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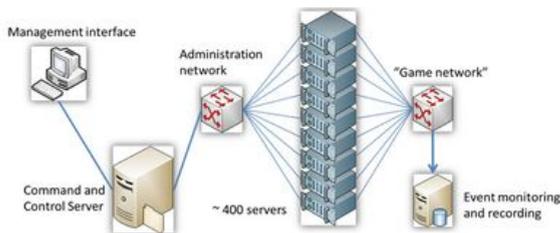
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CRATE - Cyber Range And Training Environment

The Swedish Defence Research Agency (FOI) develops and maintains a Cyber Range And Training Environment (CRATE). CRATE makes it possible to smoothly deploy and configure a large number (thousands) of virtual machines in a controlled environment. CRATE is also equipped with host based traffic generators emulating user behaviour and tools for logging and monitoring the environment. This lab resource is used to create computer networks for use during experiments, competitions and exercises in cyber security.

The development of the asset nowadays called CRATE started in 2008 and was fuelled by donations from the Swedish Meteorological and Hydrological Institute (SMHI) and the national supercomputer center in Linköping. These two organizations donated their old computers to FOI. Although the computers already back then were a bit stale FOI found use in them. They were used as a platform for the first security competitions/exercises held in 2008 and 2010. Since then, investments have been made in both new hardware and in supporting tools for maintenance and control over the infrastructure.

As illustrated in the figure below, the physically infrastructure comprise some 400 servers today. A web based tool can be used to design computer networks by configuring network infrastructure, deploy a wide range of operating systems and applications, and specify users of each machine. With a press of a button networks specified through the web based management interface is deployed and the "game network" will be available for use. Some manual configurations and tuning of scripts may still be required to deploy rarer configurations, rarer operating systems and applications not covered today. The goal is that every configuration activity performed regularly should be "clickable" through the management interface.



CRATE is used on a regular basis in courses held by FOI. CRATE has also been the main platform in a number of national and international competitions and exercises in cyber security. The most complex event hosted this far is the international competition/exercise the [Baltic Cyber Shield](#) held in 2010. The possibilities offered by CRATE and the events arranged with CRATE nurtures research projects both within and outside of FOI with data and ideas. Several [reports and papers](#) have been produced about or with help of CRATE. Open datasets produced in CRATE can be downloaded from our [FTP server](#).

FOI is open to all sorts of joint endeavours related to exercises, competitions and courses. For instance, maybe you are responsible for the IT-department's competence level or a university course in security and want to use CRATE for practical exercises? Maybe you have heard about an event that you are interested in? Or maybe you are interested in arranging a technical competition between universities together with us at FOI? If you have ideas or questions, please, do not hesitate to contact us.

Contacts

Mikael Wedlin
Deputy Research Director

+46-13-37 80 96
mwe@foi.se



Teodor Sommestad
Senior Scientist

teodor.sommestad@foi.se



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