

# Channel Capacity Comparison of Different Network Topologies in Industry4.0

## Master's Thesis

### Project

The foundation for the next generation of mobile communication (6G) is built on revolutionary technological components, which require new measurement approaches and simulations. To simulate environment-specific and physically accurate channel realizations for specific scenarios, ray-tracing methods can be used. These simulations are especially valuable in production halls, where communication with high reliability and low latency is essential.

In this project, you will further develop a ray-tracing-based simulation to investigate industrial communication topologies in a SEW-Eurodrive production hall.

### Tasks

1. Familiarization with the existing ray-tracing-based simulation environment.
2. Implementation of an algorithm to calculate channel capacity in a communication system.
3. Modeling and comparison of various network topologies.
4. Evaluation and analysis of the calculated capacities.

### Requirements

- ✓ Studies in communications engineering, electrical engineering, computer science, or a comparable field.
- ✓ Programming skills in Python.
- ✓ Knowledge in mobile communication and mesh networks is an advantage.
- ✓ Experience in 3D modeling/rendering (e.g., Blender) is an advantage.

### Institute

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