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Integrated vs. standalone – how to integrate best a single purpose Predictive Maintenance Solution.

With a growing number of interconnected machines and advanced computer capabilities, the question of isolated vs. integrated systems is more present than ever. There are more and more solutions available which provide benefits to industrial operations. Many new machines bring along own information and management systems. Other systems are added to existing machines providing updated features to the existing operations such as Predictive Maintenance Solutions. Overall, these modern systems are helping to reduce costs, to increase productivity, to improve reliability and many more. However, with the growing number of systems and tools, the complexity for the users also increases. The question is: How to integrate best a single purpose Predictive Maintenance Solution to benefit from a fast development and its features?

## Integrated system landscape to eliminate co-existence: convenient but complex

Manufacturing sites are nowadays equipped with multiple systems to manage their operations. They assist the site personnel with diverse tasks including process control, automation, maintenance management, performance monitoring and information, and many more. The scenario 1 presents a possible landscape of systems, which may be interconnected. The level of interconnection will depend on different factors such as age of the site, age of the equipment, make and version of the systems supplied, interface and connectivity capabilities, to name a few. Interfaces between available systems will facilitate information transfer across the landscape. However, they may not always be available or in some cases information is only transferred thanks to manual inputs.

Scenario 1   Manufacturing site with multiple co-existing systems
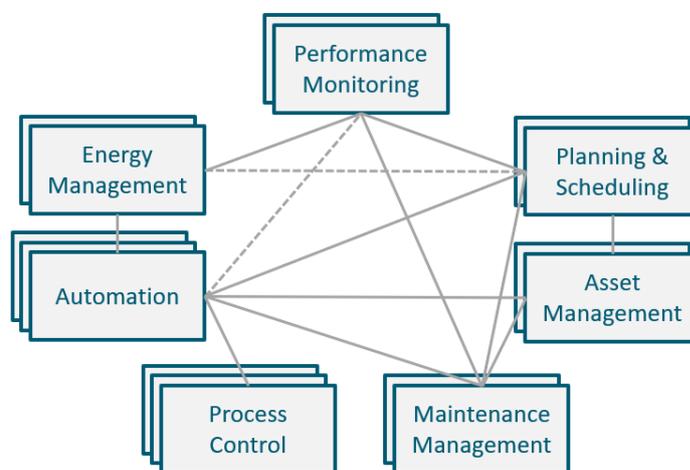
Scenario 1: Simplified representation of relevant systems available in a manufacturing site with several machines in a production line. Those systems may include interfaces among them to enable the information transfer. The gray lines represent the interfaces available, with manual data transfer (dotted lines).

Scenario 2   Manufacturing site with a fully integrated system
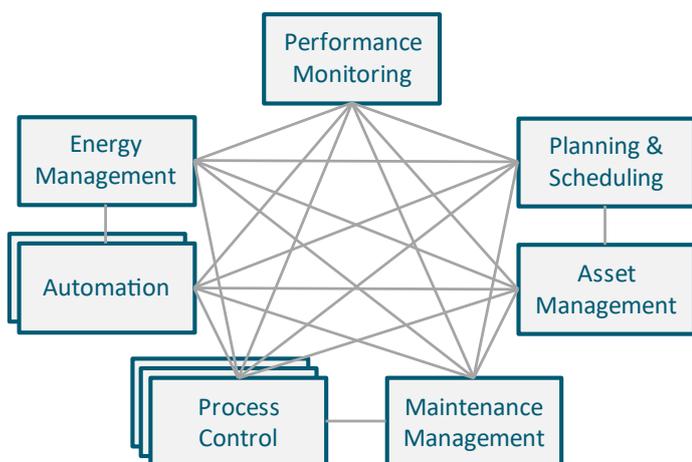
Scenario 2: A manufacturing site with fully integrated system landscape will achieve this having fewer systems than in scenario 1, interconnected by modern interfaces (no dotted lines) to fulfil the information transfer requirements.

**In this landscape users may face several difficulties:**

- Where to find all available information, can it be in one place?
- How to benefit from all the available equipment data?
- How to transform and analyze the available information to achieve real insights?
- In a large organization or site: how to connect relevant information and events?

In this case, the early integration of all relevant manufacturing systems is desired. An integration that will not only be convenient to the users but also provide additional benefits, including better accuracy, higher productivity, and cost-effectiveness. This can also lead to a full integration of all relevant systems, which is beneficial. However, it requires diligent care to deal with its complexity. In scenario 2 the number of interfaces from scenario 1 is increased, allowing more systems exchange information, possibly reaching a full integration.

Predictive Maintenance fully integrated

Integration can be challenging and overcoming the challenges can diminish the benefits of the integration. Beyond the initial effort required, the integration maintenance needs to be considered, that is keeping up with developments of the interconnected parts. Reaching full integration can be achieved through extensions of available systems, through interfaces or through complete replacement with new systems. The scenario 3 presents a scenario, where all systems are already interconnected using modern interfaces. The addition of a new functionality, such as Predictive Maintenance, will in this case be developed within an existing system, e.g. the maintenance management module. The main benefit of this kind of integration is that all relevant information will already be interconnected, and for the end-users the new functioinality will be easy to find. However, this

Scenario 3   New system fully integrated to existing landscape
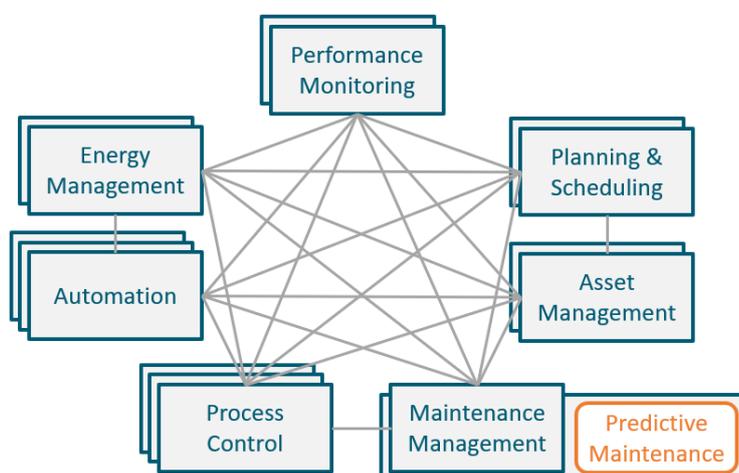
Scenario 3: The development of a new functionality, a Predictive Maintenance Solution, may be done fully integrated by extension of an already available system, e.g. the maintenance management.

advantage will be diminished by the drawbacks of development constrains, as mentioned above: time to develop, updates and modifications needed. Furthermore, the possibility to transfer this development to other sites and systems may be limited. An integrated Predictive Maintenance Solution in site A cannot be transferred to the site B. **Therefore, you need to do the same development and integration in another plant in case this is not using the same system setup. This is the reason why such kind of system will be often developed and installed standalone.**

The older the machine, the higher the risk of breakdowns, high costs and non-availability of spare parts. The integration of a standalone Predictive Maintenance Solution meets the requirements of limited budgets and supports machine owners and the OEM to secure a high machine and spare parts availability.

How to integrate best a standalone Predictive Maintenance Solution

Many solutions develop faster standalone and reach more benefits once they mature and can be integrated. This approach benefits from dividing the complexity of the business or operation, with focus on one specific task or topic, such as a Predictive Maintenance Solution, which brings intelligence to an existing machine instead of investing a lot of money into a new machine (see also our article "Progress despite stagnation"). In this way, it is possible to realize new developments, achieve results faster, and provide a solution ready to be integrated.

The following are some advantages given by standalone solutions developed by OEMs:

- ☑ Know-how and experience from machine development
- ☑ Many years of experience from different industries and applications
- ☑ Lower development cost with faster results
- ☑ Built on knowledge from interfacing to different systems

Having the resulting system integrated via an interface will provide the best of both worlds building a platform with multi-source solutions.

Integration through interfaces

Scenario 4 Hybrid solution: integration through interfaces
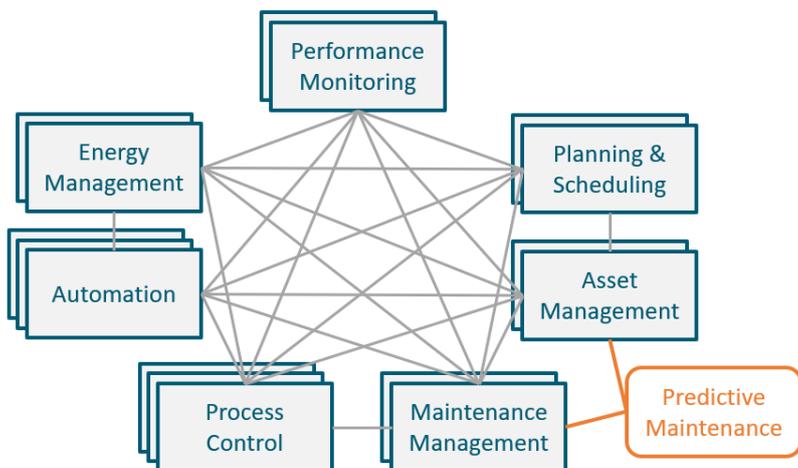
Scenario 4: An alternative to a fully integrated Predictive Maintenance Solution is the interfacing of an external solution, to benefit from the fast development.

Unfortunately, there is no standard interface available for system integration. The main reason is due to the diversity of the business and the large number of different systems existing. A common solution is provided by an API (application programming interface). By establishing interconnection through APIs, different systems can communicate and transmit data seamlessly. The advantages of APIs extend to their flexibility, smooth operations, and high availability. Additionally, the development of interconnected systems can run independent, and will enable data transfer across multiple platforms. e.g. a Predictive Maintenance Solution can interface with site A and the same solution can communicate to site B thanks to the integration through APIs.

The best from both worlds: Robust Predictive Maintenance Solutions & API system integration by OEMs

Industrial machines are often used across multiple industrial segments in multiple applications (e.g. mining, agriculture, metals, construction materials, etc.). For Predictive Maintenance, the industrial users and the OEM can collaborate to improve operations, developing advanced solutions, building on the strengths and knowledge of the OEM as well as of the experience of the end user. Thanks to the use of modern interface technology (API) it is possible to achieve the best of both worlds: first, a fast development standalone, and second, the system integration through interfaces. This provides a fast and efficient way to achieve results, using the existing business systems, and interfacing them to new solutions.

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