

University of Bern:

Institute for Medical Education

The Institute for Medical Education (IML) is a centre of excellence in the field of medical education. It promotes and fosters innovation in teaching and actively shapes the digital transformation of teaching and assessment to shape future leaders in healthcare education. To oversee the institute's network and infrastructure the IML relies on Icinga Monitoring.



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The University of Bern is a public research university in the Swiss capital of Bern. It was founded in 1834 and currently has 20,000 students. The Institute for Medical Education (IML) celebrated its 50th anniversary in the academic year 2021/22. It offers diverse services, among others, training and education programmes, workshops, learning media, evaluations, as well as assessment for medical examinations and technological developments.

The Challenge

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We manage bare metal and virtual hosts in the network of our university and virtual machines on Switch Engines.

Axel Hahn
University of Bern
Institute for Medical Education
Network Administrator

Axel Hahn, network administrator of the institute, tells that their infrastructure includes several physical systems as well as predominantly virtual machines. They manage a virtualization cluster using OpenNebula as administration tool, KVM, and Ceph technologies. Additionally, they have access to an external OpenStack API provided by SWITCHengines, a service provider for Swiss universities.

In 2019, the team faced a challenge when the existing monitoring tool, Sensu v1, reached its end-of-life, and the new version proved incompatible with the previous one. To address this, the team embarked on a search for a new solution. Their criteria included the software being open-source and free, with a focus on achieving full automation and the use of a single tool for rollout. They were determined to avoid setting up new hosts or virtual machines on a different server, regardless of whether it was for backup or monitoring purposes.

The team outlined specific requirements, including a notification feature and integrated performance graphs, which were viewed as advantageous. Additionally, they wanted a solution that offered Role-based access, allowing restricted views for application-specific systems or devices within a department. And they found all that in their new monitoring solution Icinga.



The Solution

Automation 95%

After verifying a few products and writing proof of concept snippets for integration they started the first automation steps in infrastructure rollout. Axel is very satisfied that with Icinga, they were able to integrate significantly more and new devices into the monitoring very easily.

In LDAP they now have a flat list with all checks including its parameters, required packages and required sudo permissions and groups that link their checks with a member value. Their automation tools Puppet and Ansible put checks, tools and rules to the target host. Via Icinga Director API a server and its checks are created and updated. Any newly created host automatically appears in Icinga UI and can send check data.

Some configurations of devices like SNMP checks of printers and TCP checks for the availability of external services, are not handled in Ansible but managed in the Icinga Director. And for Icinga clients using the Icinga API they built a Bash scripted solution that sends the check results to the next satellite.

Simple Creation of Custom Checks

On each host around 30 basic checks are conducted, covering CPU, RAM, disk usage and several performance metrics for net I/O, disk I/O, disk latency and system load. Moreover there are host specific checks depending on its services. They monitor webservices Apache httpd using PHP-FPM, Ruby or NodeJS and several database services like MariaDB, PostgreSQL or CouchDB.

The sysadmin team of the institute developed their own plugins for creating custom checks covering the basic checks and checks tailored to specific services or applications. They receive warnings about end-of-life checks for operating systems, programming languages and databases. Icinga shows them expiring SSL certificates, the status of all cronjobs and backups.

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In contrast to Nagios, Icinga is highly automatable through the Director and various APIs, so that one doesn't have to struggle with the configuration.

Axel Hahn
University of Bern
Institute for Medical Education
Network Administrator

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It is very easy to design your own checks so that you get the output exactly in the form you need it.

Axel Hahn
University of Bern
Institute for Medical Education
Network Administrator

Axel particularly values the fact that the checks primarily consist of simple CLIs or tools. They employ numerous custom checks written in Bash for system checks allowing them to generate customized outputs for various functionalities.

Powerful Filtering and Custom Dashboards

Other valued Icinga features are the fast access to information via the search field and the powerful filtering of Icinga web. The administrators designed personalized dashboards for all systems that are required to perform examinations or another one to monitor the basic infrastructure below the virtualisation level: ceph-storage, KVM, OpenNebula.

Icinga web is not just for keeping an eye on the whole infrastructure but also a very helpful tool for different daily tasks. They make ample use of links with filtered views, e.g. they put the link of a troublemaker into their ticket system to verify the link after solving the problem and before closing the ticket. Or they create filters for service "update available" and host matches the host group for a wanted maintenance window. Or even filter all installations with end-of-life status critical, to inform people using that server.

Seamless Cloud Migration

Since 2022, the institute has successfully transferred over 100 virtual machines from the University of Bern's internal network to the external service provider SWITCHengines. The seamless functionality of Icinga 2 simplified the process of incorporating hosts and checks from different networks. All that was required was the installation of an Icinga satellite in the designated network, and subsequently, all checks were accessible on the Icinga master. Axel Hahn emphasizes that the straightforward migration process underscores the simplicity and convenience of task management.



The filtering functionality in Icinga web is very powerful. It is the base for custom dashboards or to create a link for several tasks.

Axel Hahn
University of Bern
Institute for Medical Education
Network Administrator



Success

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Icinga is the quick control centre for us in the morning. The web interface of Icinga is straightforward and easy to use. I quickly get to the desired information.

Axel Hahn
University of Bern
Institute for Medical Education
Network Administrator

Fast Access to System Status

After completing the monitoring platform modernization with Icinga, the team has access to real-time, easily readable, and customizable dashboards. These dashboards include both real-time data and historical trend analysis, helping to identify issues and begin troubleshooting before they impact customers.

Role-based Access

For the different departments in the institute, it is of great value to have the possibility to access monitoring data. To make access easy for the different user groups, they see only the subset of relevant systems by adding a filter with host groups. Graphs help for understanding the current value.

Axel Hahn and his team are highly pleased with the functionalities offered by Icinga, which seamlessly cater to their needs. Their colleagues consistently offer positive feedback, noting the ease with which they can identify crucial status information on the Icinga Web dashboard, and they consistently rely on the monitoring system.

Outcomes

- ✓ Manage bare metal and virtual hosts in the university network and virtual machines in the Cloud
- ✓ Leverage automation via Icinga Director and Ansible to cover monitoring for more devices and applications
- ✓ Provide access and insights for departments with Role-based Access Control



Share your Story

Do you also have excellent experiences with Icinga and would like to **share** them?

We'd be happy to make your story come out big on our website!

Please get into contact with us at:

info@icinga.com



About Icinga

Icinga is a comprehensive open source monitoring solution that integrates easily in existing infrastructures and is unbeatable in configuration possibilities, automation and scaling. Monitor private, public, or hybrid clouds. For more information, visit icinga.com

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