

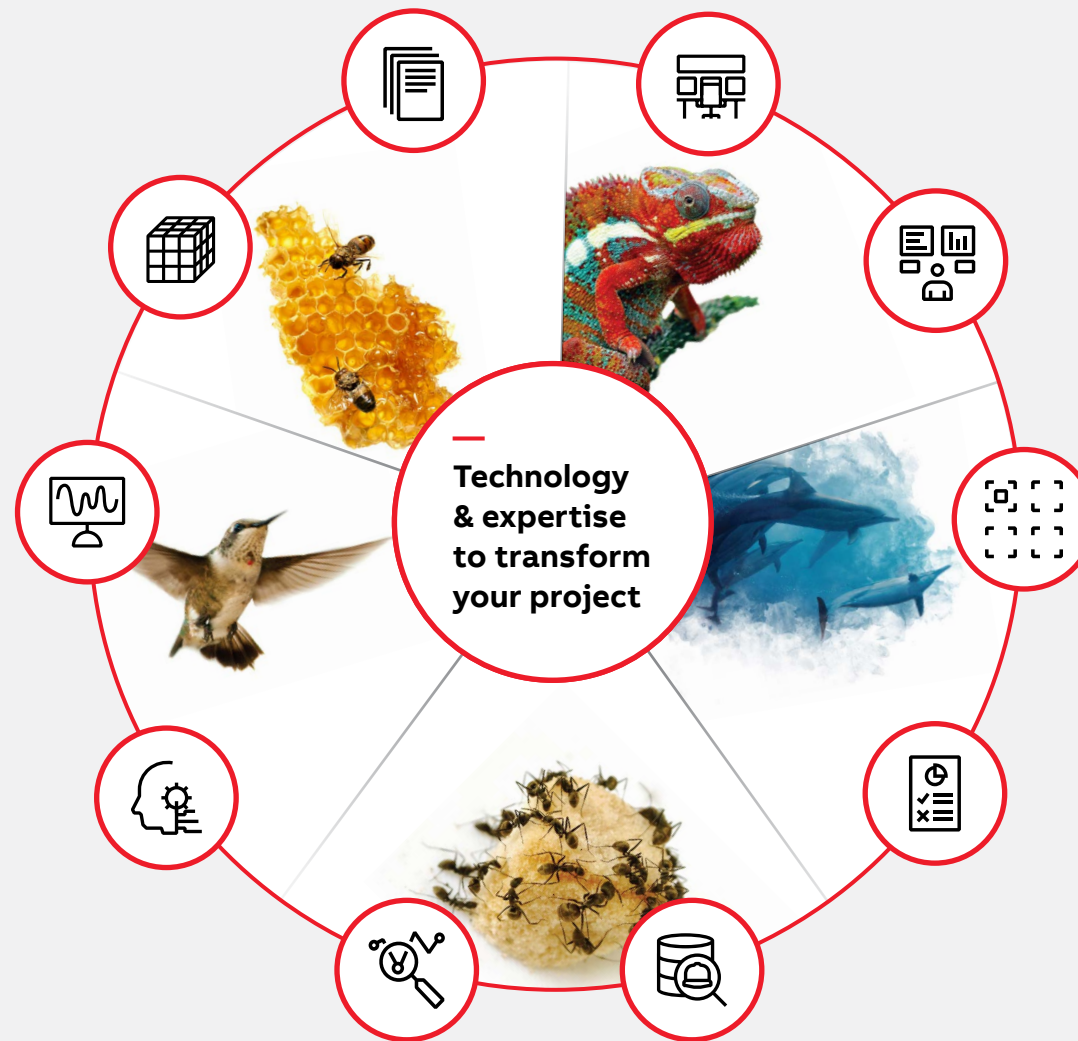


ABB Adaptive Execution™

Leveraging people,
competencies and technology

A transformative approach that yields measurable improvements

Navigate the menu to learn more



Inspired by nature. Perfect by ABB.

Efficiency through modularity

ABB Adaptive Execution™ incorporates efficient modular design, standardization and reliable infrastructure to boost solution performance. This increased productivity enables the delivery team to achieve more in shorter timeframes, improving overall CAPEX efficiency.



Predictable results through better collaboration

Capital projects are fraught with interdependencies that can slow progress and impact delivery quality. ABB Adaptive Execution™ introduces standardized processes and proactive management tools that promote collaboration and minimize the negative impact of any complications.



ABB Adaptive Execution™ Attributes

360° project vision

By integrating people, technology and proven methodologies, ABB Adaptive Execution™ provides total visibility across the entire project life cycle.



Improved agility and responsiveness

Critical to every capital project's success is the ability to react and adjust to scope changes quickly. ABB Adaptive Execution™ leverages agile processes and validated methodologies to shift scope on the fly and deliver the right people with the right skills at the right time.



Proven pathways to success

At ABB, each successful project builds on the lessons learned from previous initiatives. Our experienced team of subject matter experts can provide customers with proven, detailed guidance and advice to ensure success.



Define: simulator integration

Leveraging system digital twins during design, execution and operation

What is it?

ABB Ability™ System 800xA Simulator is a true non-emulated replica of the production control system which optimizes plant design, reduces risk and unplanned shutdowns, improves safety and productivity, as well as energy savings through a realistic DCS simulation of your operation.

Why is this important?

- Due to the non-emulated nature of 800xA Simulator, operator training sessions and control application studies are conducted in an environment which is an identical replica of the production system
- Combined with ABB Ability™ Process Power Simulator, an end-user can **simulate the entire plant** (even during the design phase), and evaluate the impact between process and the electrical network system
- Decision makers can run simulation scenarios to **optimize equipment design and control strategies** during the planning phase
- A life cycle simulator can be used for **virtual commissioning** and to **train plant personnel** before commissioning takes place
- Operators and decision makers can **study** how their equipment behaves under **anticipated conditions and scenarios** without affecting the plant

What is the value we will deliver to you?

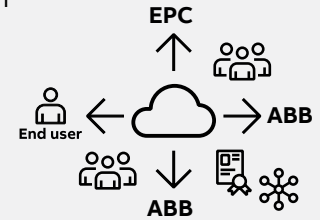
- ABB Ability™ System 800xA Simulator allows the control system software to be **tested, validated and tuned** before being installed on the actual operating control system
- Automation and simulation go hand-in-hand: for verifying design, testing implementing control logic and HMI implementation, **virtual commissioning, operator training** and improving operations
- The ABB Ability simulation helps customers to **improve** plant operations, **availability, reliability** and to perform the required actions to **prevent unplanned outages**



DEFINE

Design and execution simplicity

- Application software built on a life cycle simulator can be efficiently tested and validated before being installed on the actual operating control system
- Saves time and money by identifying potential process and electrical system bottlenecks and/or problems during the design phase before commissioning
- Operators and decision makers can study how their equipment behaves under anticipated conditions and scenarios without affecting the plant



EXECUTE



Complete system simulation

- Reduces maintenance costs and reduces the number of shutdowns with the ability to test proposed operational changes prior to implementation
- A life cycle simulator can be used for virtual commissioning and to train plant personnel before commissioning takes place

OPERATE

Reduced operating cost

- Improves operator training and education by training operators in a safe, simulated environment that is identical to actual plant engineering and operations
- Leads to increased process efficiency by optimizing process and power control strategies in an integrated fashion



Define: standardization

Engineering tools, industry-specific software libraries, and productized hardware solutions

What is it?

- Standardization of **engineering processes and solutions**
- **Enables an agile execution model** where project **deliverables are generated in parallel**
- Leveraging **ready-to-deploy elements** in coordination with site activities
- ABB can deliver **productized, pre-certified cabinets** straight to customer site for construction work to start

Why is this important?

- **Reduces or eliminates design and engineering efforts** and helps avoid the need for software and hardware testing/rework
- **Streamlines change management** process and lowers installation, commissioning and start-up times
- **Leverages Engineering Base (Ebase) as common engineering platform** which converts the design inputs into software applications, hardware packages and documentation
- With standardized tools, we can **minimize or eliminate the FEED or basic design phase** since we can easily deploy standardized solutions at a very early stage of the discussions with EPCs and end-users

What is the value we will deliver to you?

- Pre-engineered solutions and tools can be deployed at the different phases, which **improves delivery schedules and reduces costs**
- Automatic generation of hardware packages, software applications and project documentation
- Full **decoupling** between **software and hardware** engineering, **allowing late binding on site**



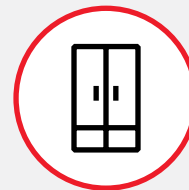
Common engineering platform (Ebase)

- Automatic generation of project deliverables, production or drawings, export of control applications to DCS to eliminating costly manual steps and reducing human error
- Simple change management process



Use of standardized engineering tools and libraries

- Standard libraries fully integrated with the 800xA core product that incorporate the requirements of various industries and segments
- Global engineering tools for automation of complex engineering processes (e.g., automatic 3rd-party integration)



Productized hardware solution

- No need for hardware engineering
Productized cabinets are ready for shipping from day 1 of the project
- Reduces cabinet manufacturing and testing time
- Eliminates cabinet certification cost for hazardous area by having Atex/UL pre-certified cabinet design

Define: integration

Helps customers adapt to inevitable changes to improve business outcomes

What is it?

A **single environment** that delivers integration **across control, safety, electrical and telecom** systems and ensures that **any changes** can be **implemented** far **quicker** and more **cost effectively**.

Why is this important?

Lower project life cycle costs with ABB's **fully integrated solution**

- **Shared resources** such as IT infrastructure, common networks, engineering workstations, etc.
- ABB's single state-of-the-art operational user interface **reduces the size and cost** of the **control room**
- Gain access to **ABB expert insights** and guidance from the design phase through operation

Increase operational effectiveness

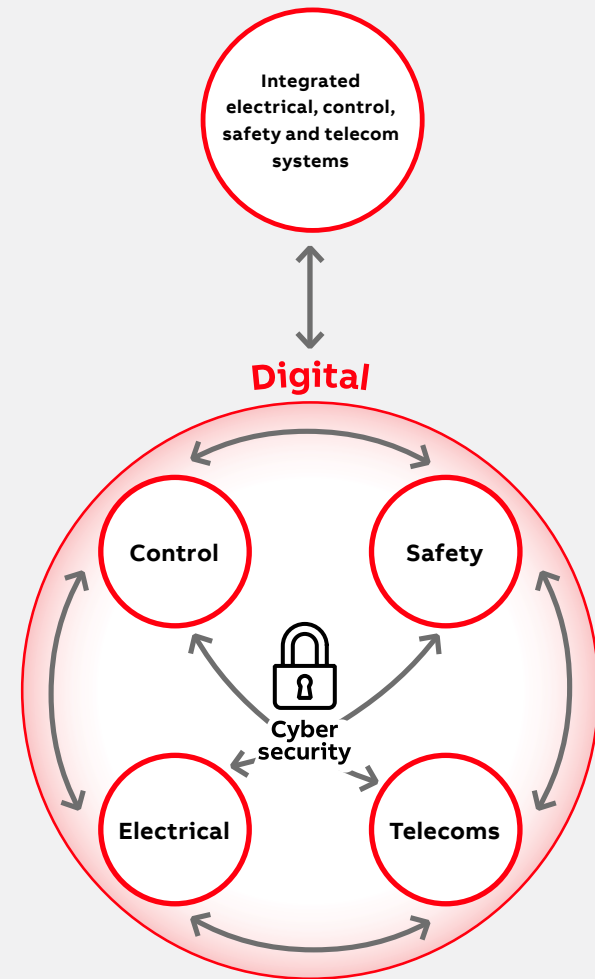
- Increases production uptime, safety and lower operational cost by providing a **360° view across the entire facility**
- Improves plant visibility and fast access to **relevant real-time information** which allows for operational issues to be resolved **before downtime occurs**
- **Integrated design** helps us to deliver systems that can be Operational excellence Industry 4.0 Ready. With ABB Ability we can easily build digital solutions that will achieve improved Asset integrity, Operational performance, supply chain efficiency and manage risks, safety (Including Cyber Security) and sustainability aspects of the facility.

What is the value we will deliver to you?

- Provides operational staff with a **comprehensive view** that spans the **entire production facility**
- Enables change to be implemented **faster and more cost effectively** than with a solution based on separate connected systems



In the past, “built to last” was a guiding principle.
Going forward, “built to adapt” offers greater promise.



- Most design changes impact more than one system or component (Ex: an electrical change can necessitate a change to control, safety and telecom)
- An integrated solution with a single engineering environment and database means change can be implemented far quicker and more cost effectively

Execute: Integrated Project Management (IPM)

A consistent and predictable way of executing, resulting in project efficiencies

What is it?

IPM is an integrated suite of software solution utilized in the project life cycle, from tendering, through project execution and close-out. IPM drives excellence in project execution by streamlining project execution processes, integrating them in one platform, automating manual tasks and allowing us to collaborate seamlessly within and beyond a local unit.

Why is this important?

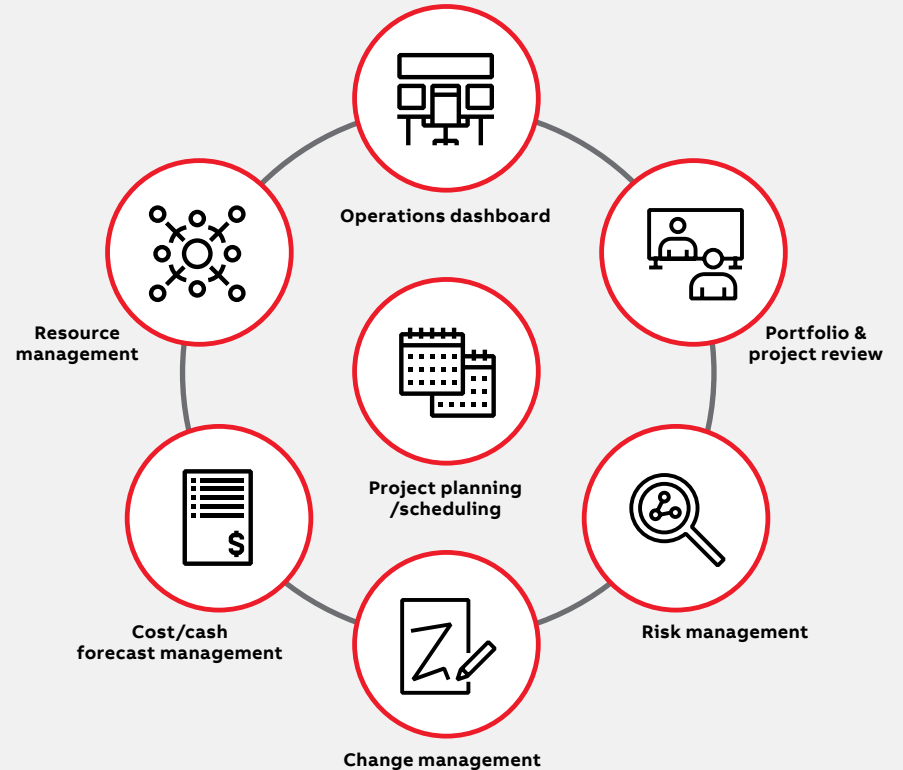
- **Standardized data:** re-usable data structures (e.g. work breakdown structures) provides a more uniform experience when dealing with ABB execution teams
- **Consistent global execution:** allows for leveraging expert and high-value engineering to deliver predictable outcomes
- **Faster response to customer change requests:** A standardized, template-based approach with integrated project controls to allow faster responses to customer change requests
- **Reduces risks and issues:** IPM delivers better real-time insight into projects and provides various dashboards and foresight to help identify and mitigate risks

What is the value we will deliver to you?

- **Predictability.** Eliminate firefighting. Taking project execution off the critical path. Faster delivery and enhanced collaboration.
- **Consistency.** Doing business with ABB is now easier. Can build true partnership between our teams, since customer team will recognize that the approach, templates, reports, etc. are the same regardless of geography.
- **Speed.** Faster customer response and quicker complaint resolution, faster action on risks and issues, better resource utilization and more accurate planning.



IPM delivers a highly integrated project controls system that enables truly data-driven project management with integrated schedule, resource, procurement, financials and other data



- 1 Streamlining project execution processes
- +
- 2 Integrating them into one platform
- +
- 3 Automating manual tasks
- = Seamless collaboration

Execute: methodology and enabling tools

Adapt to change by removing traditional execution dependencies

What is it?

- Transforms project execution through **decoupled tasks** and **parallel execution**, ultimately reducing CAPEX by 15 - 40 %
- Enables **virtual commissioning** via process models, leading to far fewer changes and modifications being required on-site during commissioning

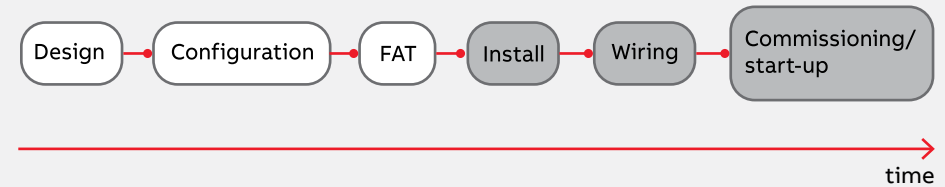
Why is this important?

- Provides **standard** designs, methodologies and engineering workflows and support tools **accessible to all project execution groups**
- Facilitates **virtual engineering**, allowing ABB and EPC contractors to work from a **single engineering database** and set of **common, standardized designs**
- Easily **accommodates late cycle design changes**
- Leverages **high-value engineering centers** to allow for a “follow the sun” approach to work schedules

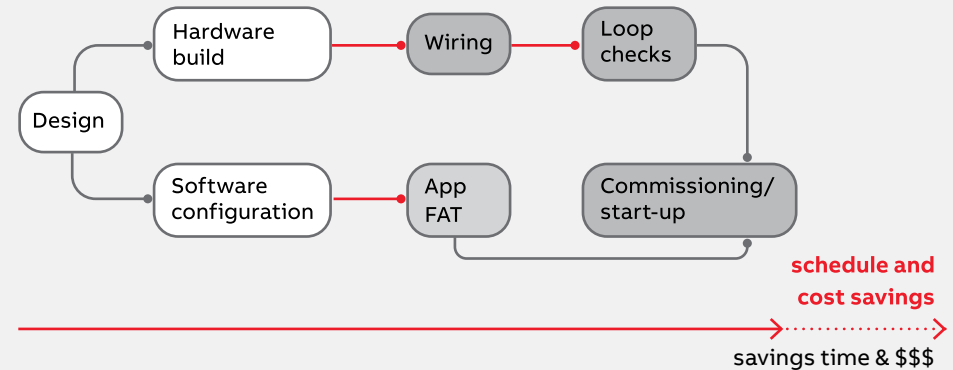
What is the value we will deliver to you?

- The methodology and enabling tools of ABB Adaptive Execution™ **improve speed, increase savings and reduce risk of project execution**
- Reduces** risk and costs and **increases** schedule certainty
- Allows **testing to be conducted off-site** or at the **staging area**
- Keeps automation off the critical path** of the overall project schedule
- Extended flexibility** through Select I/O with digital marshalling

Traditional approach: dependency driven (in series)



New approach: decoupled, parallel tasks



Schedule compressed

10 % to 30 %



CAPEX savings of

15 % to 40 %



Fewer start-up hours of

up to 40 %



Virtualized environment

removes the need for site access engineering



Simplified interfaces

centralizes interactions across all stakeholders



Delivering superior quality

standardizes designs, tools and processes



Execute: xStream Engineering

Significantly and positively impact project efficiency

What is it?

- Enables **decoupled application software and hardware workflows**
- Leverages **validated modular applications** that are coupled with **smart commissioned I/O hardware** that can be connected very late at site due to ABB's rapid, **late binding** aspect of xStream Engineering

Why is this important?

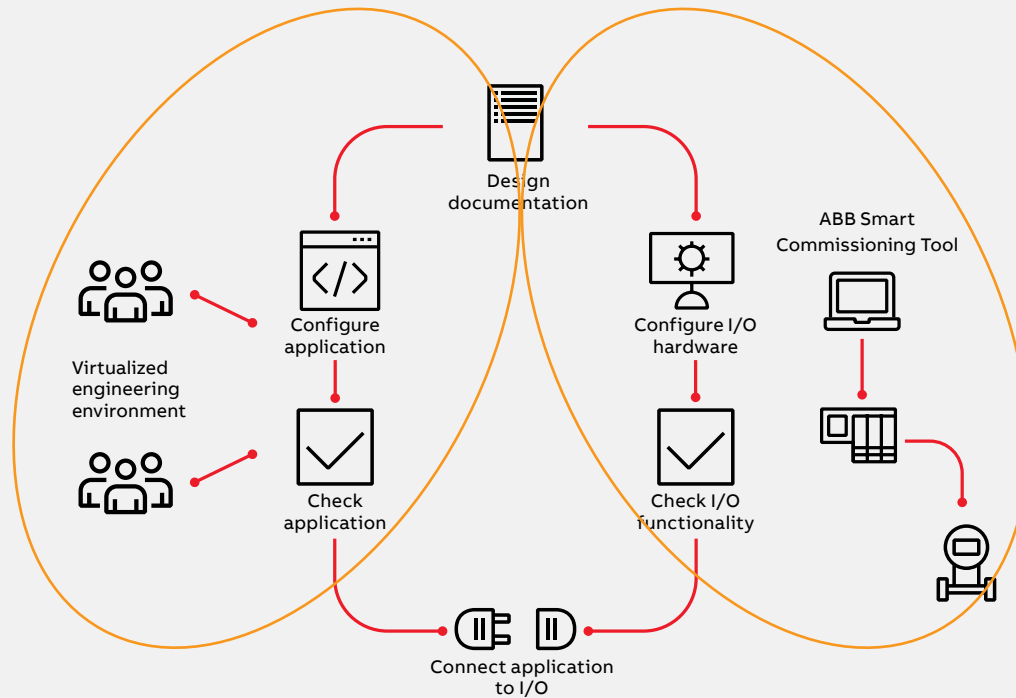
- Substantially **minimizes site work and schedule adjustments** typically required by late changes, significantly reducing overall project cost
- Hardware and software are **bound together quickly and automatically** by the system when the controllers and HMI infrastructure is installed

What is the value we will deliver to you?

Taking automation off the critical path allows for xStream flexibility

- Front-end loading is **significantly optimized** with ABB Adaptive Execution thus **reducing personnel** needed to execute the project
- Build/test the ICSS/ECM software application later in the project schedule when the EPC design is mature
- Traditional design freeze is replaced with a series of design freezes adapted to how the project design matures
- Continuous modular build and test using simulation (**virtual commissioning**) of application software in the cloud
- Controllers and HMI not required so smart junction boxes (SJBs) **can easily be commissioned** in a module yard or on site

Hardware/decoupling



xStream Engineering supports execution agility

Well-tested application software modularity

- Multiple levels of fidelity
- Process, safety and electrical simulation

Modular I/O hardware deployment

- ABB Select I/O supporting **Detect, Interrogate, Configure, Enable, Document** (DICED) loop commissioning
- Smart commissioning software runs on a laptop connected to the standard ABB SJB; no automation controller required
- I/O modules easily changed on the fly; SJBs easily added/configured/tested
- Rapid, automatic binding between fully commissioned SJBs and fully tested application software



Execute: efficiency through modularity

Supports the latest modular plant construction techniques being applied to large capital projects

What is it?

- Approach to executing complex projects using **package interface tools**, standard **hardware** solutions (select I/O) and **software** building blocks
- **Continuous modular build and test** of application software in a **virtualized cloud-based engineering environment** and utilize standard hardware designs

Why is this important?

- Gives purchaser more **flexibility in project planning**—modules requiring change can more easily be re-scheduled
- Enables **faster implementation of change** to impacted modules; change doesn't have to be considered or applied across the entire solution
- **Promotes standardization and re-use**, so it is likely that change can be accommodated more easily by using or adapting a different module

What is the value we will deliver to you?

No traditional design freeze

- Removes front-end loading and **flattens out the engineering resources** curve
- Enables ability to plan float into automation project schedules; **facilitates design improvement and optimization**
- Provides more time for supply chain management to **negotiate better deals**

Flexible modular approach

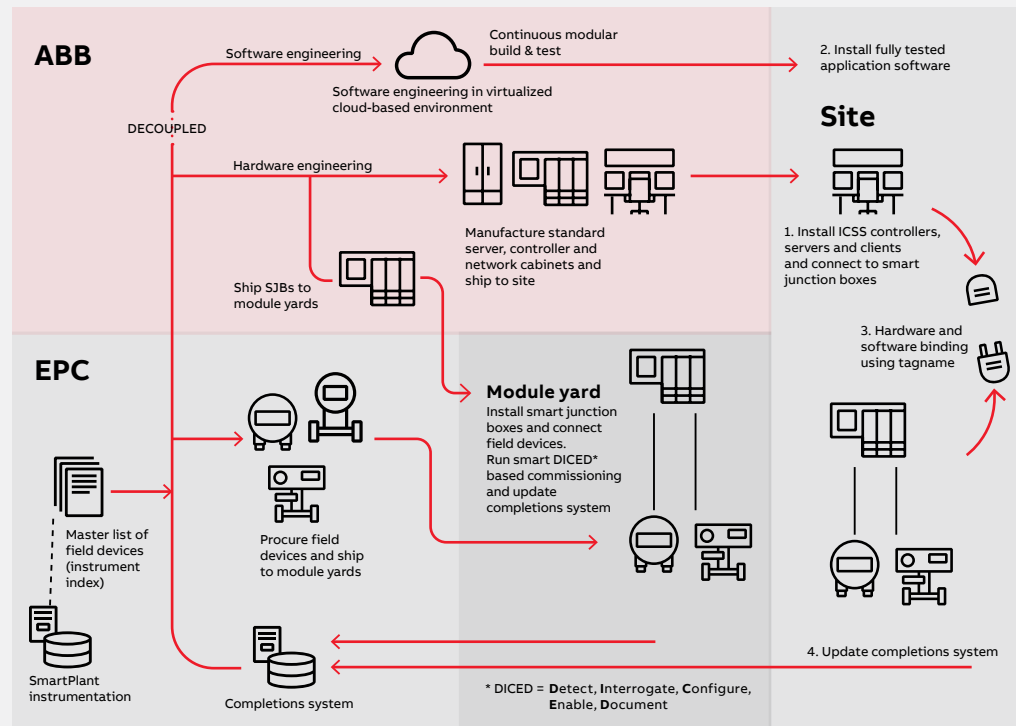
- Significantly **reduce onsite commissioning time**, achieve **faster plant start-up** and **lower project capital costs** and **quality assurance** through continuous modular testing and virtual commissioning of application

Design based on criticality

- Reduces the complexity and the number of components in the critical path of the project schedule



Continuous modular build and test of application software in a virtualized, cloud-based engineering environment



Operate: business optimization using ABB Ability™ Genix

Connect your operations and business systems to empower real-time, data-driven decisions

What is it?

- One place for **integration of OT/IT/ET data** (single version of truth)
- **Integrates** production systems with ERP data
- **Contextualizes** your data with ABB's pre-built applications (industry-specific data and software models)
- Provides **unbiased and repeatable** analytical predictions

Why is this important?

- Aids in safer, smarter operations that maximize resource efficiency and contribute to a **low-carbon future**
- In an ever changing and challenging market environment, industries require new business models to stay **efficient, relevant, competitive and profitable**

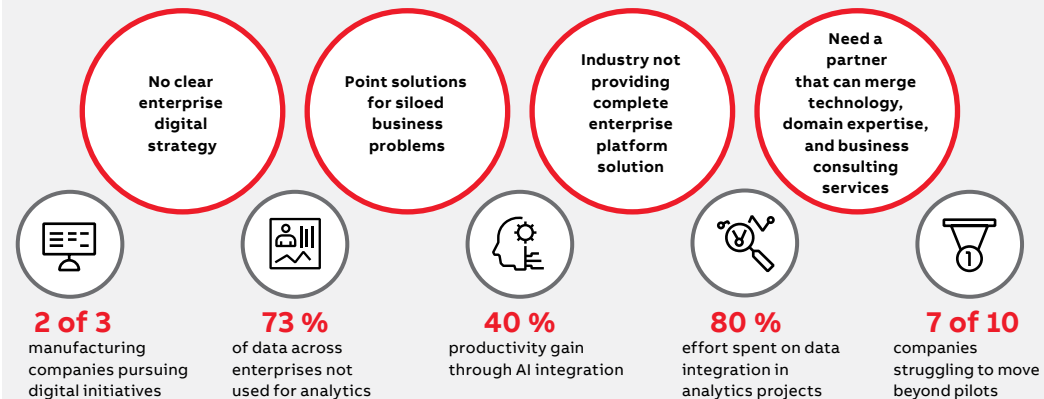
What is the value we will deliver to you?

- Allows customized advanced applications to be built by end-users to generate data **insights quickly and effectively** without high-cost data analytics consulting
- **Increases** throughput, revenue and profitability
- **Improves** asset reliability and asset life
- The application suite can be deployed **on-premises, in-cloud** or via a **hybrid model** and is scalable to meet needs from pilot to enterprise installation
- Asset Performance Management (APM) consulting
- Integrated 800xA information model for advanced edge or cloud-based analytics solutions

Why are our customers pursuing digital transformation?



Customer challenges



Operate: service digitalization

Helps customers adapt to inevitable changes

What is it?

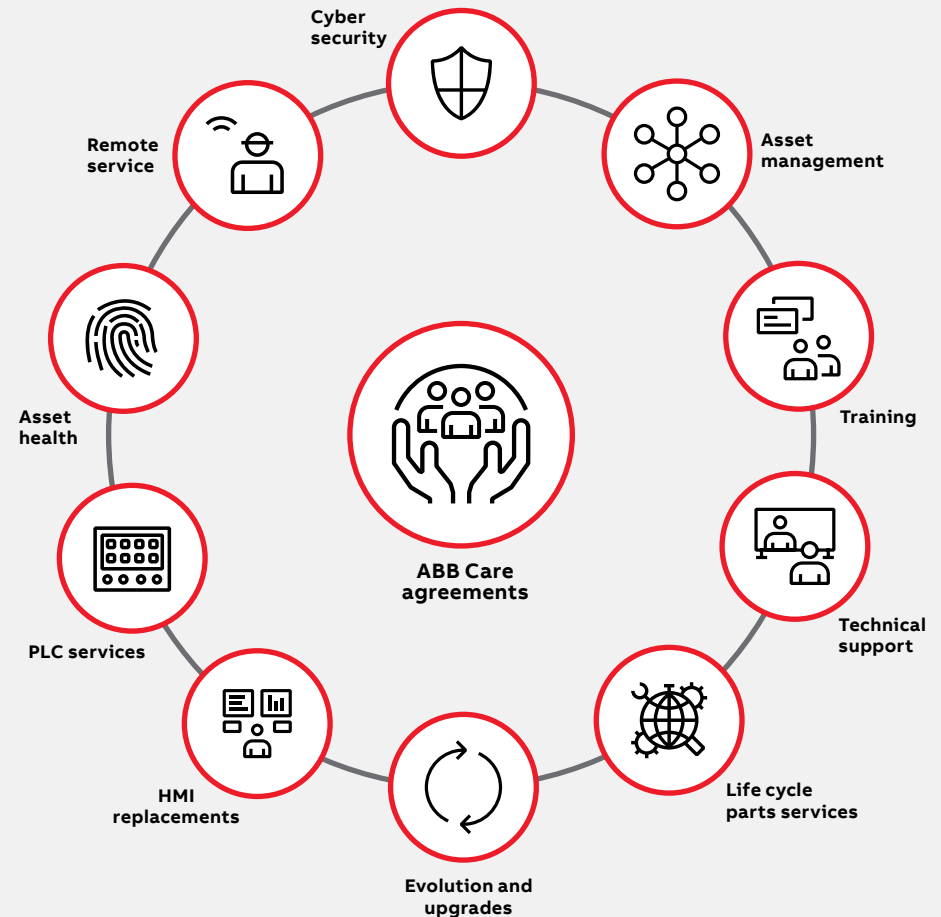
ABB provides **safe, secure and reliable operations** by offering customers an optimized service portfolio **that leverage data** to identify improvement opportunities, support customers with **ABB Care agreements** and provide customers with **instant self-service access** to system information through MyABB / My Control System.

Why is this important?

- **Cost reduction:** focus on asset health (including cyber) helps improve maintenance efficiency = 15 % less cost
- **Performance optimization:** discover deviations that impact plant performance and improve availability by adding loop optimization, alarm rationalization, asset management or simulation applications = Greater than 50 % more availability
- **Risk avoidance:** optimization solutions help achieve the operational insights necessary to keep production running with minimal risk and interruptions = 66 % fewer incidents

What is the value we will deliver to you?

- **One standard contracting framework** for service makes engaging with ABB easy, saving the customer time
- On-premises and cloud delivery options enable **onsite, remote and mobile service delivery**
- **Reduces OPEX** with special pricing on covered products and services
- **Supports** the life cycle of your automation or electrical assets at your facility
- **Reduction of unplanned downtimes** with proactive maintenance strategy supported by care offerings



Data and technology to help achieve operational and business insights

Operate: digital applications to optimize plant production

Enable strategic decision-making, resiliency, and long-term profitability

What is it?

ABB applies digital solutions across entire industrial systems for efficient information handling. We link disparate systems by breaking traditional data silos and connecting them as one system. Collaborative systems help work to become more integrated with the guarantee of providing smart, safe and sustainable operations in real time.

ABB's operations-oriented digital portfolio addresses the following operational areas:

- **Asset Performance Management (APM)** – You need tighter control over your assets to optimize the risk, costs and rewards of operating your industrial enterprise. ABB APM solutions deliver this value with Asset Strategy, Asset Expertise and Asset Health offerings
- **Manufacturing Operations Management (MOM)** - ABB's Manufacturing Operations Management suite provides the backbone for optimized operations by enabling the control and insight needed in effective production-, quality-, inventory- and maintenance operations
- **Cyber security** - ABB's cybersecurity solutions allow you to identify and address cyber threats before they harm your business. With our approach, it's easy for you to select services that meet your needs
- **Life cycle management** – Gain efficiency with an optimum basis of safety and alarm management, ensuring operational risks are managed and identifying opportunities for improvement, optimizing the overall cost of safety and alignment with enterprise risk management

Why is this important?

- Extract the most value from your assets by avoiding the uncertainties, risks and costs of ineffective maintenance approaches. Using data-driven decision making, you optimize asset performance and maintenance across your entire enterprise
- Mitigate cyber risks by identifying threats, automating compliance and deflecting cyber-attacks



Select one of the buttons to view the diagram

Safety Life Cycle
Management

Alarm Life Cycle
Management

Digitalization of
manual procedures

Asset Performance
Management (APM)

Manufacturing Operations
Management (MOM)

What is the value we will deliver to you?

- **Enable** quick business response with efficient, safe and profitable operations in our dynamic markets, backed by products and services to last the life of your operations
- **Improve** resource utilization, throughput and lead times
- **Reduce** material consumption and inventory
- **Improve** quality and reduce variations, errors and waste
- **Fulfill** regulatory compliance



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