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Motivation

Mobile Connectivity Everywhere

- Laptops & Desktops
- Mobile Phones
- Tablets
- Other Devices

Global Network Trend

- 43% Year-Over-Year Change
- 52% Year-Over-Year Change
- 4% Year-Over-Year Change
- 0.14% Year-Over-Year Change

Wireless Network Characteristics:
- Low bandwidth
- Unstable connectivity
- Hard to deploy

User-Perceived Latency!

Key Insights

Solution: Prefetch can achieve “zero” latency!

Wait... But “how” to Prefetch?

- App code has useful information on what & when to prefetch
- “User think time” provides prefetch opportunities

Current State of the Art

Existing Limitations:
- Server-based
- Human-based
- History-based
- Domain-based

PAOLMA:
- Client-only
- Automatic
- No historical information
- Domain-independent

PAOLMA Overview (Program Analysis for Latency Optimization of Mobile Apps)

Real App Evaluation

- 32 apps from Google Play store
- 4G network
- 2 Android users

Results across the 32 apps

<table>
<thead>
<tr>
<th>App</th>
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</tr>
</thead>
<tbody>
<tr>
<td>32</td>
<td>64</td>
<td>15</td>
<td>38</td>
<td>41</td>
<td>14</td>
</tr>
<tr>
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<td>100%</td>
<td>47.74%</td>
<td>28.81%</td>
<td>23.25%</td>
<td>21.61%</td>
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<td>98.82%</td>
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Road Ahead

- Lay the foundations for program analysis-based prefetching techniques
- Balance QoS trade-offs
- Study user behaviors
- Extend to other latency-hogging operations