

Monitoring En Masse at Audi, Germany


Just as smooth as a ride in an Audi, so should the production process be. Coordinating components flowing through conveyor belts 'just-in-time' to meet their corresponding parts is a complicated dance. That's where ICINGA has been able to assist, ensuring the right chassis meets the right engine to form its custom manufactured whole. Multiply this process to hundreds of conveyor belts across 7 international production sites, and you have a distributed monitoring system to the tune of 10,000 + hosts and over 50,000 services.

Vorsprung durch Technik 

Audi AG, headquartered in Ingolstadt, Bavaria, is one of Germany's oldest and most established carmakers. Founded in 1909 by August Horch, the company merged in 1932 with DKW, Horch and Wanderer. Today Audi is owned by the Volkswagen group and is one of the leading, premium car manufacturers. In 2010 Audi produced over 1.15 million automobiles and more than 1.6 million motors. At the forefront of automotive innovation, Audi's success is embodied in its mission statement and slogan: 'Vorsprung durch Technik'.

WHAT IS ICINGA?

ICINGA is an enterprise grade open source monitoring system which keeps watch over networks and any conceivable network resource, notifies the user of errors and recoveries and generates performance data for reporting. Scalable and extensible, ICINGA can monitor complex, large environments across dispersed locations.

ICINGA takes open source monitoring to the next level. 

FIRST THERE WAS TIVOLI

The modern automotive manufacturing process is an incredible act of millisecond accurate coordination. Components marked with unique ID numbers meet their respective parts over multiple assembly lines in constant motion to finally form a car customised for each new owner.

Such synchronisation is naturally important to monitor, and Audi had Tivoli Distributed Monitoring 3.7 with Tivoli Enterprise Console to meet this end. With stagnant development and substantial license costs, the opportunity to migrate to an open source solution appeared at the point of upgrade.

Looking for a highly scalable and flexible monitoring system, which could be easily distributed for high availability lead them to the modular solutions the likes of Nagios and ICINGA. A look at ICINGA's dynamic, flexibly customisable user interface and continuous yet transparent development sealed the deal.

THEN THERE WAS ICINGA

With high availability and extensibility in mind, ICINGA was implemented as a master with three slave satellite clusters in geographically disparate locations. The master collated passive check results from the slave clusters which monitored Audi's production sites in Germany (Ingolstadt, Neckarsulm), Hungary (Győr), Belgium (Brussels), China (Changchun), India (Aurangabad) and Brazil (Curitiba). These results were then graphically displayed in ICINGA Web. With this design, the entire monitoring system could be easily managed by just two Audi administrators via the central master instance.

Each satellite consisted of two HP DL380 servers with 8GB RAM and two quad-core processors in a high availability cluster, which could juggle the load of thousands of services between each other. Should one server fail, the other would automatically take over. This was also possible in the case of the satellites themselves, where hosts monitored by one satellite could be assigned to another with a few mouse clicks.

FLEXIBLE INTEGRATION

To enable Audi's Control Center staff to continue using their familiar infrastructure manager CA Spectrum, ICINGA was integrated to forward all alerts to the existing system. The alerts were enriched with additional information to improve their speed and accuracy, attributed as custom host and service variables in ICINGA Web.

Thanks to the easily customizable views and 'Cronks' in ICINGA, many hosts and services could be viewed at a glance, from many perspectives. As business processes, middleware components, production sites or assembly lines, views were only restricted by the user's rights. As authorization could be configured to the detail of individual hosts and services, views were even more user-tailored.

DRAG 'N' DROP MASS CONFIGURATION

Configuring the 10,000 or so hosts and 50,000 services from so many locations required a special solution. With the help of ICINGA professionals, LConf was born.

The LDAP tree directory coupled with a Perl script, provided a user friendly back end to configure ICINGA objects. While LDAP offered a structured, graphical overview of the entire IT environment, LDAP2ICINGA automatically generated executable ICINGA configurations with a few clicks. Where services reappeared throughout a cluster, they could simply be attributed to all hosts by moving their position higher up the tree with a drag 'n' drop.

LConf saved weeks of tedious configuration work and would come in handy for future changes. As with all good open source innovations, the tool that Audi inspired was released to the community.

