

MA1 Access control and monitoring for campus computer labs

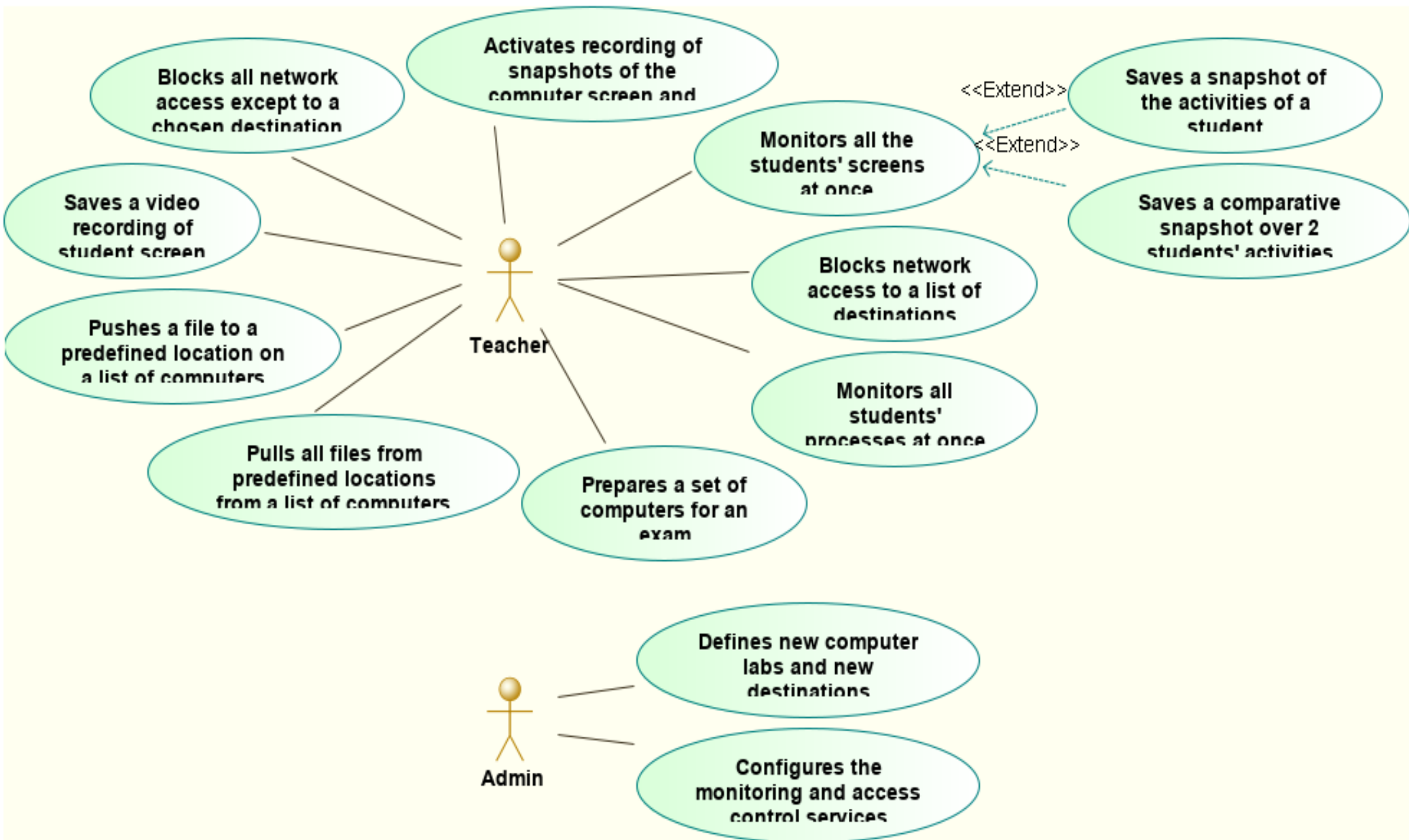
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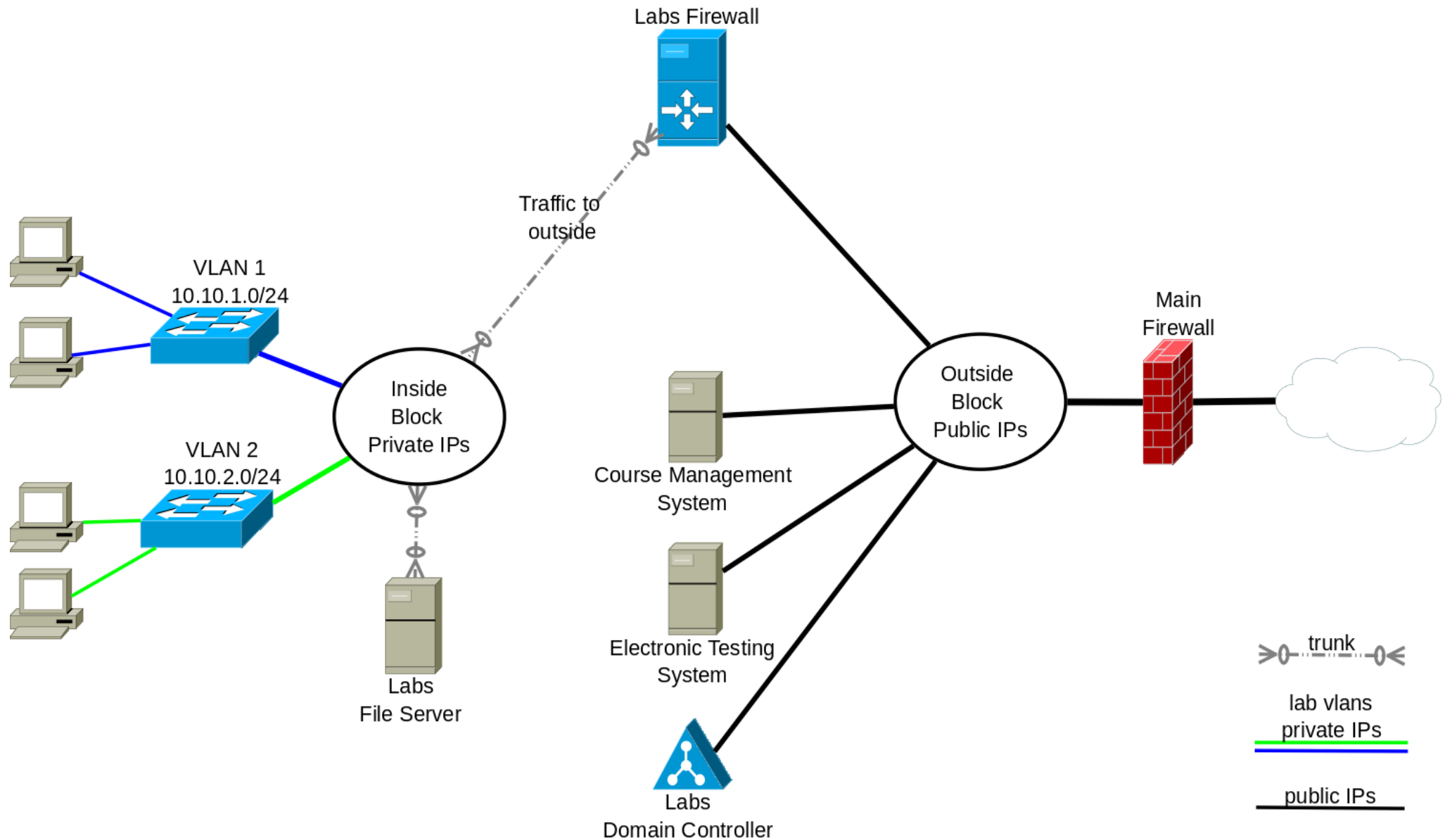
Introduction

- Computer labs at the universities are used in three general situations:
 - practical demonstrations,
 - individual work by students on projects and
 - conducting exams.
- Depending on the special use-cases for each situation
 - different access permissions are required
 - different network setup is required
 - access to online resources should be permitted/denied, and
 - in most situations such adjustments should be performed by the teacher,
 - without any network administration knowledge and equipment access.
- This document should be considered as a reference and guide to several simple solutions that can be used to achieve such scenarios, based on many years of trials at computing departments within the Ss. Cyril and Methodius University - Skopje

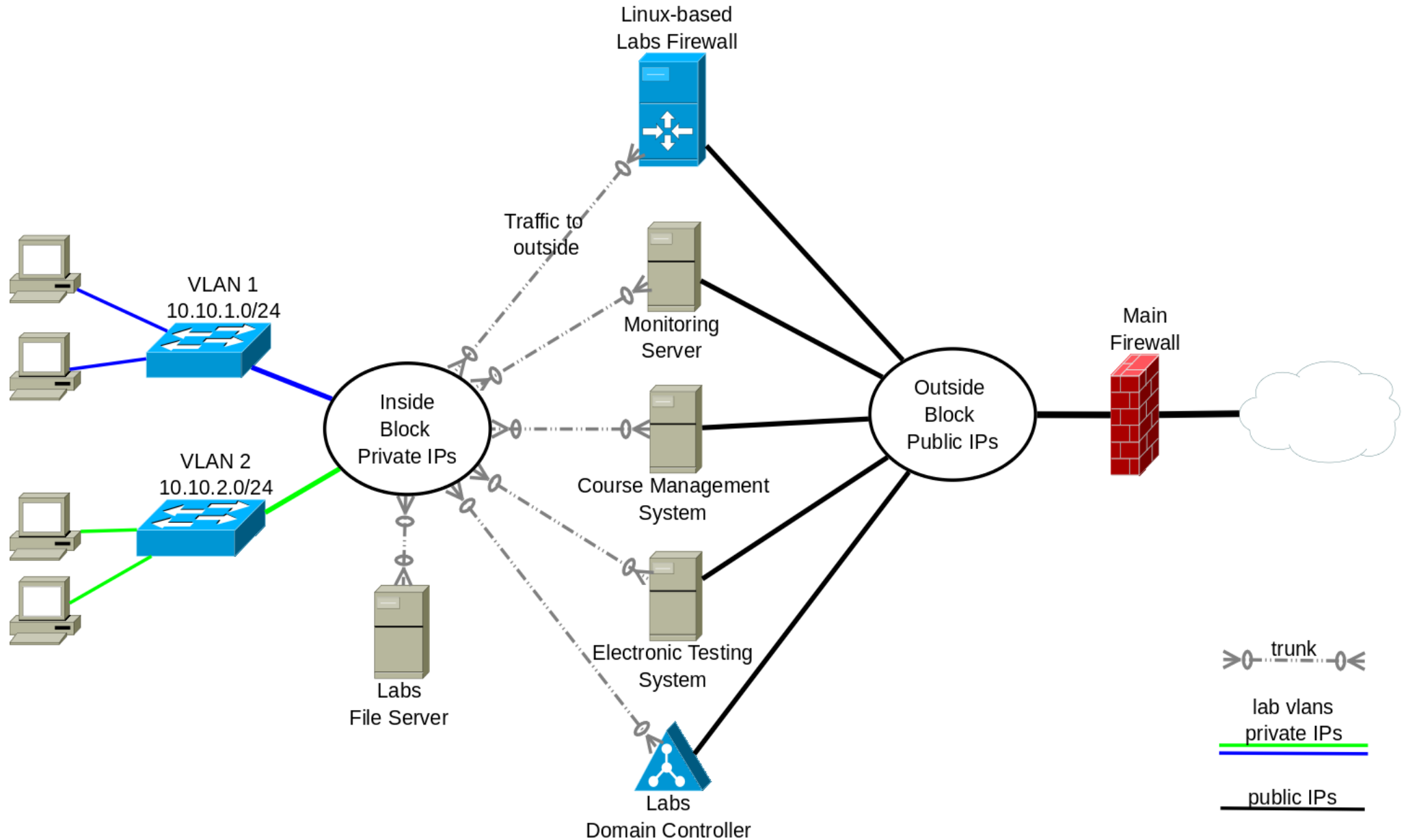
Use-cases



Architecture Before (usual)



Architecture After



The idea behind this architecture

- Network split in two blocks
 - Inside privately-addressed labs block, a separate VLAN and IP for each lab
 - Outside publicly-addressed server block
- Labs firewall that is based on linux does the following:
 - static router among parts of the labs block + NAT/PAT
 - custom software for switching on/off access to network destinations
 - DNS server for resolving the server names present in the inside block
- Computer labs have presence only in the inside block, each lab in a separate vlan
- Some servers can have presence in both blocks, the reason is
 - computers in the labs should be able to access such servers
 - even if the internet access is disabled completely
 - the servers should know the address of each lab computer that is accessing it
- Access from the inside block to the outside block is only via the labs firewall

FINKI-Firewall control application

- FINKI-Firewall is a Java based web application
 - created initially by the author Dragan Sahpaski
 - for use at the FCSE, but later was shared
- <https://github.com/dragansah/finki-firewall>
- To be used by teachers
 - enabling them to control and block network traffic in the computer labs.

Customization

Network access profiles in JSON files

```
{  
  "name" : "Profile",  
  "description" : "Access to SITE only",  
  "iptables" : [  
    "iptables -I FORWARD -s ${ipClass} -j DROP",  
    "iptables -I FORWARD -s ${ipClass} -d SITE.ADDRESS -j ACCEPT",  
    "iptables -I FORWARD -s ${ipClass} -d DOMAIN.CONTROLLER.INTERNAL.ADDR -j ACCEPT",  
    "iptables -I FORWARD -s ${ipClass} -d MONITORING.SERVER.INTERNAL.ADDR -j ACCEPT",  
    "iptables -I FORWARD -s ${ipClass} -d FW.INTERNAL ADDR -j ACCEPT"  
  ]  
}
```




Computer labs

No.	Code	Lab Name	Active profile
1	Lab-200		
2	Lab-118		
3	Lab-3		
4	Lab-26		
5	Lab-215		Moodle

Network Access Profiles

No.	Profile	Description	
1	Moodle	Access to local Moodle server	Lab 215
2	Oracle	Access to local Oracle server	
3	Home Network	Access restricted to local network services	
4	Internet	Unrestricted Internet Access	

Monitoring lab activities

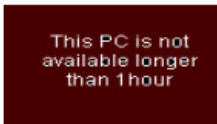












- There are two services that have to be installed
 - Screenshot service
 - Info sending service
- Screenshot service
 - <http://develop.finki.ukim.mk/projects/fccapps>
 - It is a simple service, that when run by a desktop user, executes every 10 seconds and takes a screenshot and stores it to a file in a pre-configured location.


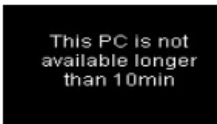
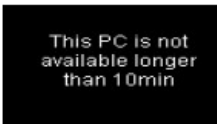

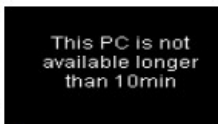





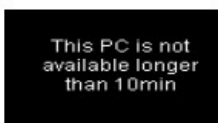
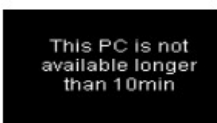
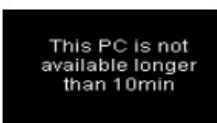

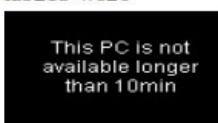
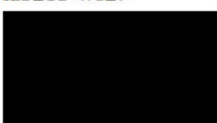
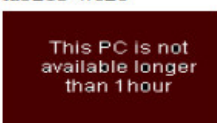
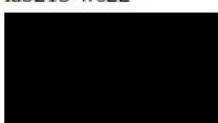

...

- Info sending service
 - <http://evelop.finki.ukim.mk/projects/fccapps>
 - It runs every 10 seconds, records data about some system information (for example: logged-in username, cpu usage, temperature, list of processes) to a local file and uploads this file via SFTP to a configured location.
- If the screen shot service is running it can also
 - upload the file with the current screenshot via SFTP

■ ■ ■

Lab 215

 lab215-ws14	 lab215-ws15	 lab215-ws16	
 lab215-ws09	 lab215-ws10	 lab215-ws11	 lab215-ws12
 lab215-ws05	 lab215-ws06	 lab215-ws07	 lab215-ws08
 lab215-ws02		 lab215-ws03	

 lab215-ws37	 lab215-ws39	 lab215-ws40	
 lab215-ws33	 lab215-ws34	 lab215-ws35	
 lab215-ws29	 lab215-ws30	 lab215-ws31	
 lab215-ws25	 lab215-ws26	 lab215-ws27	 lab215-ws28
 lab215-ws21	 lab215-ws22	 lab215-ws23	 lab215-ws24
 lab215-ws18			 lab215-ws20

Blackboard

Customizing the application

```
<table>
  <tr>
    <td><%=wks("ComputerName1")%></td>
    <td><%=wks("ComputerName2")%></td>
    <td><%=wks("ComputerName3")%></td>
  </tr>
  <tr>
    <td><%=wks("ComputerName4")%></td>
    <td><%=wks("ComputerName5")%></td>
    <td><%=wks("ComputerName6")%></td>
  </tr>
</table>
```

- The sources are given as templates, and being JSP files, they can be easily modified and this can be done live in production
 - This requires very basic HTML knowledge.
 - For advanced customization, basic Java knowledge is required

Questions?