

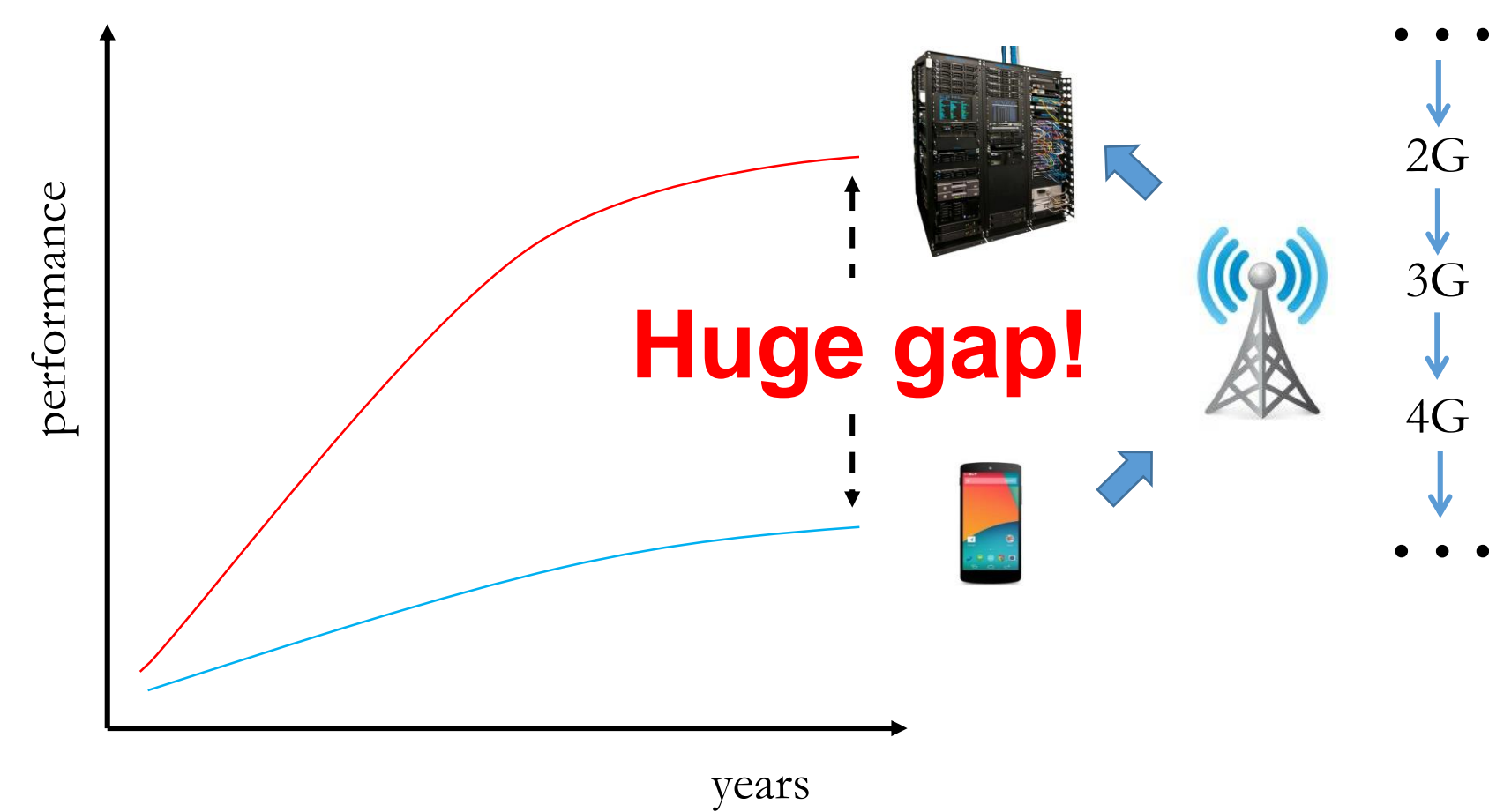
Architectures and Systems for Mobile-Cloud Computing: Georgia Tech

A Workload-Driven Perspective

Xin Zhang, Prashant Nair, Mayur Naik and Moin Qureshi

Background

Mobile devices have become the primary computing device



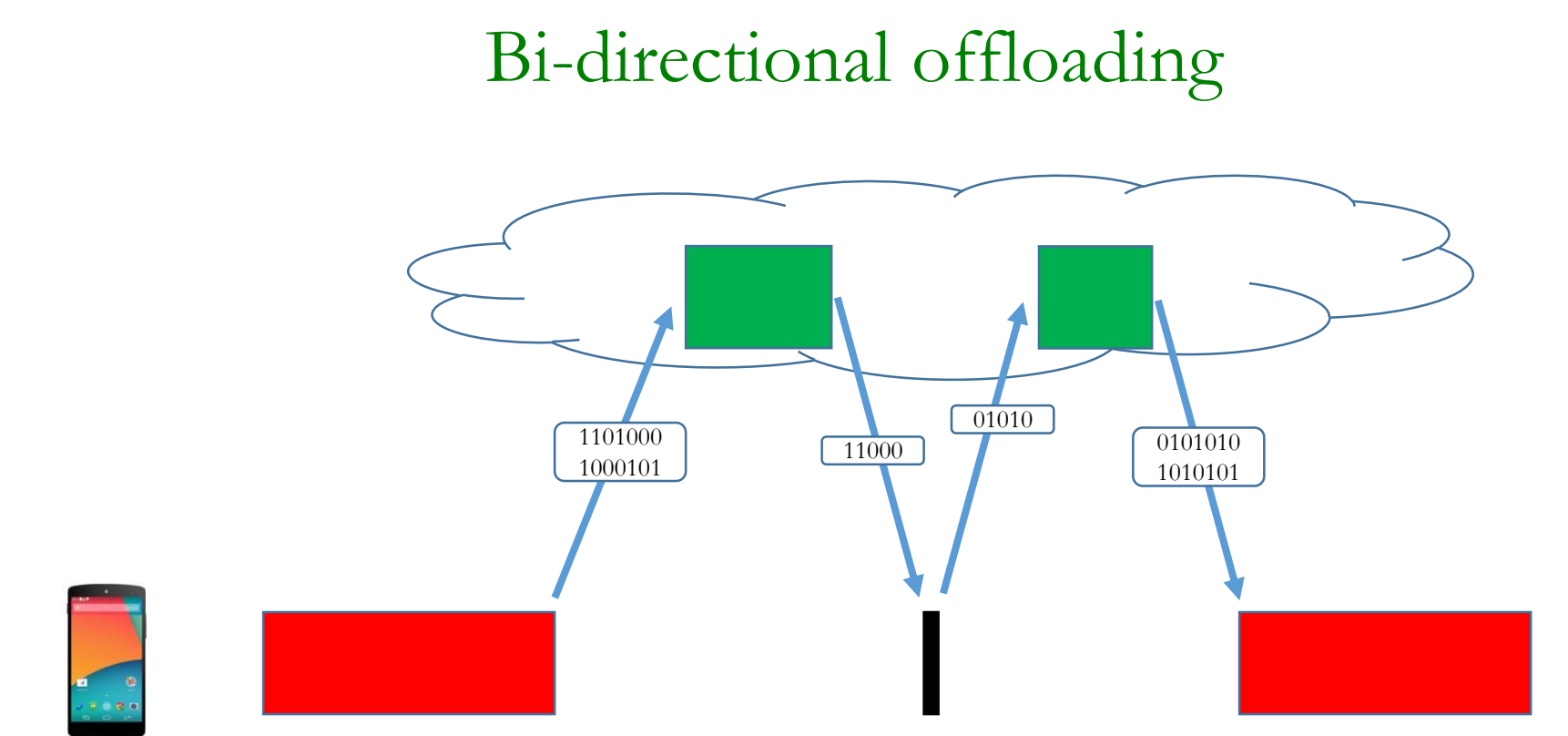
New Applications



Idea: Offload Computation to Cloud

Flexible Offloading Scheme I

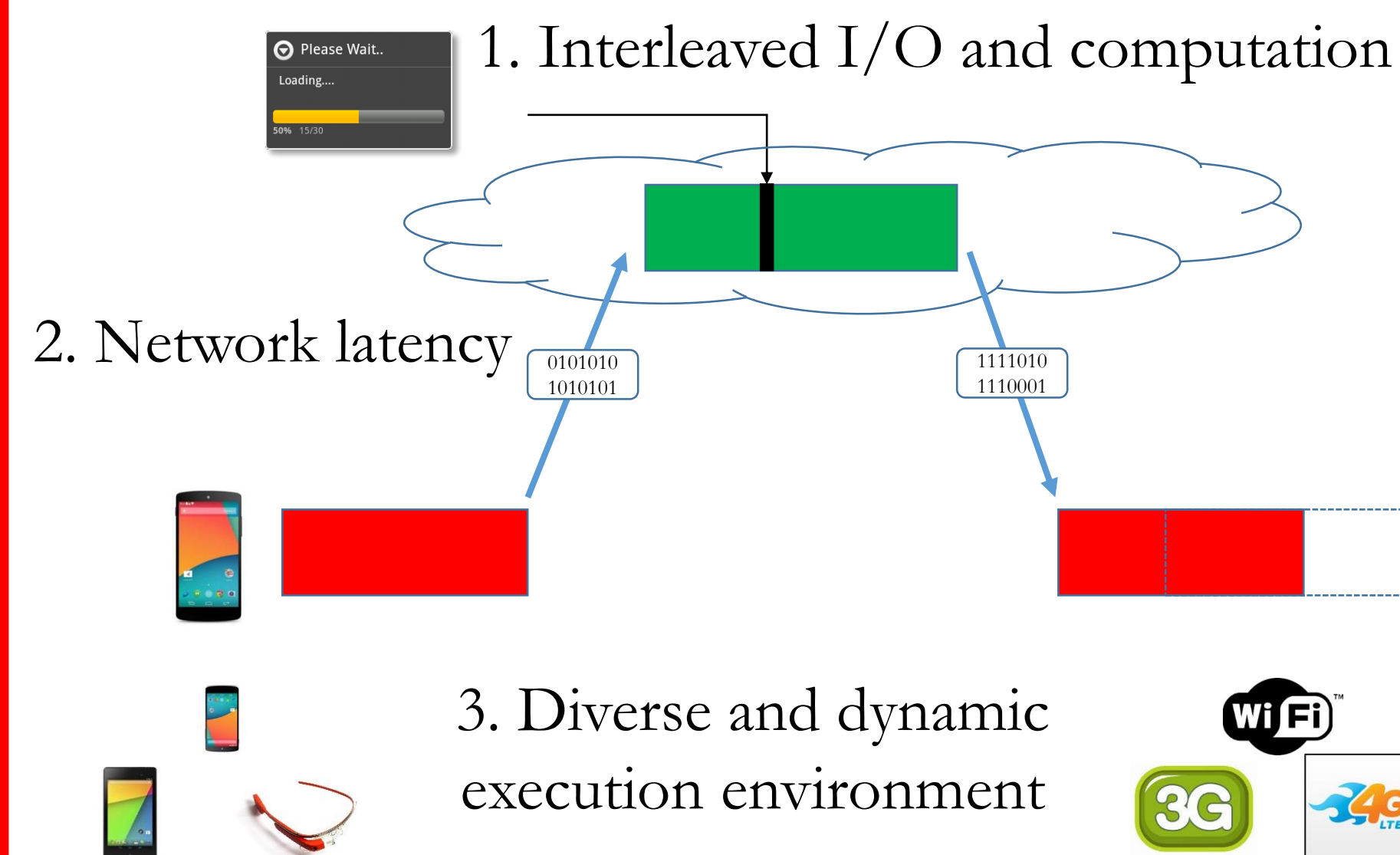
Challenge 1: Interleaved I/O and computation



Mobile Cloud Computing

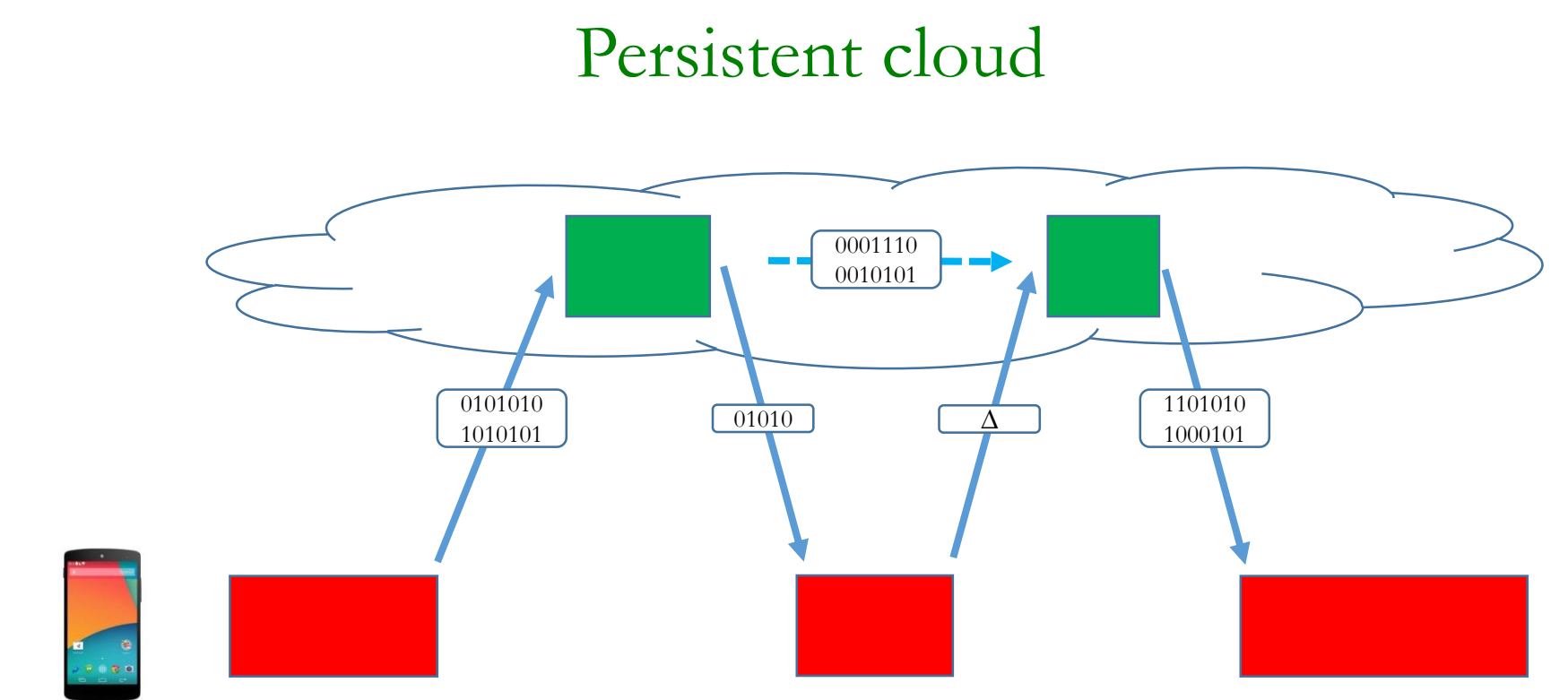


Challenges



Flexible Offloading Scheme II

Challenge 2: Network latency

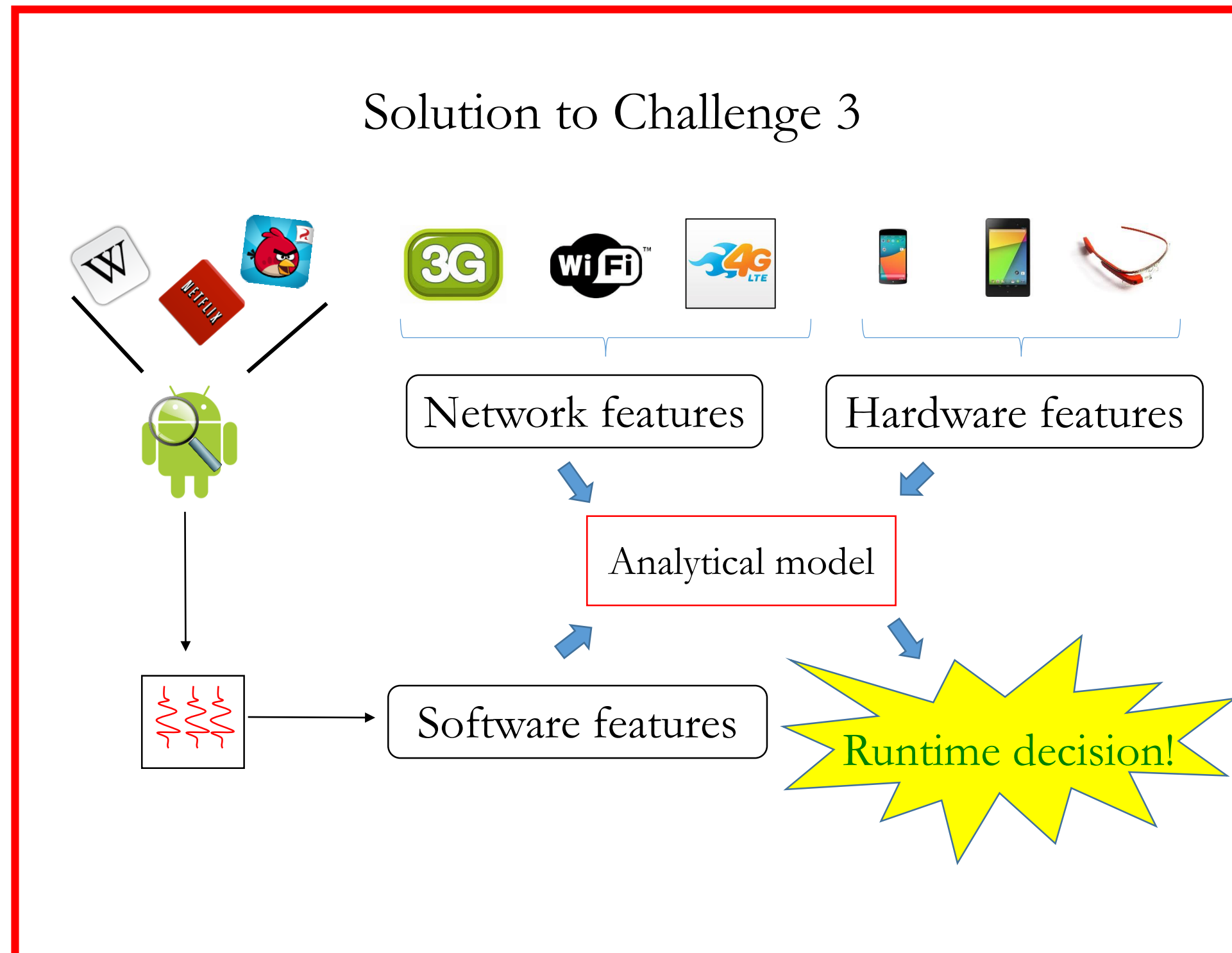


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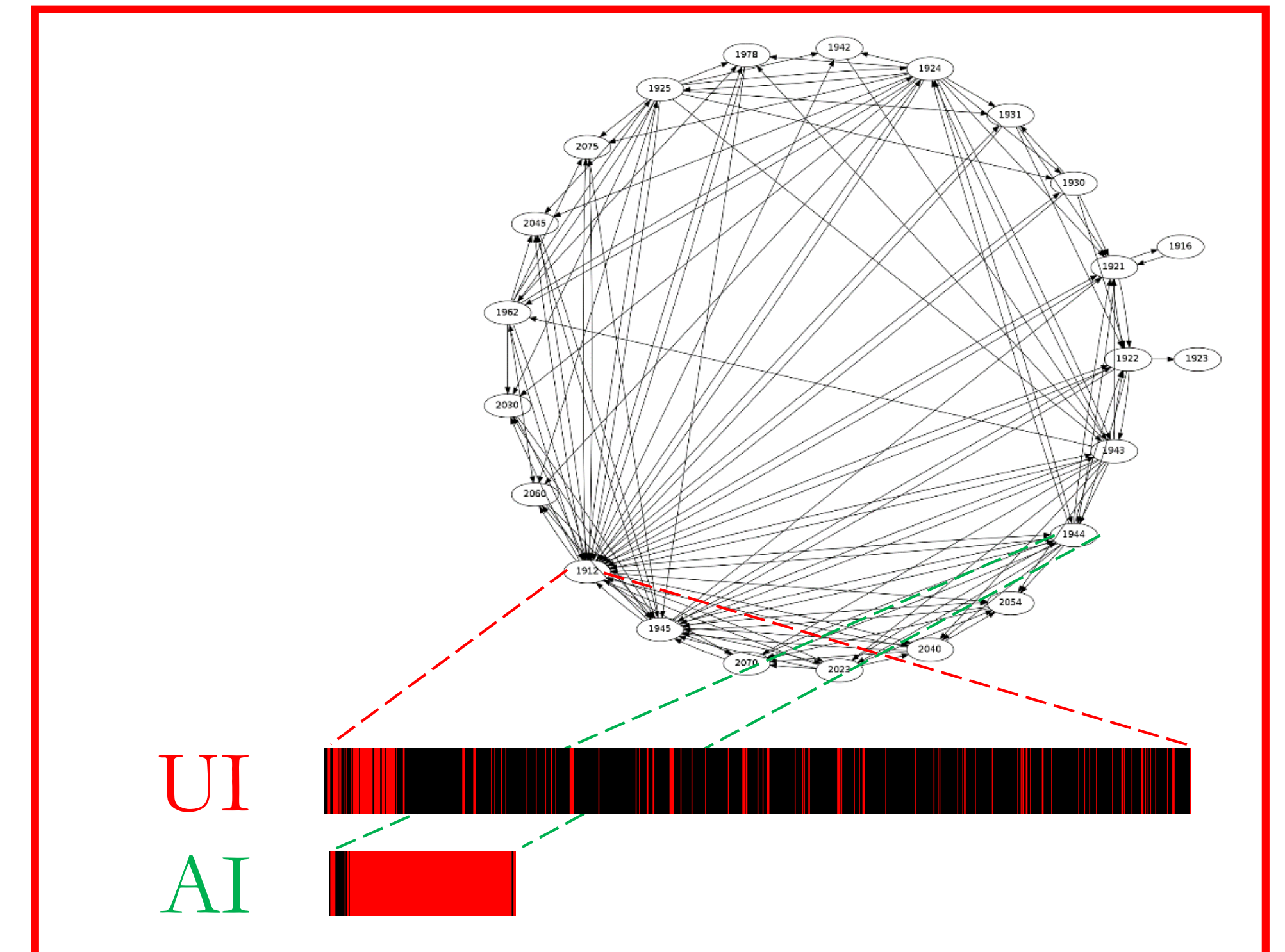
Analytical Models for Tradeoffs



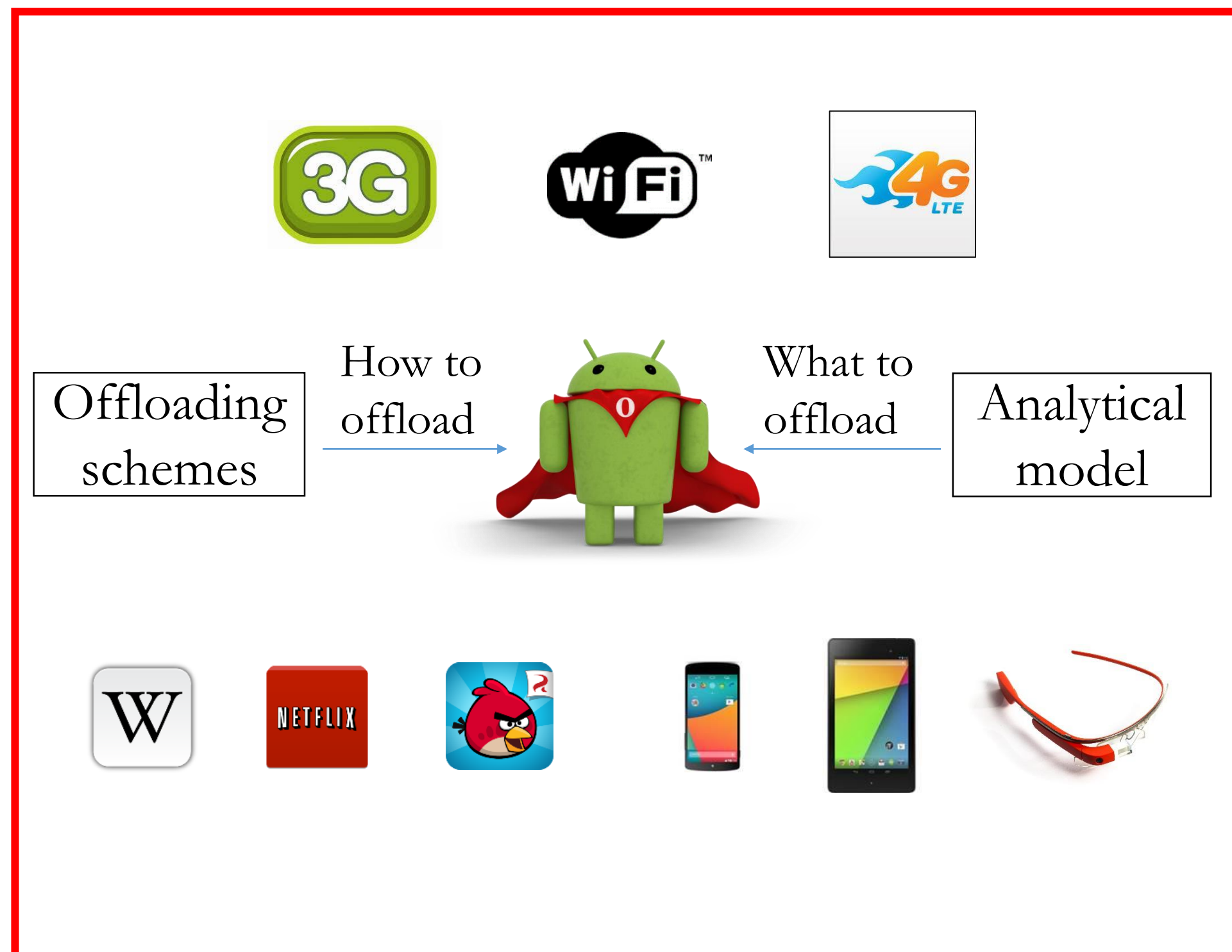
Roadmap

- ▶ Mobile workload tracing (**Infrastructure implemented**)
 - ▶ Trace mobile workloads of top 150 Google Play apps
- ▶ Workload characterization (**~3 months**)
 - ▶ Identify features common and unique to mobile workloads
- ▶ Analytical models of performance and energy usage (**~3 months**)
 - ▶ Produce tolerable error bounds compared to hardware measurement
- ▶ Mobile-cloud computing system (**~6 months**)
 - ▶ Show speedup and energy savings

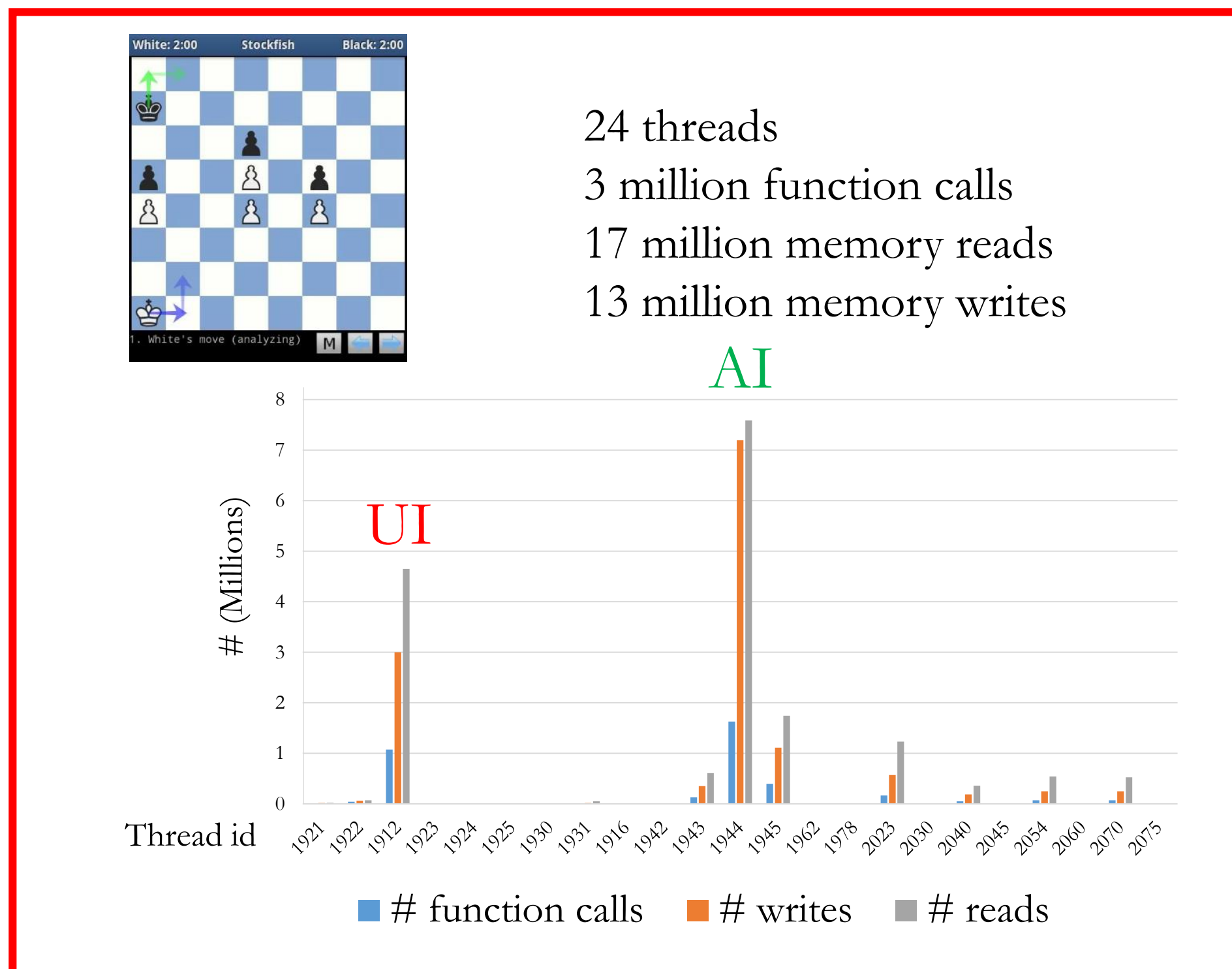
Preliminary Findings



Offloading System



Results of Tracing



Summary

- ▶ 😊 Mobile devices have become the new “PC”
 - ▶ 😞 Big performance gap between mobile and desktop
- Our Proposal:*
- ▶ 😊 😊 Enable desktop-class performance for mobile apps by:
 - ▶ Offloading computation to the cloud ☁️
 - ▶ Using robust analytical modeling 📊
 - ▶ 😊 Enable new applications and usage models