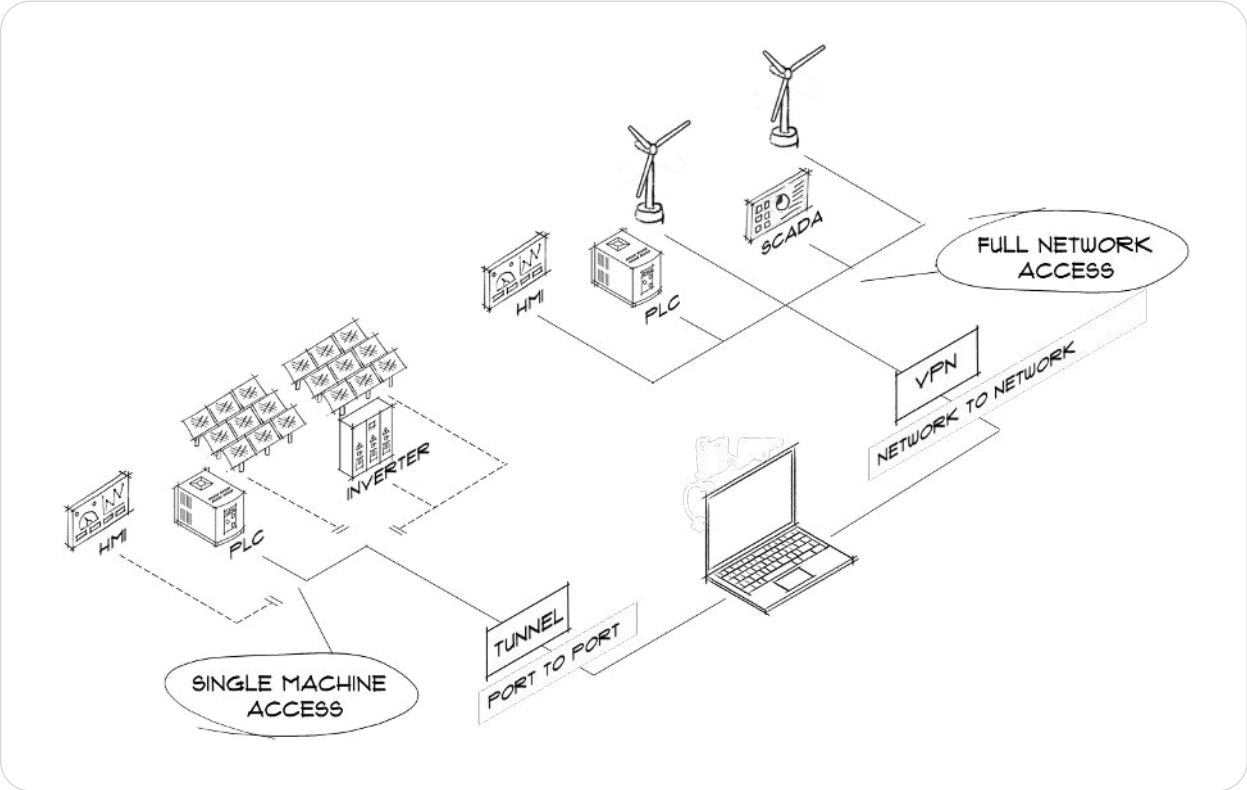
AFFORDABLE AND PRACTICAL PLANT CONTROL



CONTROL – REMOTE ACCESS

There has been an abrupt shift to remote working across all industries. Companies now see the need to undertake tasks remotely that were traditionally done physically at plants. This yields rapid resolution of plant problems, with reduced downtime, labor cost and travel expenses.

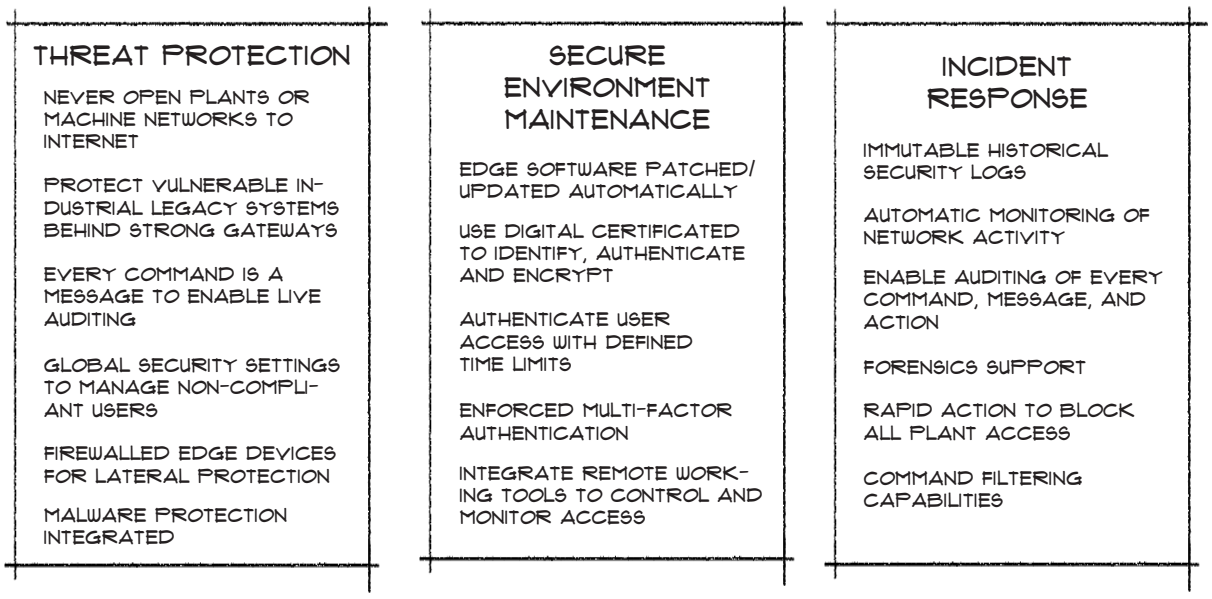
The Ardexa Digital Control Platform incorporates remote working tools that provide machine access to authorized personnel for remote diagnostics, maintenance and control. Ardexa supports both single-machine and full-network tunnels, enabling engineers to meet a wide array of requirements while minimizing the cybersecurity risk. Remote access capabilities are governed by Ardexa's built-in security monitoring system, enabling administrators to control users access to plants and the ability to review audit trails of every action.



SECURE BY DESIGN

Renewable energy plants are critical infrastructure that must be protected—an objective that is reinforced through ever increasing regulations.

Effective data protection comes from holistic approaches, rather than an array of disjointed features. Holistic cybersecurity requires the tight interlocking of multiple security principles that together yield the highest levels of protection. Core cybersecurity principles inherent to the Digital Control Platform include:



With Ardexa's Digital Control Platform for OT increased levels of control, flexibility and cost-containment do not come as a tradeoff to securing renewable infrastructure. Ardexa materially strengthens the security posture of large, distributed portfolios from the edge to the Cloud with an architecture that is secure by design.

All of this comes in a ready to implement package, that does not require extensive training or preparation. Most importantly, customers do not require any software or cloud competencies, as Ardexa provides a full managed service, taking care of software development, cloud management, cybersecurity monitoring and technical support.

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