

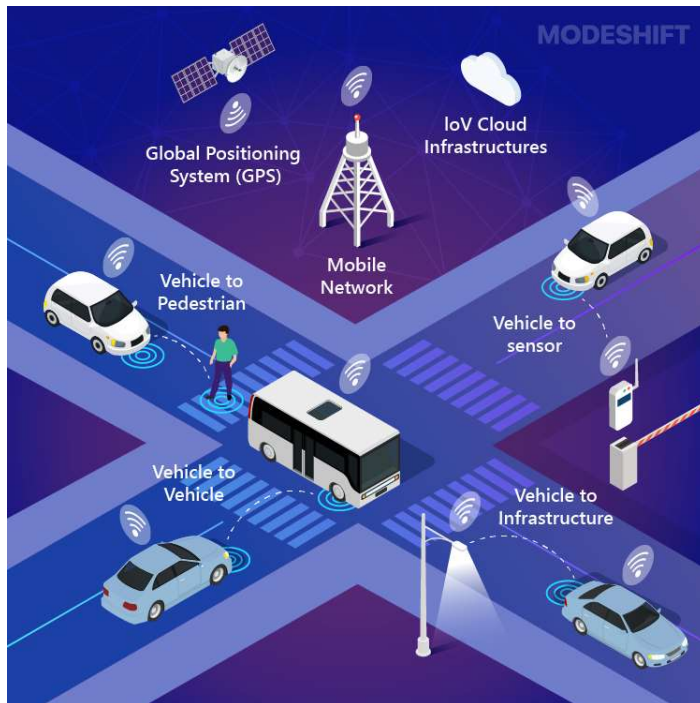


> CNet Communication Networks

Introduction, Organisation

SYND/IP4 – 2025

> Communication & Industrial Systems



- **Industrial systems are ever less standalone**
- Why integrating them in a larger information system?
 - To **adapt their behaviour to their environment**
 - Beyond local sensors
 - To **feed a global information system with local sensed measurement results**
 - Online sensor role
 - To **receive a mission** from some central system

Source: <https://www.modeshift.com/what-is-an-intelligent-transport-system-and-how-does-it-work/>

> Objectives stated in the Study Plan

Compétences visées / Objectifs généraux d'apprentissage

- À la fin du cours, l'étudiant.e est capable de :
 - Connaître **les technologies**, **l'architecture** et **les éléments** qui composent des **réseaux de communication** utilisés dans des environnements **industriels** (**C**)
 - Déployer des réseaux de communications basées **Ethernet** et **TCP/IP** dans un **contexte industriel** (**A**)
 - Développer des solutions de communication basées sur des **architectures client/serveur** en utilisant **TCP/IP**, **Modbus**, **HTTP/REST** (**A**)
 - Choisir un modèle de communication adaptée à un contexte industriel donné (par exemple **client/serveur**, **subscriber/notifier**, **producer/consumer**) (**J**)

C : Connaissance et compréhension

A : Application des connaissances et de la compréhension

J : Capacité de former des jugements (analyse, évaluation)



> Outline of CNet

- Focus is **connectivity**, not smartness
- Focus on **Ethernet** & **TCP/IP**, the most widely used communication standards:
 - For internet, for mobile 4G / 5G networks...
 - Can also be used for closed (i.e., not connected to the internet) industrial networks
- Motivations:
 - Know-how can readily be used in multiple use cases
 - Other connectivity solutions feature similar patterns as TCP/IP
TCP/IP know-how helps address them
- Content:
 - **Lectures & exercises**
 - **Labs**
 - **Final project**



> CNet in your Curriculum

- Communication Network (CNet) is...
 - ... the **teaching unit I.411** in the module **I4.1 Operational Technology 1** module for **Infotronics students**
 - The second teaching unit in I4.1 is I4.12 Circuit design
 - Both teaching units have the same weight for the module grade calculation
 - ... **the module P4.3** for **Power & Controls students**
 - Standalone module
- **Same subject and same grading for both orientations**



> Practical Organisation

- **Lectures and exercises:** Single session for **Infotronics** and **Power & Control** students
 - Room: VS-ENP.23.N319
 - Teacher: Rico Steiner
- **Labs and final project:** Two simultaneous sessions
 - **Infotronics** session:
 - Room: VS-ENP.23.N320
 - Teacher: Christopher Métrailler, assistant: Aurélien Rithner
 - **Power & Control** session:
 - Room: VS-ENP.23.N321
 - Teacher: Rico Steiner, assistant: Patrice Rudaz



> Who is Who



Rico Steiner
(rico.steiner@hevs.ch)

ENP-VS.23.N309

Christopher Métrailler
(christopher.metrailleur@hevs.ch)

ENP-VS.23.N309

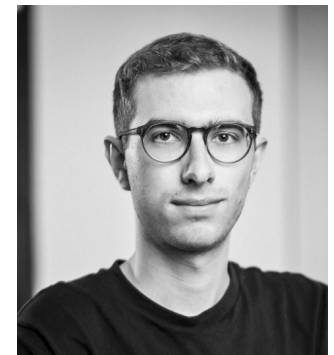


**Ready to answer your questions
Make an appoint with them for
out of class time support**



Patrice Rudaz
(patrice.rudaz@hevs.ch)
ENP-VS.23.N306

Aurélien Rithner
(aurelien.rithner@hevs.ch)
ENP-VS.23.N309



> Preliminary Schedule for the whole Semester

- Subject to change!

Week		Block 1	Block 2	(Block 3)
		Monday 14:35 - 16:10	Friday 8:15 - 9:50	(Friday 10:10 - 11:45)
		2 periods	2 periods	2 periods
2025-02-17	P01	Communication Networks & Industrial Systems		TCP/IP Networks
2025-02-24	P02	TCP/IP Networks		TCP/IP Networks
2025-03-03	P03	TCP/IP Networks		TCP/IP Networks
2025-03-10	P04	TCP/IP Networks	My TCP/IP Network (1+2)	
2025-03-17	P05	TCP/IP Networks		TCP/IP Networks
2025-03-24	P06	TCP/IP Networks		TCP/IP Networks
2025-03-31	P07	My TCP/IP Network (3+4+5)		
2025-04-07	P08	TCP/IP Networks		Exam
2025-04-14	P09	Introduction to socket programming	Vendredi Saint - Karfreitag	
2025-04-21		Vacances de Pâques - Osterferien		
2025-04-28	P10	Introduction to socket programming	Client Server Programming (1+2)	
2025-05-05	P11	Client Server Programming (3)		Client Server Programming eval. (4)
2025-05-12	P12	Project Minecraft EA		
2025-05-19	P13			
2025-05-26	P14			
2025-06-02	P15			
2025-06-09	P16	Lundi de Pentecôte - Pfingsmontag	Project Minecraft EA	



> Collaborative Tool

▪ CyberLearn

- Communication Network (CNet) - SYND 2025 - I4.11 /P4.3
- Sharing of scripts and other documents
- Links to external resources
- Notifications
- Return of assignments

Registration key:
CNET2025



▪ GitHub classroom

- Virtual classrooms & assignments
- Sharing code using git (hosted on github.com)
- Template repositories for labs and projects



> Grading

- Only in-semester evaluations, no semester exam

Mid-semester theory exam			1/3
Labs	My TCP/IP Network	50%	1/3
	Client / Server Programming	50%	
Project	Minecraft EA		1/3

