

# Cyber Range Organization and Design

*NEC Corporation Endowed Chair*

Cyber  
Range  
Organization  
aNd  
Design

A *cyber range* is a virtual environment created on a computer and network infrastructure for the purpose of conducting practical cybersecurity training. The cyber range complexity and content need to be adapted to the actual training purpose, such as cyber attack and/or cyber defense, the number of participants and their skill level, and so on. The *Cyber Range Organization and Design* chair studies cyber range architectures and instantiation mechanisms, so that cyber ranges can be deployed in a cost-efficient and time-effective manner.

National University Corporation  
**Japan Advanced Institute of Science and Technology**  
Security and Networks Academic Field  
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## CHINEN Laboratory

<http://www.jaist.ac.jp/~k-chinen/>

### Server technologies

This is the era of network services. Server performance improvement makes the society more convenient. We are addressing various improvement technologies for server building and operation. We have achieved excellent results in developing server scaling and prefetching for web services.

### Network testbed

Various tests are needed for studying servers. A lot of clients are necessary for these tests, and it is complicated to control the client group. We are addressing the technologies for building and controlling such test facilities (testbeds). Because building and control are difficult by conventional tools, we have developed a language for describing test scenarios and procedures, and its processing system.

### Cyber range

Since it is a time when human life and assets depend on networks, various security activities are performed. A cyber range is a technological practice site for cyber attack and defense. In a closed environment, players conduct security exercises. As an extension of testbeds, we are addressing the technologies for building and controlling cyber ranges.



## BEURAN Laboratory

<http://www.jaist.ac.jp/~razvan/>

### Overview

People have become more and more reliant on the Internet for daily communication. In addition, networks are and will be more and more used to improve people's quality of life. This will lead to a world in which devices and people are all connected to the same network: the *Internet of Everything* (IoE).

### Network emulation

Such a pervasive network infrastructure requires providing guarantees regarding the network performance, so that *Quality of Experience* (QoE) requirements are met. Network emulation is an experiment technique that makes possible carrying out the performance evaluations needed in this context by recreating a wide range of network conditions.

### Cyber-security

Although network communication makes life more convenient, it also exposes users to risks such as malware and phishing. As a consequence, the network applications people use need to be designed and analyzed from the perspective of such security risks. Furthermore, IT and security specialists must have the practical skills needed to be able to properly handle computer security incidents. They must have practical experience with actual threats in order to be able to deal with them in an efficient and timely manner. This kind of experience can only be obtained in *cyber ranges*, realistic environments for cyber-security training.



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