



Institute for the Wireless Internet of Things

at Northeastern University

Colosseum Batch Experiments

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Platforms for Advanced
Wireless Research

MITRE



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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

```
1 {  
2   "BatchName": "My Test Batch",  
3   "Duration": 300,  
4   "RFScenario": 6742,  
5   "TrafficScenario": 1,  
6   "NodeData": [  
7     {  
8       "RFNode_ID": 1,  
9       "ImageName": "modem-image-v1",  
10      "ModemConfig": "modem_config_file_1",  
11      "isGateway": true,  
12      "TrafficNode_ID": 1,  
13      "node_type": "competitor"  
14    },  
15    {  
16      "RFNode_ID": 2,  
17      "ImageName": "modem-image-v1",  
18      "ModemConfig": "modem_config_file_2",  
19      "isGateway": false,  
20      "TrafficNode_ID": 2,  
21      "node_type": "competitor"  
22    }  
23  ]  
24 }
```

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

```
1   {
2     "BatchName": "My Test Batch",
3     "Duration": 300,
4     "RFScenario": 6742,
5     "TrafficScenario": 1,
6     "NodeData": [
7       {
8         "RFNode_ID": 1,
9         "ImageName": "modem-image-v1",
10        "ModemConfig": "modem_config_file_1",
11        "isGateway": true,
12        "TrafficNode_ID": 1,
13        "node_type": "competitor"
14      },
15      {
16        "RFNode_ID": 2,
17        "ImageName": "modem-image-v1",
18        "ModemConfig": "modem_config_file_2",
19        "isGateway": false,
20        "TrafficNode_ID": 2,
21        "node_type": "competitor"
22      }
23    ]
24 }
```

Example of Batch Experiment

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

The screenshot shows the 'Manage Batch Jobs' page of the Colosseum web interface. At the top, there is a navigation bar with icons for Home, Reservations, Batch Jobs (which is the active tab), Scenarios, and Images. Below the navigation bar, a message states: "Your team has 3400 tokens left this week. Your team will reset to 3480 - Tue May 23rd at 9am" and "The cost of each batch job is 0.14 tokens per SRN/minute. Please contact Colosseum help desk in case of issues." The main area is divided into four sections: "Available Batch Files", "Pending Batch Jobs", "Active Batch Jobs", and "Completed Batch Jobs".

Available Batch Files:
- merif
- merif_batch_job.json (7 SRNs)

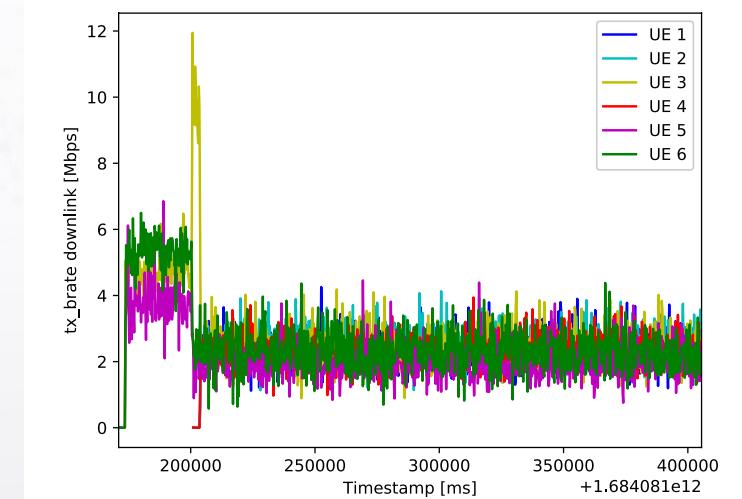
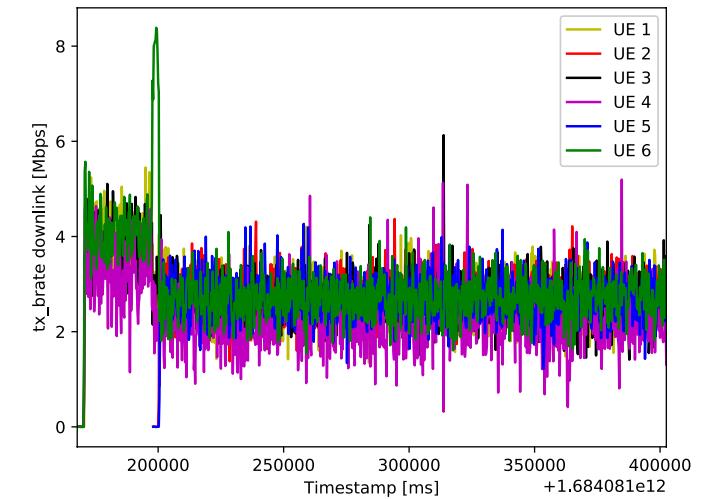
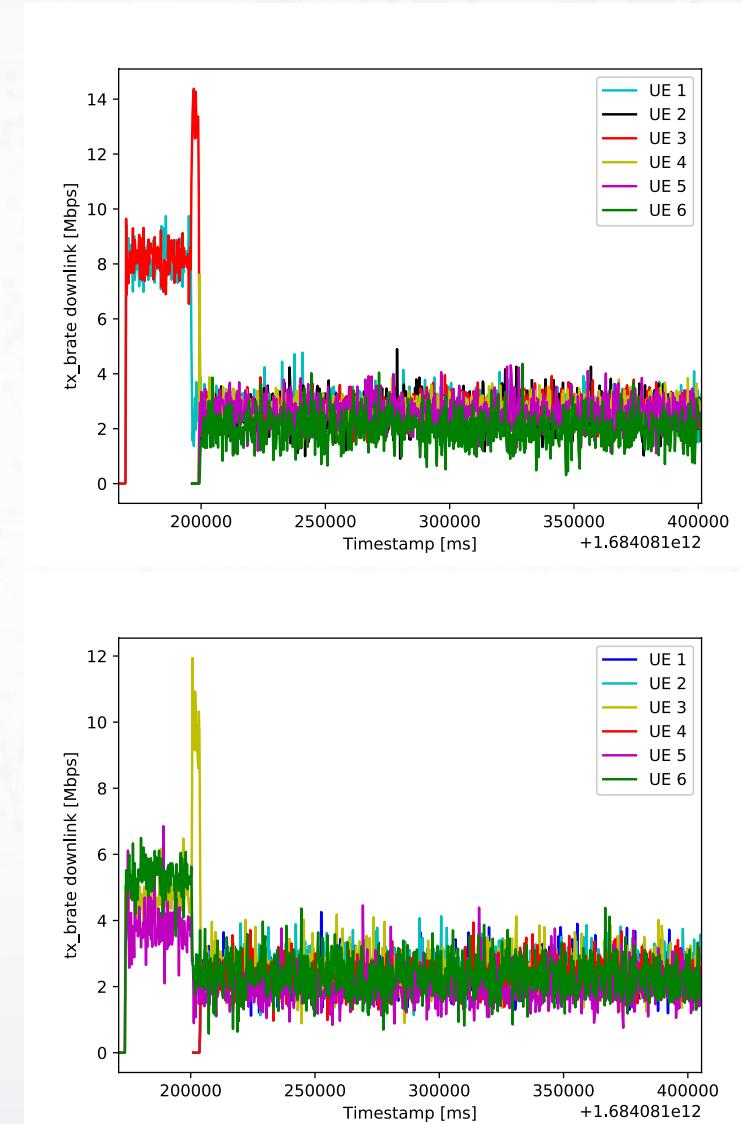
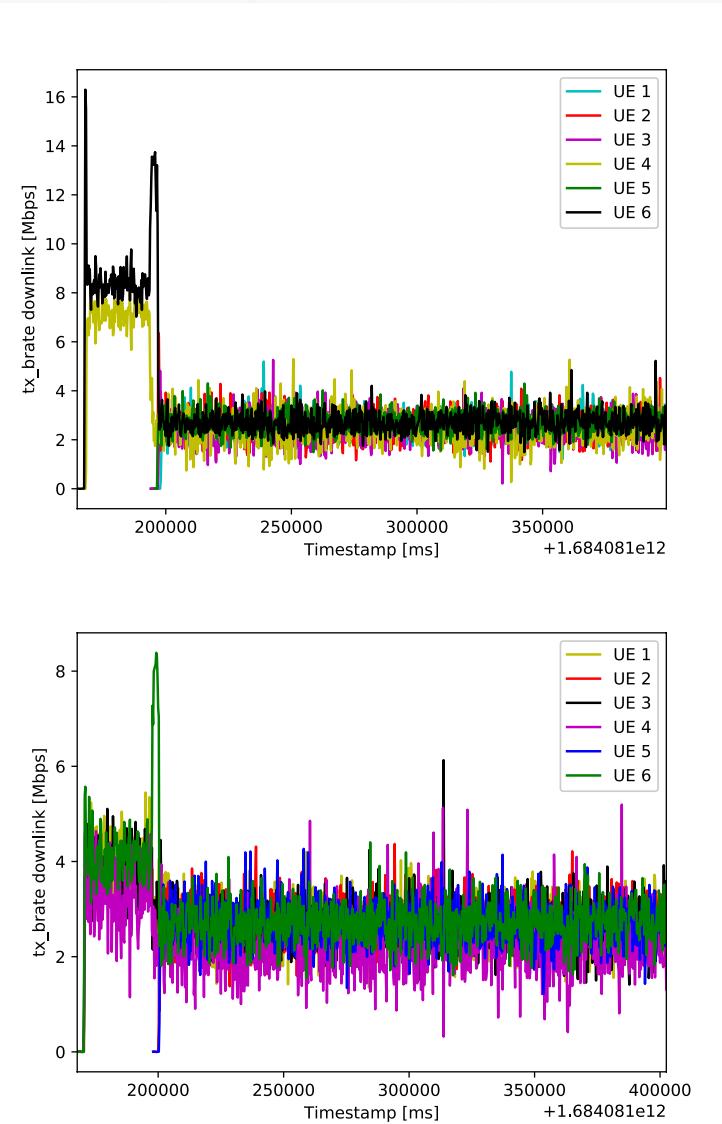
Pending Batch Jobs:
- No pending batch jobs

Active Batch Jobs:
- No active batch jobs

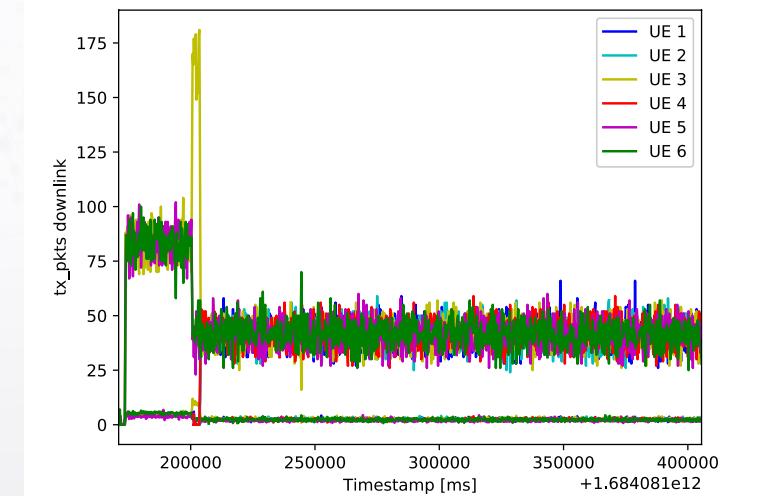
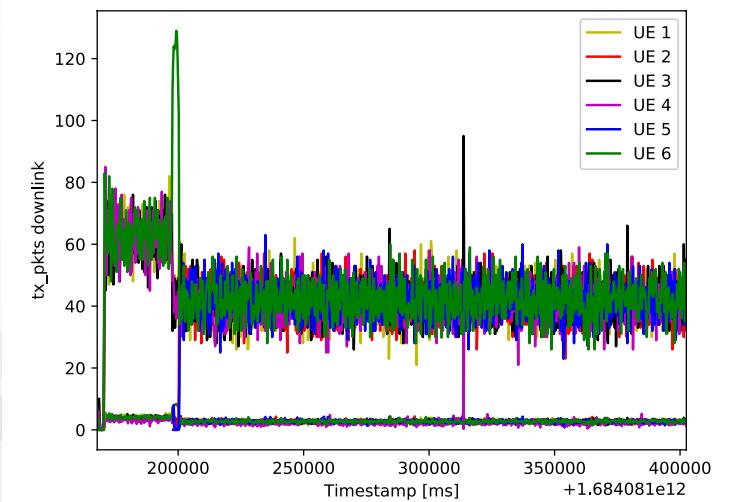
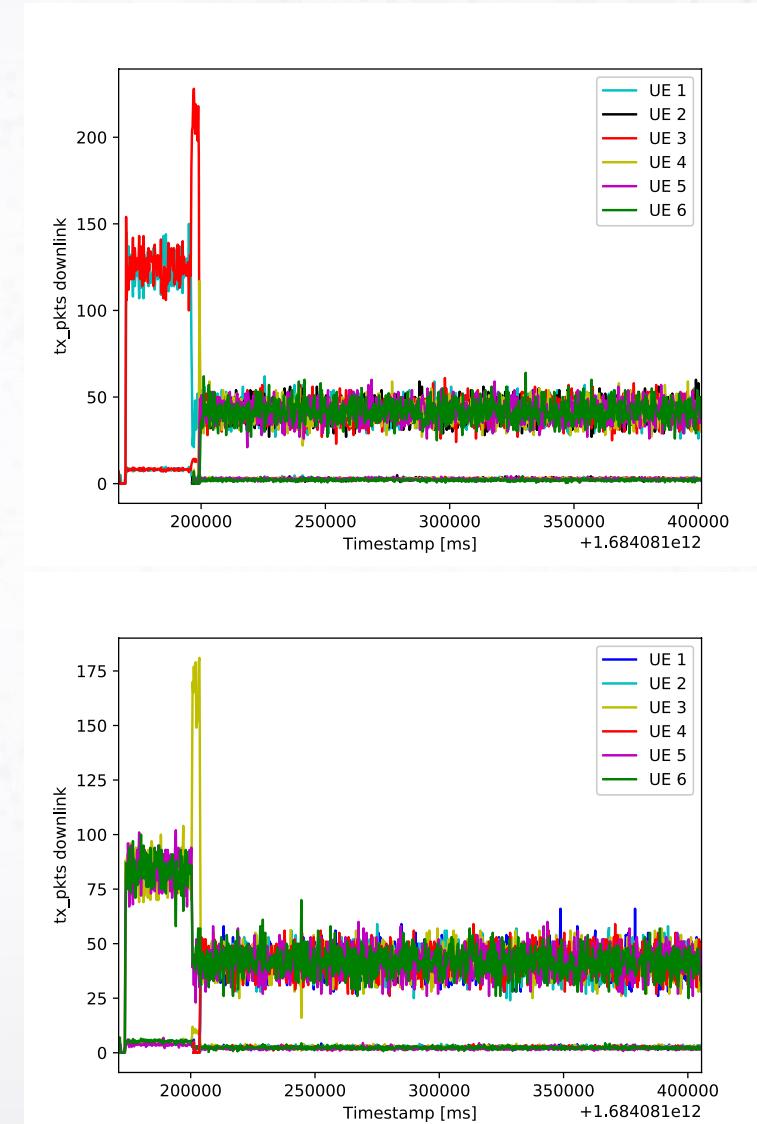
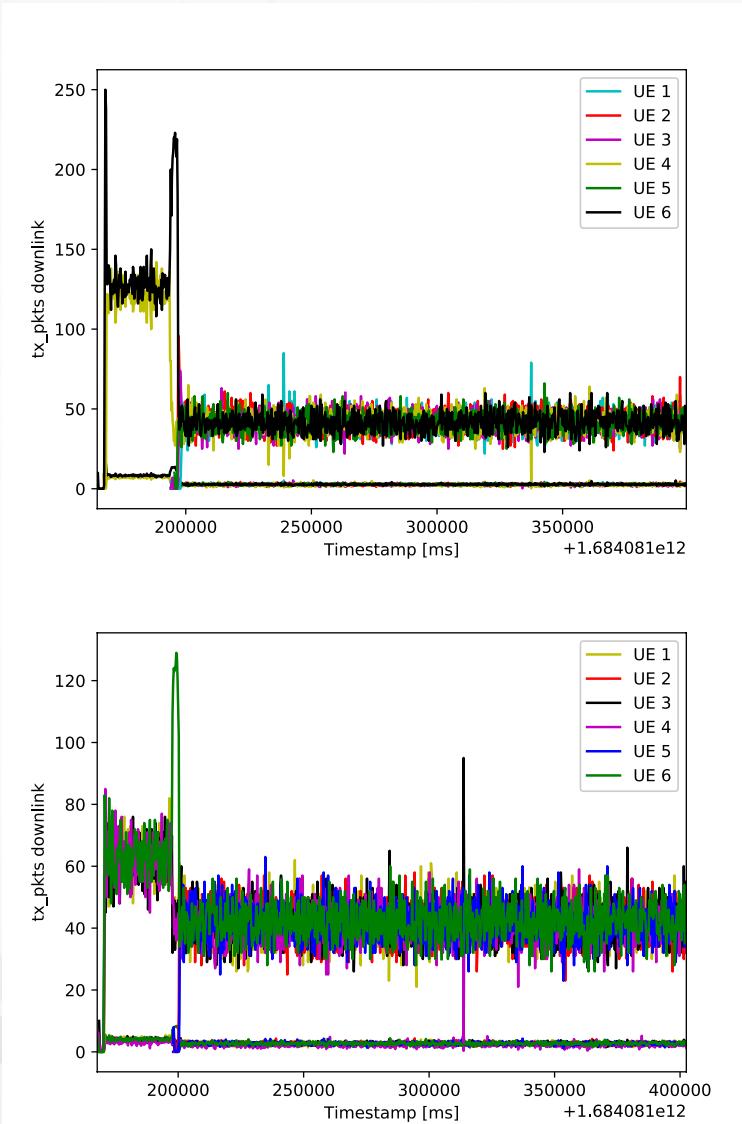
Completed Batch Jobs:
- ID: 133719, Name: merif_batch_job, Filename: merif_batch_job.json, Status: complete, SRNs: 7, Start: 2023/05/18 - 3:51:27 PM, End: 2023/05/18 - 4:13:57 PM, Duration: 23 minutes. Action buttons: play, more, delete.

demo

(Some) Independent Realizations: Throughput



(Some) Independent Realizations: Transmitted Packets





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Thank You! (Questions?)



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