Institute for the Wireless Internet of Things

at Northeastern University

Colosseum Batch Experiments

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Platforms for Advanced Wireless Research

MASSACHUSETTS TECHNOLOGY COLLABORATIVE

COLOSSEUM at Northeastern University

Batch Mode

- Radio applications and scenarios are controlled automatically by Colosseum
- Containers need to be preconfigured to use the Radio API which will allow Colosseum to control the radio applications
- Containers **do not** have access to the teams' network storage folders
- Containers **are not** accessible by SSH (except for the nodes with node_type set to "bot")
- Batch jobs are inserted in a queue and run when resources are available

Batch Mode

Set-up through configurations files:

- Batch configuration file:
  - Tells Colosseum how to run the experiment
  - Must be saved to the network storage on the File Proxy at /share/nas/teamname/batch/
- Modem configuration file(s):
  - Passes any additional parameters to the container
  - Parameters need to be handled by user code
  - Must be saved to the network storage on the File Proxy at /share/nas/teamname/config/

Batch Configuration File

- Name of batch experiment
- Duration of batch experiment
- RF Scenario to run
- Traffic scenario to run
- Mapping of SRNs to nodes in the scenarios

```
{
"BatchName": "My Test Batch",
"Duration": 300,
"RFScenario": 6742,
"TrafficScenario": 1,
"NodeData": [
  {
    "RFNode_ID"       : 1,
    "ImageName"       : "modem-image-v1",
    "ModemConfig"     : "modem_config_file_1",
    "isGateway"       : true,
    "TrafficNode_ID"  : 1,
    "node_type"       : "competitor"
  },
  {
    "RFNode_ID"       : 2,
    "ImageName"       : "modem-image-v1",
    "ModemConfig"     : "modem_config_file_2",
    "isGateway"       : false,
    "TrafficNode_ID"  : 2,
    "node_type"       : "competitor"
  }
]
}
```

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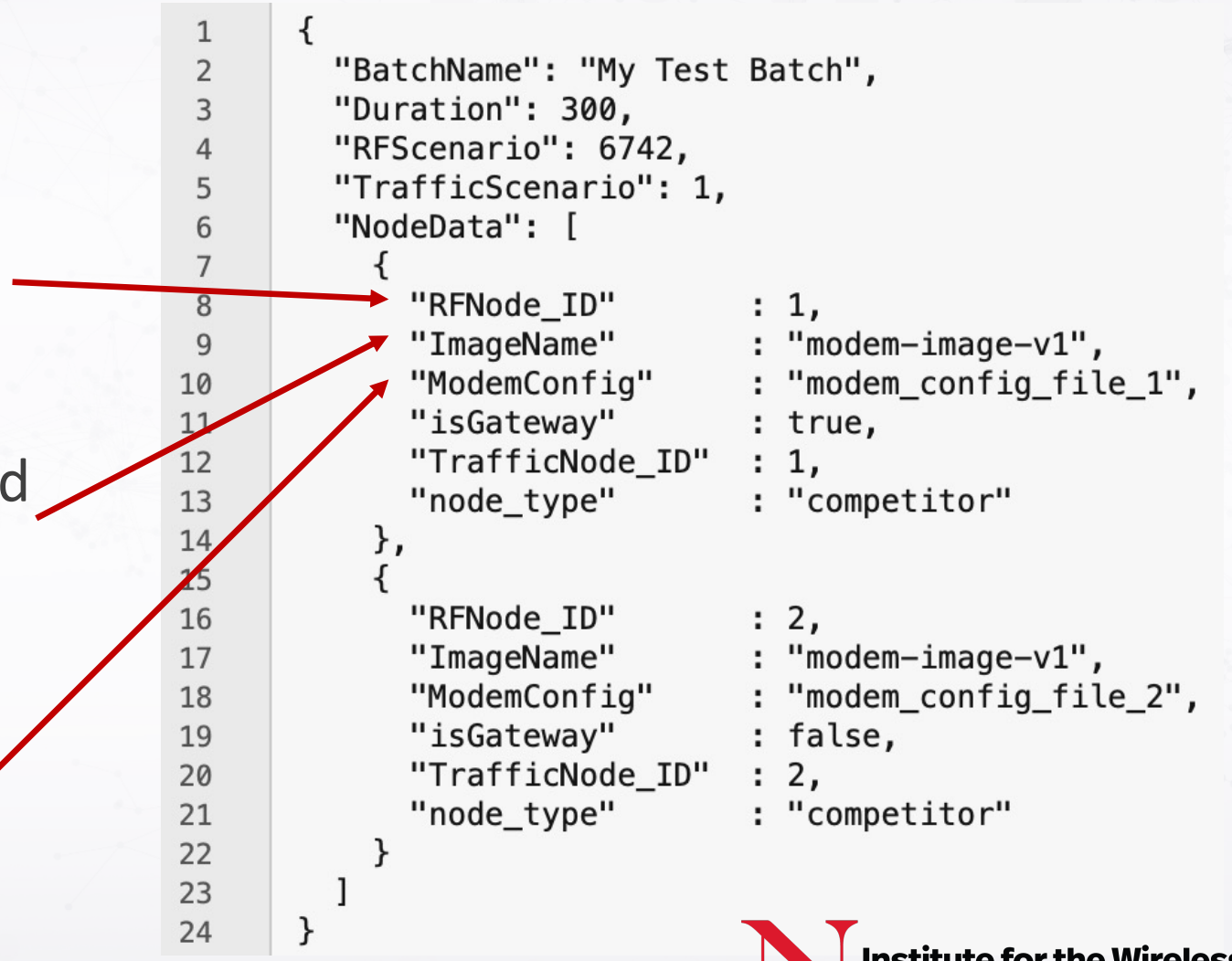
Batch Configuration File, cont'd

Mapping of SRNs to nodes in the scenarios:

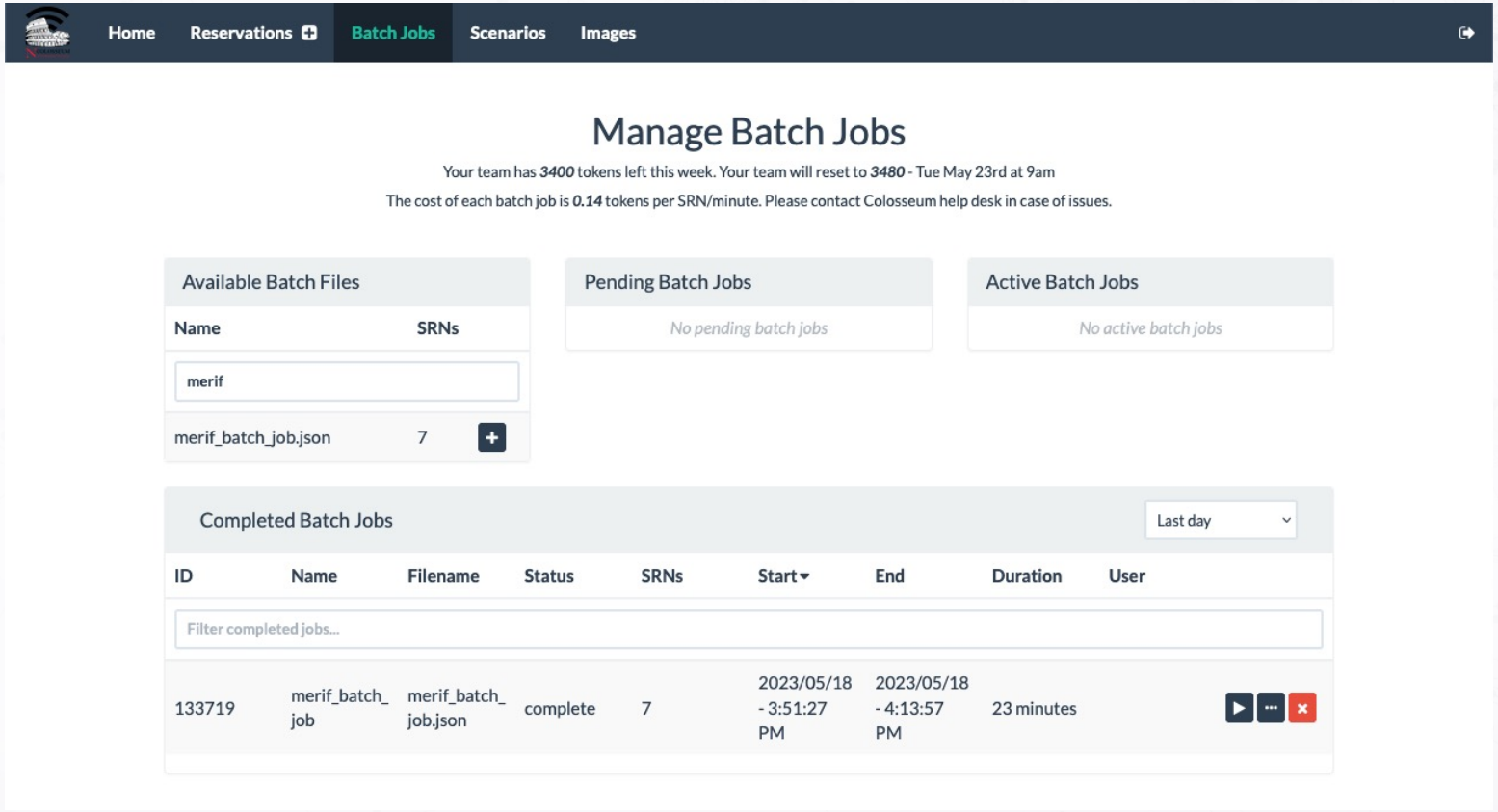
- **RFNode_ID**: Node in the RF scenario the SRN should be mapped to
- **ImageName**: Container image to load on the SRN
- **ModemConfig**: The location of the modem config file to load



```
{
  "BatchName": "My Test Batch",
  "Duration": 300,
  "RFScenario": 6742,
  "TrafficScenario": 1,
  "NodeData": [
    {
      "RFNode_ID"       : 1,
      "ImageName"       : "modem-image-v1",
      "ModemConfig"     : "modem_config_file_1",
      "isGateway"       : true,
      "TrafficNode_ID"  : 1,
      "node_type"       : "competitor"
    },
    {
      "RFNode_ID"       : 2,
      "ImageName"       : "modem-image-v1",
      "ModemConfig"     : "modem_config_file_2",
      "isGateway"       : false,
      "TrafficNode_ID"  : 2,
      "node_type"       : "competitor"
    }
  ]
}
```

Example of Batch Experiment

- Cellular network w/ 1 BS and 6 UEs
- iPerf3 used to exchange traffic
- (Some) figures automatically generated after the experiment



demo

Detailed instructions here: https://github.com/colosseum-wiot/colosseum-merif-2023/tree/main/reproducibility

(Some) Independent Realizations: Throughput

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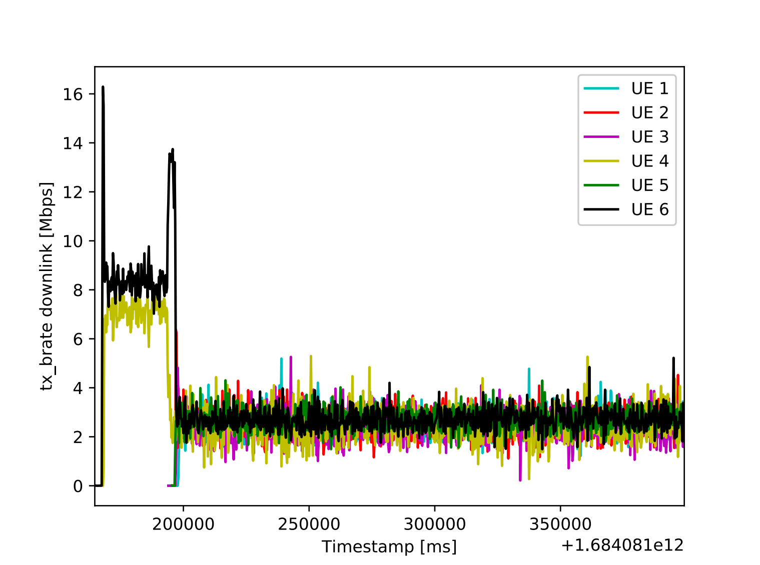
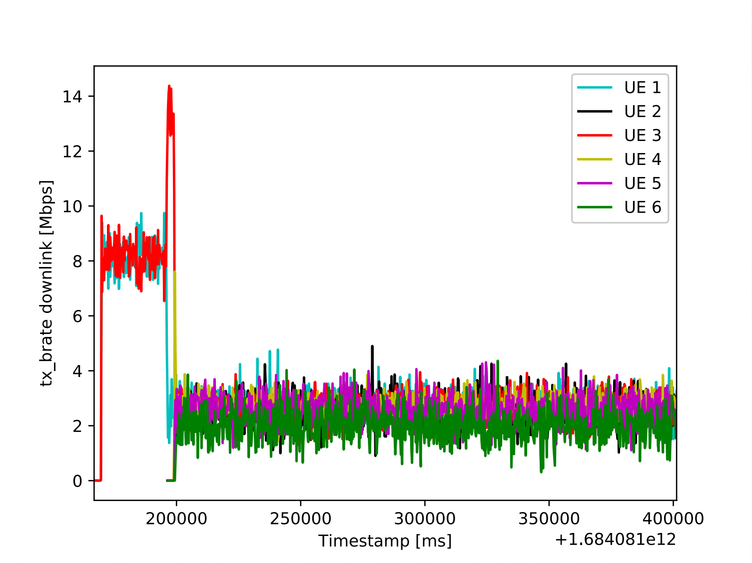
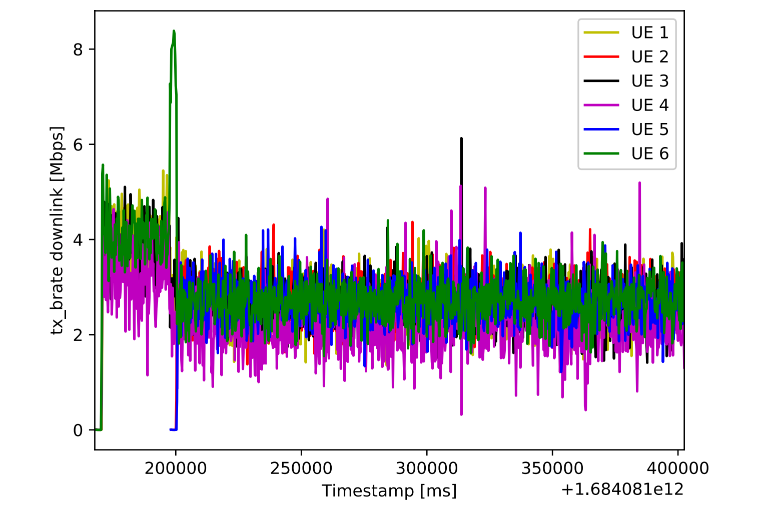
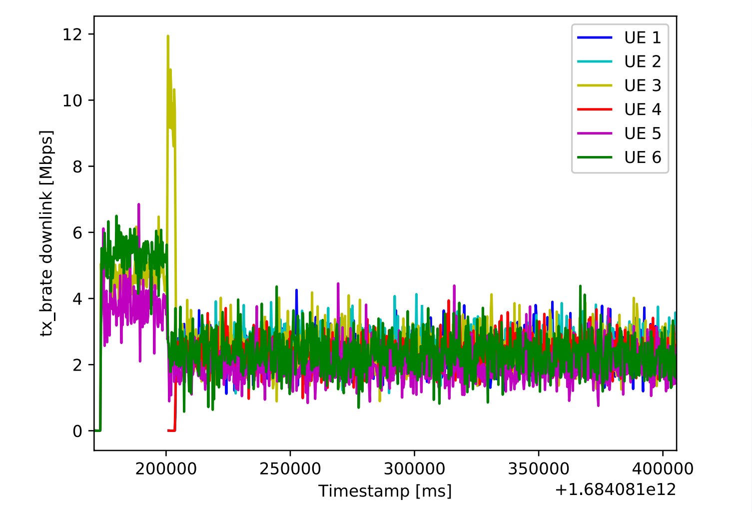
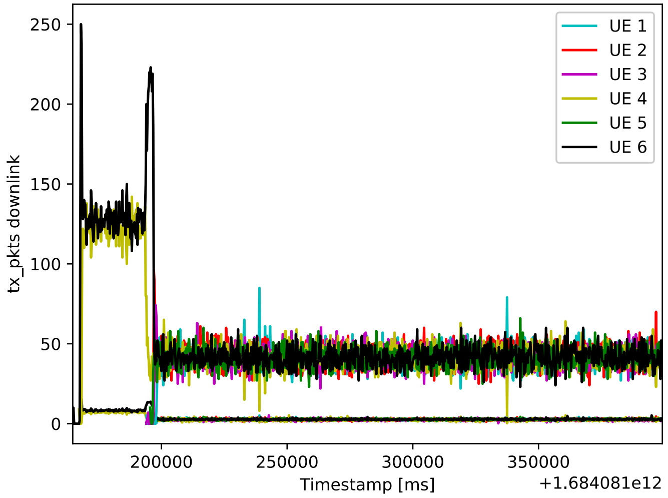


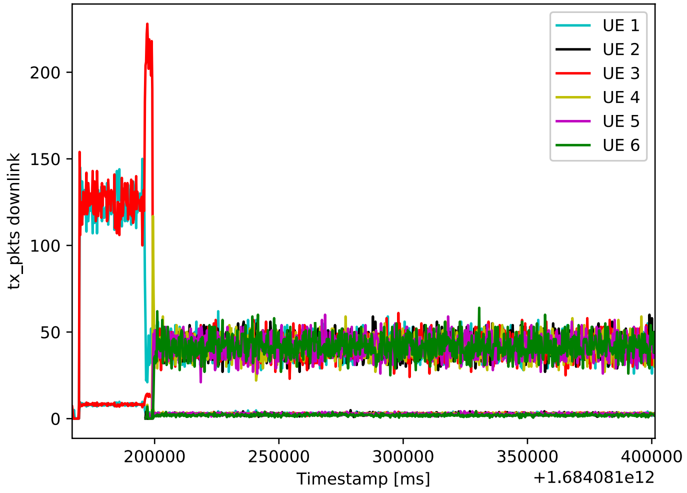


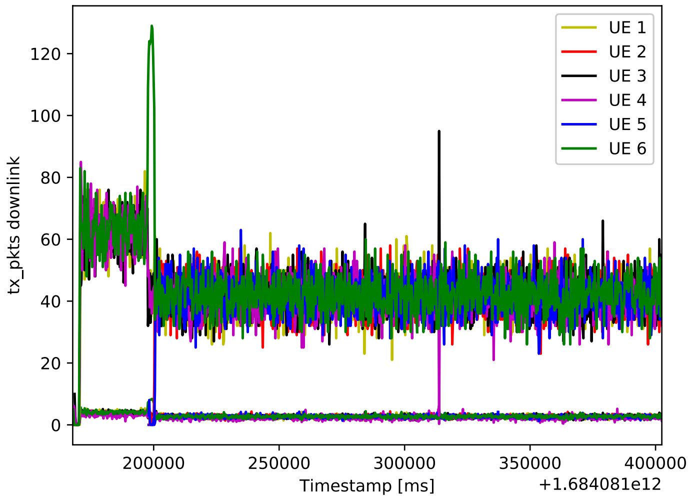


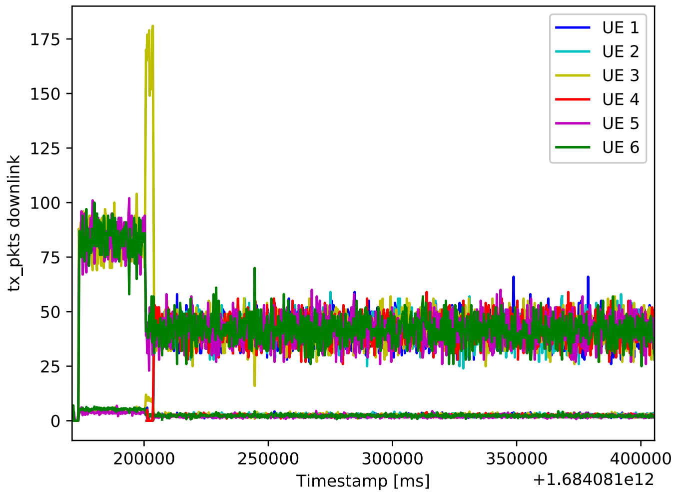


(Some) Independent Realizations: Transmitted Packets









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Thank You! (Questions?)

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