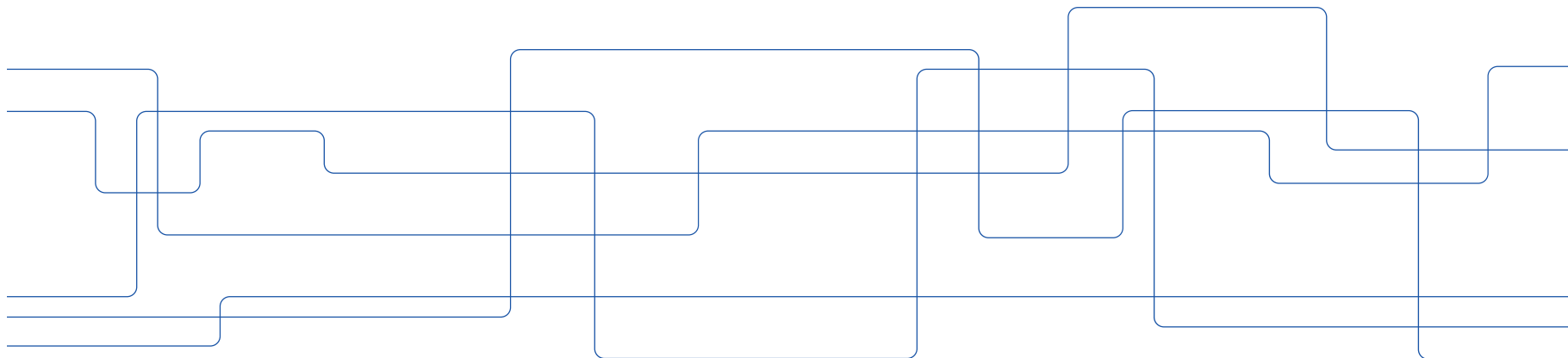


# IK2215: Project assignment

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# Objectives

- Hands-on experience in designing, configuring & handling TCP/IP networks, and providing services as an Internet Service Provider (ISP) to end users by primarily using PC hardware and Unix
- Insights into how an underlying network influences deployed services
- Learn to test and troubleshoot configurations of your network and services
- Venue for you to describe and discuss network design and implementation
- Learn to work professionally

You work in pair with an assigned project partner in Project Groups

**Contact us ASAP if you are not in a group!**



# Overview of the project assignment

- Guideline on the course web (see the [Project assignment page](#))
- Scope of tasks
  - Routing (networking protocols)
  - Internet services
- Deliverables
  - Reports (LaTeX templates in Overleaf)
    - > Network design report **max 6 pages**
    - > Peer-review report **max 4 pages**
  - ISP implementation (on the lab VM)
  - Demonstration
    - > Perform individually (Project partners present in different demo sessions!)
    - > ISP implementation must pass our verification to be allowed to demonstrate



- |  |   |            |               |
|--|---|------------|---------------|
| • Pass/Fail                                      | You must pass all activities to pass the project module |            |               |
| • Reports  |   | Total      | 6 points      |
| – Network design reports                         | (group)   | 2 versions | 2 points each |
| – Peer-review report                             | (individual)  |            | 2 points      |
| • ISP implementation                             |   | Total      | 30 points*    |
| • Demonstration (perform individually)           |   | Total      | 24 points     |
| – Presentation slide                             |   |            | 4 points      |
| – Oral presentation                              |   |            | 10 points     |
| – Q&A  |   |            | 10 points     |
| • Passing criteria                               |   |            |               |
| – Score at least 1 point in each reports         | (total 3 points)  |            |               |
| – Score at least 24 points in ISP implementation | (Not allow to demo if you fail!)                        |            |               |
| – Score at least 18 points in demonstration      |   |            |               |

# Details of ISP implementation grading

basic_configurations	point: 5 of 5
basic_configurations	bonus: 1
dhclient	point: 1 of 1
ping	point: 2 of 2
dns_forward	point: 2 of 2
dns_reverse	bonus: 1
dns_all_interfaces	point: 1 of 1
www	point: 2 of 2
same_path	point: 2 of 2
IGP_disruption	point: 4 of 4
BGP_transit	point: 3 of 3
eBGP_disruption	point: 4 of 4
eBGP_ISP_disruption	point: 2 of 2
iBGP_disruption	point: 2 of 2

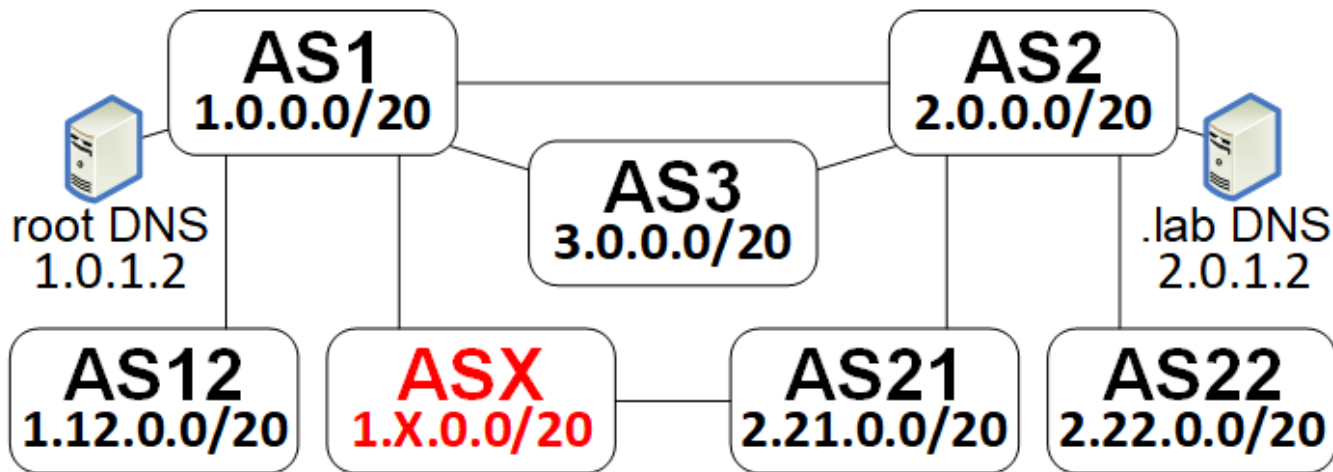
TOTAL: 32



# Requirements

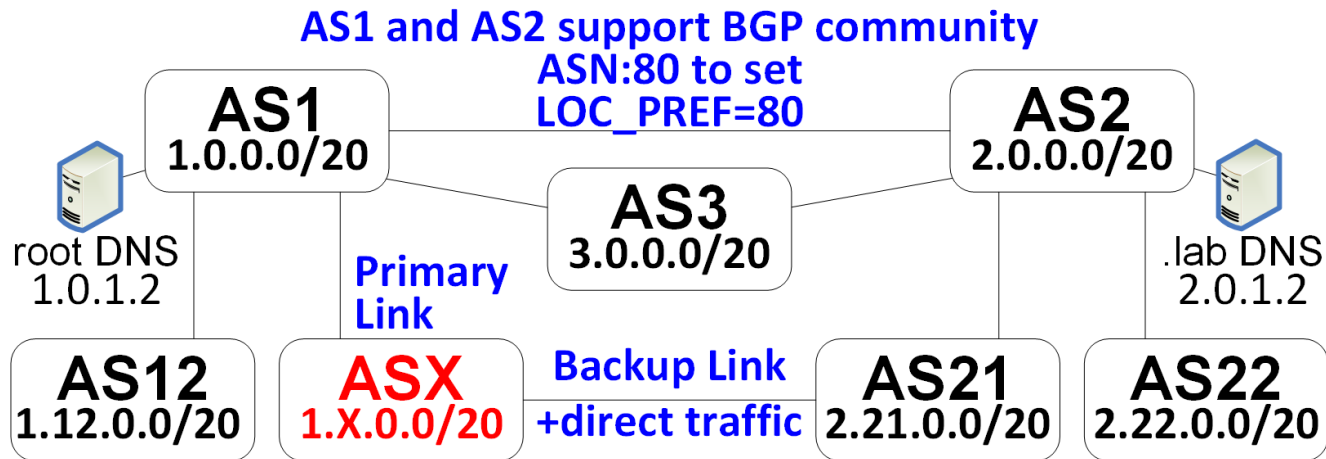
- Routing requirements
  - Intra-domain routing      deterministic paths with redundancy
  - Inter-domain routing      primary and backup links with transit
- Internet service requirements
  - DNS      ns.isp**X**.lab (1.**X**.1.2)      forward lookup (reverse lookup is optional)
  - Web      www.isp**X**.lab      simple text-based web page
  - DHCP      dhcpd.isp**X**.lab      dynamically assign IP for client network
  - **X** is your autonomous system number (ASN), which is 100 + your group number

# Network organization – “our Internet”



- DNS server: ns.isp**X**.lab
- Web server: www.isp**X**.lab
- **X** is the ASN

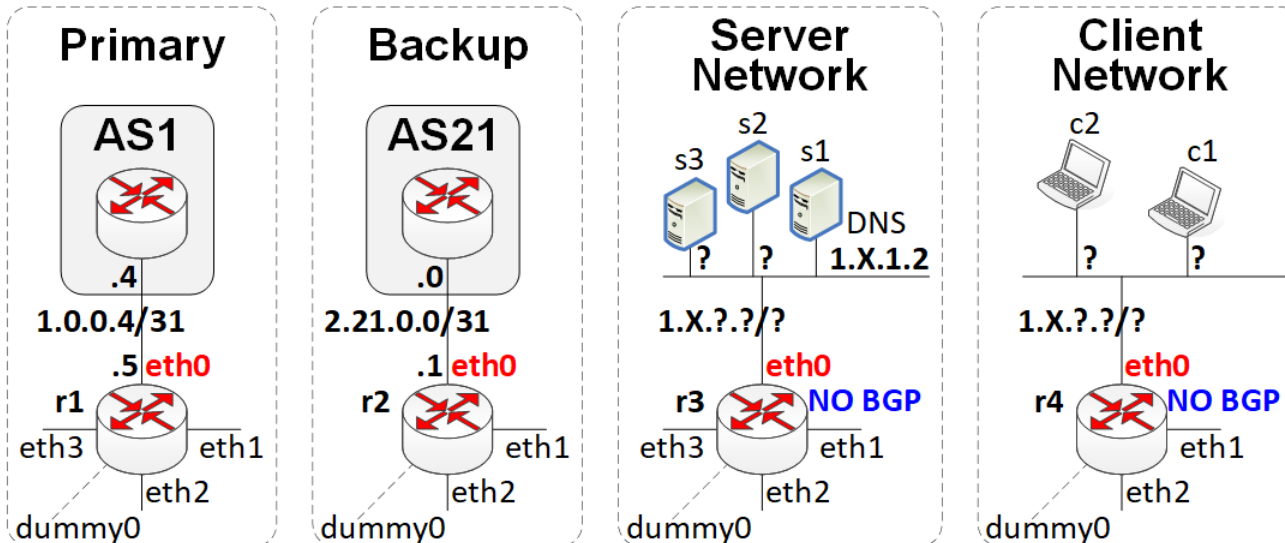
# Inter-domain routing policy



- Customers of different providers with a backup link
- Transit service for your neighboring AS (AS21) **No transit for other ASes!**
- Advertise only 1.X.0.0/20 to other ASes and suppress other subnets
- All ASes use default BGP policy
  - AS1 and AS2 support BGP community value of ASN:value (i.e., 1:80 and 2:80 respectively)
- Your policy must enforce the inter-domain routing policy of all ASes



# Resources



- eth0 must connect as shown in the figure.
- Other Ethernet interfaces must be connected as a point-to-point link!
- dummy0 for logical interface
- Do not run BGP on r3 and r4! (i.e., they are non-BGP routers)



# Milestones

- 14 Sep: Student pair assignment (group 1 with AS101, 2 with AS102, and so on)
- 14 Sep: Project template for lab VM on Canvas
- 26 Sep: Submit your network design report
- 28 Sep: 08:00-12:00, Lecture on BGP implementation
- 2 Oct: Submit peer-review report
- 5 Oct: Submit ISP project implementation for a preliminary test
- 12 Oct: Submit final version of your network design report
- 12 Oct: Submit ISP project implementation
- 12 Oct: Submit one-page slide
- 16-17 Oct: Project demonstration



# What you need to do

- Read the project guideline thoroughly
- Familiarize with Overleaf, i.e., writing a LaTeX document
- Contact your project partner
  - Agree on how to collaborate (e.g., create an Overleaf project for reports)
  - Divide the work equally in the same category
  - Avoid splitting based on services, i.e., routing and internet services
  - Schedule regular meeting to discuss work progress
- Focus on your network design based on information in the guideline
  - Project template (to run with Kathará) include in lab VM and in Canvas
- Testing and troubleshooting are one of your main tasks!
  - Discuss problems with your project partner first before asking others

**Report to us if your partner does not contribute their fair share of work!**