**APPLICATION 1: NETWORK PASSIVE PERFORMANCE MEASUREMENTS & MAPS**

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Throughput (MBps)</th>
<th>Existing System</th>
<th>AntMonitor System</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heavy Load</td>
<td>10</td>
<td>2 MBps</td>
<td>5 MBps</td>
</tr>
<tr>
<td>Medium Load</td>
<td>5</td>
<td>1 MBps</td>
<td>3 MBps</td>
</tr>
<tr>
<td>Low Load</td>
<td>1</td>
<td>0.5 MBps</td>
<td>1.5 MBps</td>
</tr>
</tbody>
</table>

**APPLICATION 2: RF HARVESTING POTENTIAL**

- **Efficiency:** \( \eta = \frac{P_{\text{outage}}}{P_{\text{in}}} \)
- **Example:** \( P_{\text{in}} = 5 \) W, \( P_{\text{outage}} = 2 \) W, \( \eta = \frac{2}{5} \times 100\% = 40\% \).

**RF HARVESTING OVERVIEW & SYSTEM MODEL**

- **Base Station:**
  - **RF-Harvester:**
  - **Circuit:**
  - **Energy Storage/Sensor Load:**
  - **Nc(t):** Number of cells active at time \( t \).
  - **Sj(t):** Signal strength of cell \( j \) at time \( t \).
  - **l(t):** Load at time \( t \).
  - **c(t):** Channel at time \( t \).

**NETWORK PERFORMANCE MONITORING APPROACHES**

<table>
<thead>
<tr>
<th>Approach</th>
<th>Network Infrastructure</th>
<th>Multi-user</th>
<th>Spread-out</th>
<th>Multiplier</th>
<th>Later Work</th>
</tr>
</thead>
<tbody>
<tr>
<td>Passive Monitoring</td>
<td>( P_{\text{in}} )</td>
<td>( P_{\text{outage}} )</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Active Monitoring</td>
<td>( P_{\text{in}} )</td>
<td>( P_{\text{outage}} )</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Offline Analysis</td>
<td>( P_{\text{in}} )</td>
<td>( P_{\text{outage}} )</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Network Performance Monitor in AntMonitor**

- **AntMonitor:** [5, 6]
- **Motivations:**
  - Data Collection:
    - (a) Passively Monitor
    - (b) Packets/Hashtags + Semantics/Content
    - (c) Granularity: Per Flow, Per App.
    - (d) User Preferences
  - Deployment:
    - (a) User-Space Mobile App
    - (b) Routers in the Background
    - (c) Incentives for the users

**REFERENCES**


**ACKNOWLEDGMENTS**

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