

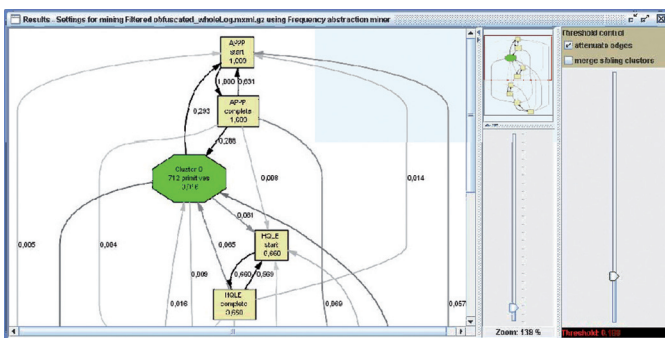
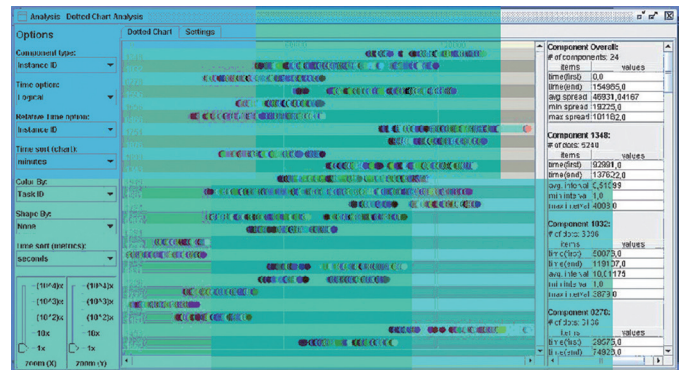


# ASML's Problem

## ASML's Problem

ASML is the world's leading manufacturer of chip-making equipment and a key supplier to the chip industry. ASML designs, develops, integrates and services advanced systems to produce semiconductors. In short, it makes the wafer scanners that print the chips. These wafer scanners are used to manufacture semi-conductors (e.g., processors in devices ranging from mobile phones and MP3 players to desktop computers). Because of competition and fast innovation, the time-to-market is very important. Following Moore's law, there is an ongoing effort to reduce the line widths on silicon wafer. Every new generation of wafer scanners is shifting the frontier of what is technologically possible. As a result, the testing of manufactured wafer scanners is an important but also time-consuming process. Every wafer scanner is tested in the factory of ASML. When it passes all tests, the wafer scanner is disassembled and shipped to the customer where the system is re-assembled. At the customer's site, the wafer scanner is tested again. Clearly, testing is a time consuming process and takes several weeks at both sites. Since time-to-market is very important, ASML is involved in an ongoing effort to reduce the test period. To assist ASML in these efforts, we applied process mining techniques to their test processes.

languages. Moreover, process mining can also be used to discover other aspects such as social networks, organizational structures, decision rules, bottlenecks, etc. without the need for people to model things beforehand. However, if models are present, process mining can be used to check conformance. This way it is possible to see where the actual process deviates from the model and how severe these deviations are. Process mining has emerged as a new and innovative way to analyze processes and systems based on the event logs they produce. ProM is an open source framework for process mining supporting a wide variety of techniques.



## Process Mining and ProM

The goal of process mining is to extract information (e.g., process models) from event logs produced by a wide variety of systems ranging from enterprise information systems (e.g., based on WFM, ERP, SOA technologies) to embedded systems (e.g., medical systems, high-end copiers, etc.). Process mining allows for the discovery of processes, e.g., it is possible to automatically generate process models based on event logs expressed in various

## Results

Using process mining ASML was able to get a better view on the actual testing process. Analysis showed that the testing process is very dynamic and unstructured. Using ProM process models were generated showing the actual testing process and these were compared with the documented procedures. Using conformance checking it was possible to discover where the main deviations occurred. Moreover, ProM was able to generate all kinds of interesting metrics for the test process. This information provided ASML with new insights and allowed for discussions based on the real process. It is expected that this will lead to improvements of the testing process such that the time-to-market is shortened. Moreover, the quality and predictability of the testing process can be further improved based on these insights.

## More information

About process mining: [www.processmining.org](http://www.processmining.org)  
About ProM: [prom.sf.net](http://prom.sf.net)