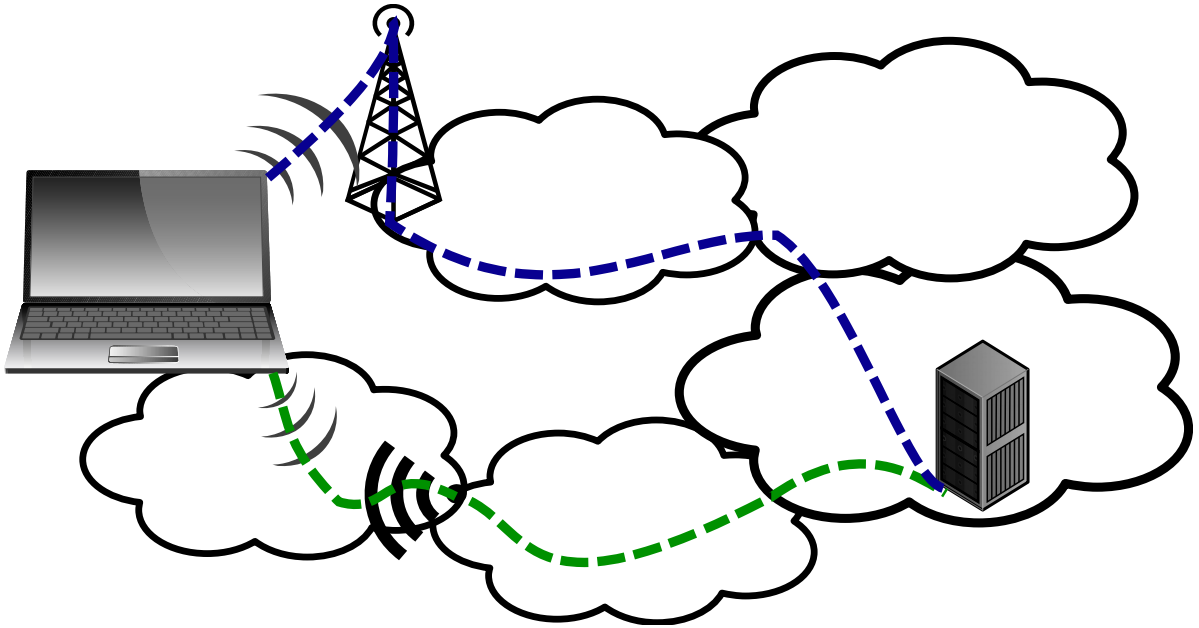
Technische Universität Berlin

INTERNET NETWORK ARCHITECTURES
Prof. Dr. Thomas Zinner

Multiple Access Networks: Properties and Selection

Theresa Enghardt
theresa@inet.tu-berlin.de

Scenario: Multiple Access Networks



- Host can use either access network
- Default interface not always best
- Our approach: The host
  - learns about networks
  - chooses which one to use

Research Questions

- How to get access network properties?
- Which network to choose for what traffic?

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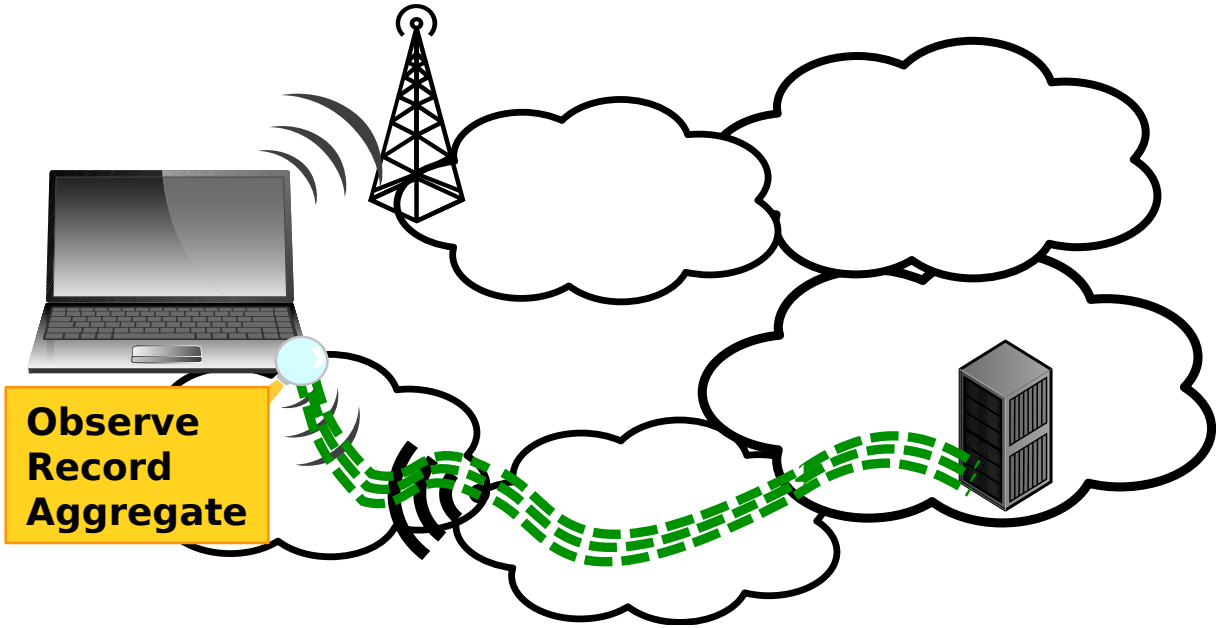
- To answer them, we developed the **Socket Intents Prototype**
  - Runs in user space
  - Gathers network properties
  - Selects between local network interfaces

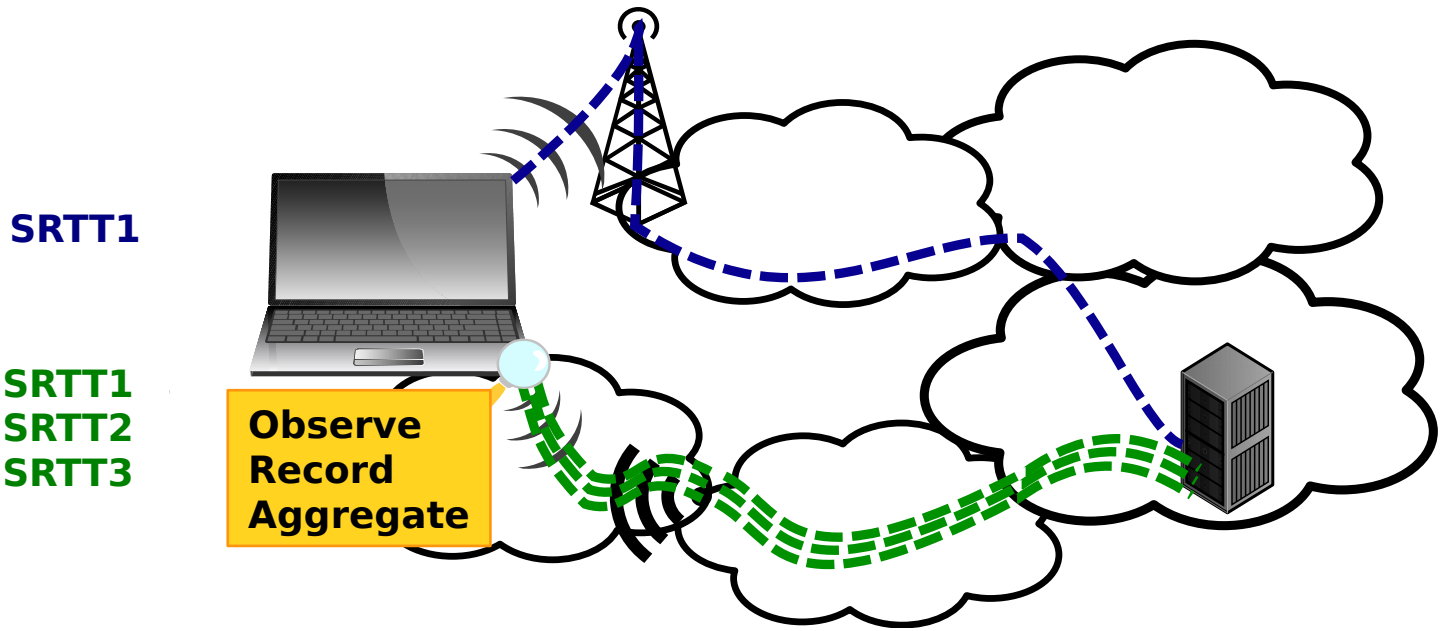
  - Code: http://github.com/fg-inet/socket-intents

Learning about Properties



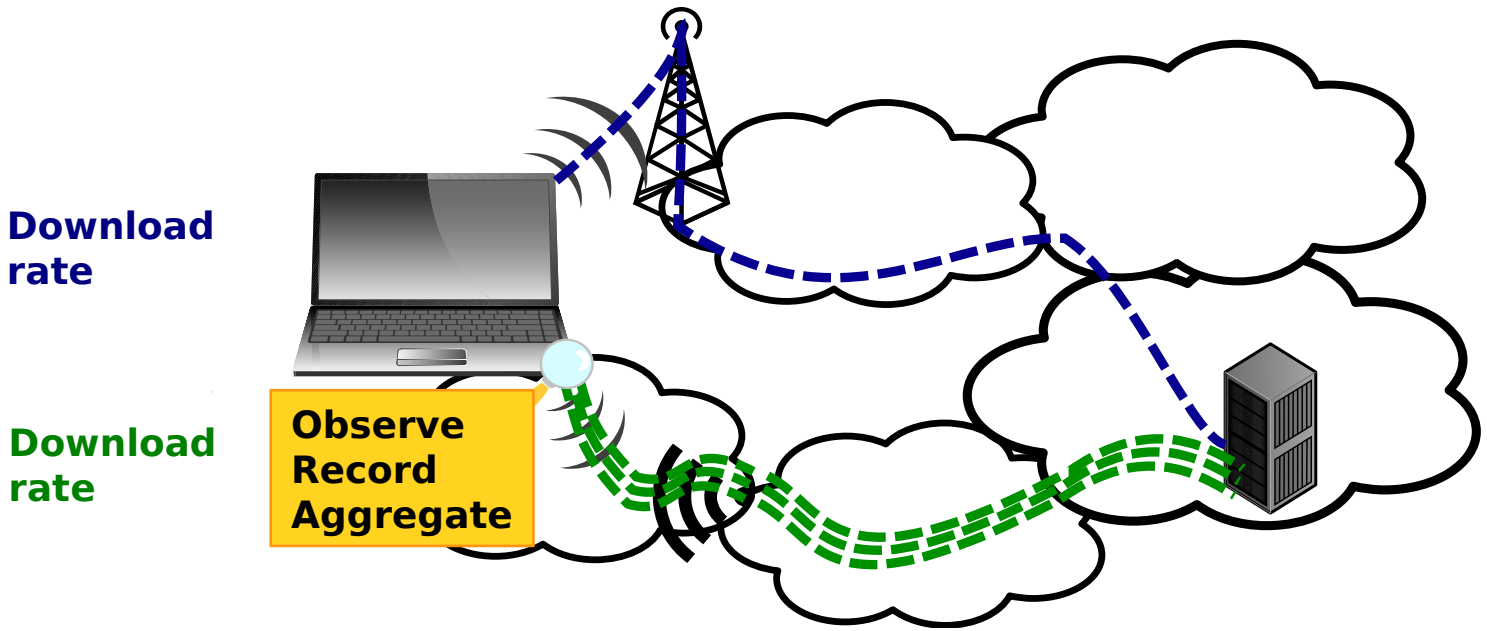
- Limitation: No data for un-used network
- **Do active probing?**

Learning about Round Trip Time



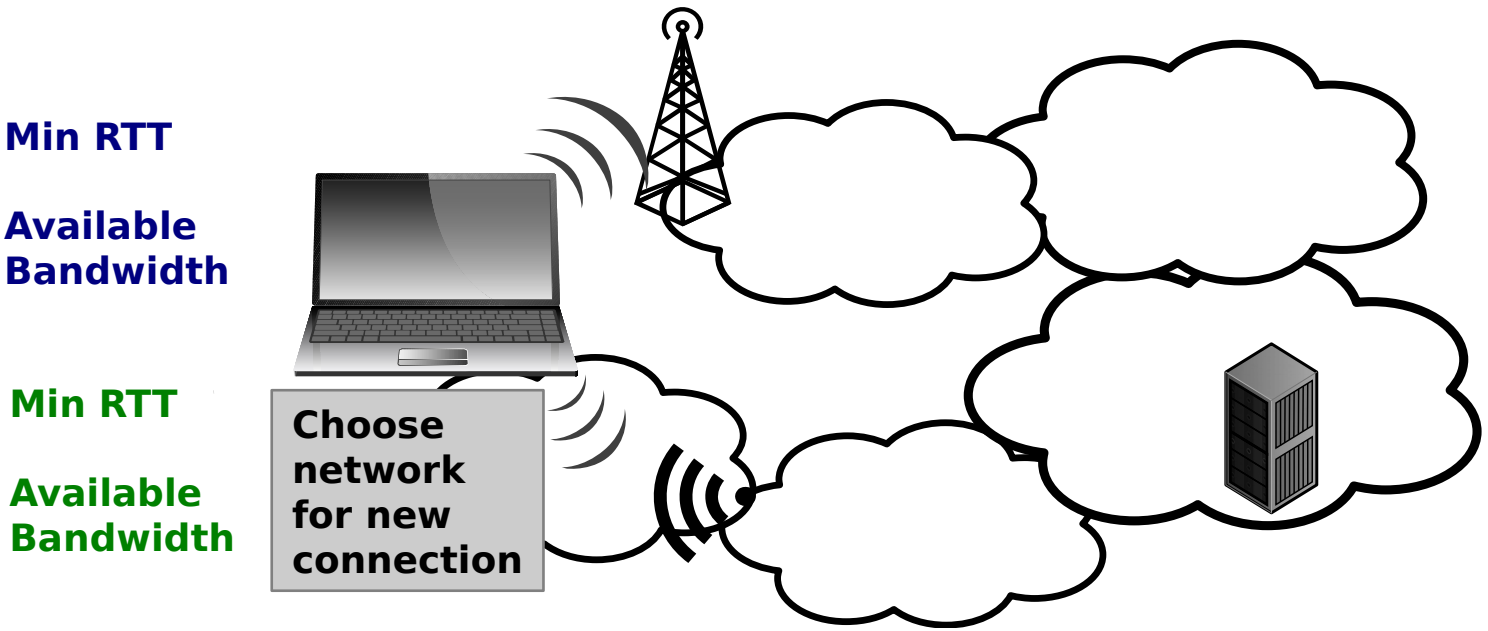
- Smoothed Round Trip Time of current TCP connections
- Minimum, median
- **Per destination IP, subnet, …?**

Learning about Bandwidth



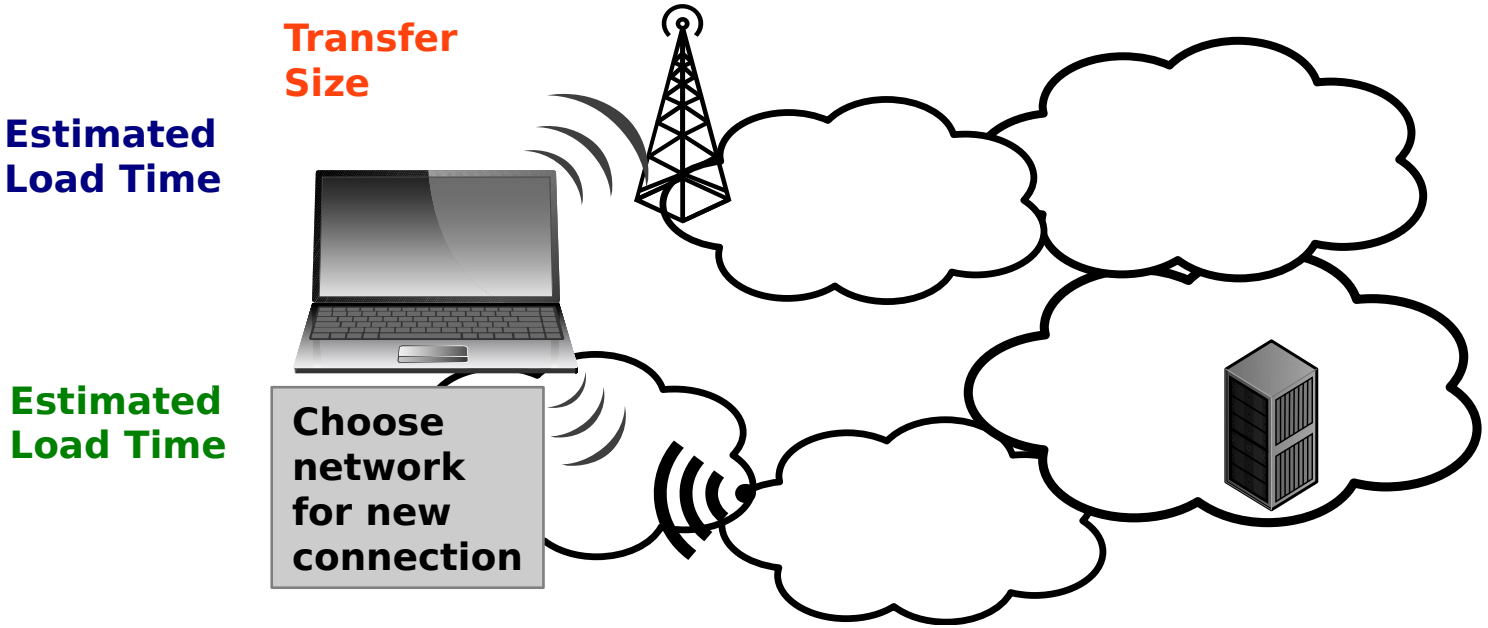
- Byte counter of local network interface
- Divide difference between samples by time
- “Available bandwith” $\approx$ maximum seen download rate
- Assumes bottleneck in access network

Selecting a Network



- Objective: Good performance for application
- Challenge: Not always a clear “winner”
- Optimize for low RTT or high bandwidth?
- Application tells us: Socket Intents

Threshold Policy



- Estimate load time on all interfaces
- Pick interface with shortest load time
- Small transfer → Low latency interface
- Big transfer → High bandwidth interface

Future Work

- Properties
  - Do active probing?
  - Aggregate properties by endpoint?
- Selection
  - Evaluate performance benefits for web browsing, video streaming
  - Compare to MPTCP
  - Other optimization objectives, e.g., low resource consumption?