

# Q&A

## Optimal+ in IIoT

Q

## *How is Optimal+ relevant to IIoT? What is Optimal+'s value in IIoT?*

A

- IIoT has two main elements – connecting the “things” and analyzing their data. Most companies that provide analytics for IIoT focus on process analytics – optimizing the manufacturing process (e.g. asset/machine utilization on the factory floor).
- Optimal+ adds the unique value of product analytics – optimizing the manufactured product, in electronics and systems with high electronics content (e.g. cars).
- Only when process analytics is complemented with product analytics, can one get the full value of IIoT, since the whole purpose of manufacturing processes is to produce products.

Q

## *What are the main differences between process analytics and product analytics?*

A

**Process analytics** is aimed at improving the manufacturing process – perform machine preventive maintenance exactly when needed, optimize asset (i.e. machine) utilization on the factory floor, etc. It can be viewed as “the voice of the machine”.

As such it mainly provides value to the manufacturer (usually OCM) in the form of higher profitability (higher efficiency = lower cost = higher profits).

**Product analytics** is aimed at improving the manufactured product – increasing its performance, quality, reliability, and brand protection, as well as its yield. It can be viewed as “the voice of the product”.

As such it mainly provides value to the OEM/brand owner in the form of both higher revenue (due to higher performance, higher quality, higher reliability, and brand protection) and higher profitability (higher yield = lower cost).

Q

## *How can product analytics improve performance, quality, reliability, brand protection and yield?*

A

Electronics product analytics enables many things such as the following:

- Check if a “good product” is really good (prevent test escapes) – improve quality and reliability, reduce customer returns
- Check if a “bad product” is really bad – improve yield
- Provide details on performance at various conditions and at various parts of the value chain – improve performance
- Smart pairing – combining together specific chips that guarantee superior system performance, power consumption, etc.
- Ensure only chips from trusted sources are used – improve quality and reliability, protect brand integrity
- Compare characteristics of products manufactured or assembled by different suppliers – improve supply chain management

Q

## ***Why is product analytics more complicated than process analytics?***

A

There are several reasons why electronics product analytics is more complicated than process analytics:

- Product analytics addresses holistically the entire life cycle and the entire value chain of the product. If we think about a value chain of chips – boards – end systems, process analytics applies to the manufacturing or assembly process of each chip separately, all of which are separate from a board manufacturing or assembly, etc. Product analytics on the other hand analyzes the product at each step and in addition provides traceability and genealogy of all chips and all boards in a system.
- Product analytics requires substantive domain expertise. For example, in a semiconductor fab the same equipment is used to manufacture many different products of different customers. Process analytics only requires knowledge of the manufacturing equipment. Product analytics requires knowledge of each different chip.
- Related to the previous points – product analytics deals with many more parameters, and hence much more data and different types of data, than process analytics.
- Process analytics deals with data (machine data). Good product analytics deals with both data and context. For example, when you analyze the test results of a chip you analyze the data itself in a specific context – the tester on which it was performed, the test results of neighboring chips on the same wafer, etc. This is critical for example to figure out if a “good chip” is really good or if a “bad chip” is really bad. The need to analyze both data and context makes product analytics much more complicated.

Q

## ***Why do you specifically refer to “electronics” product analytics?***

A

IIoT process analytics apply to manufacturing in all market segments, such as electronics, food, pharmaceutical, clothing, and more. Optimal+ specializes in product analytics in electronics and systems that have a high electronics content (e.g. cars).

Electronics product analytics is both complex and valuable as an electronics system consists of many chips (many of which are complex themselves), boards, and sub-systems.

Q

## ***What does “throughout the value chain” mean? Why does it matter?***

A

The basic components of any electronics system are semiconductor chips. Those chips are later placed on boards, and the boards go into the end system. Holistic product analytics must start at the chip level and go all the way to the end system. Such analytics can address topics that cannot be addressed in any other way, such as:

- Trace customer returns of an end system (e.g. smartphone) to boards or chips of a certain manufacturer or a certain manufacturing lot.
- Trace system performance or test results to boards or chips of a certain manufacturer or a certain manufacturing lot.
- Ensure that chips assembled on a board only come from trusted sources.

Q

## ***Does product analytics “throughout the value chain” apply to in-use data?***

A

Product analytics applies to every step in the value chain, from chips to boards, to systems, and to end system in-use. One of the main values of such holistic product analytics is that it allows an OEM/brand owner to get full visibility throughout his value chain and correlate end system in-use data with chips and boards used in that system. This is why product analytics provides the full voice of the product.

Q

## ***What does “throughout the product life cycle” mean? Why does it matter?***

A

Good product analytics provide designers with an automated and complete analysis of the results of all the tests they perform during the development of the product. As such it provides significant value for NPI (New Product Introduction) – shortening time to market and time to revenue.

After the product introduction, and all the way through HVM (High Volume Manufacturing), product analytics provides an automated and complete analysis of test results of all manufactured products. As such it improves performance, quality, reliability, and yield.

Therefore, holistic product analytics is valuable for both R&D and Operations.

Q

## ***What does “prescriptive analytics with actions” mean?***

A

There are different levels of analytics (both process and product):

- Descriptive - what happened?
- Predictive – what will happen?
- Prescriptive – what should we do?
- Prescriptive with action – actually do what we should do

Each level is more complicated and more valuable than the previous one. Optimal+ provides prescriptive analytics with action, which is the highest, most valuable, and most difficult, level of analytics.

Q

## ***Is Optimal+ the only company that offers electronics product analytics?***

A

- Most companies in the IIoT analytics space offer process analytics. There are very few companies that talk about product analytics but Optimal+ has an unmatched established leadership position in the area, based mainly on its well-established leadership in the semiconductor market, now expanding to electronics systems.
- Optimal+'s leadership position is clear:
- 35B chips passed through Optimal+ analytics in 2015 and the number keeps growing
- Deployed in 90% of the world's foundries and OSATs (Outsourced Semiconductor Assembly and Test)
- Used by top companies like Qualcomm, Broadcom, Nvidia, Xilinx, NXP, Renesas, AMD, and many others
- Collects data directly from the testers – the most comprehensive and purest data available
- Now using its proven capabilities from semiconductors to electronics systems