

# CloudMate: Energy-Efficient Mobile Computing through Cloud Offloading

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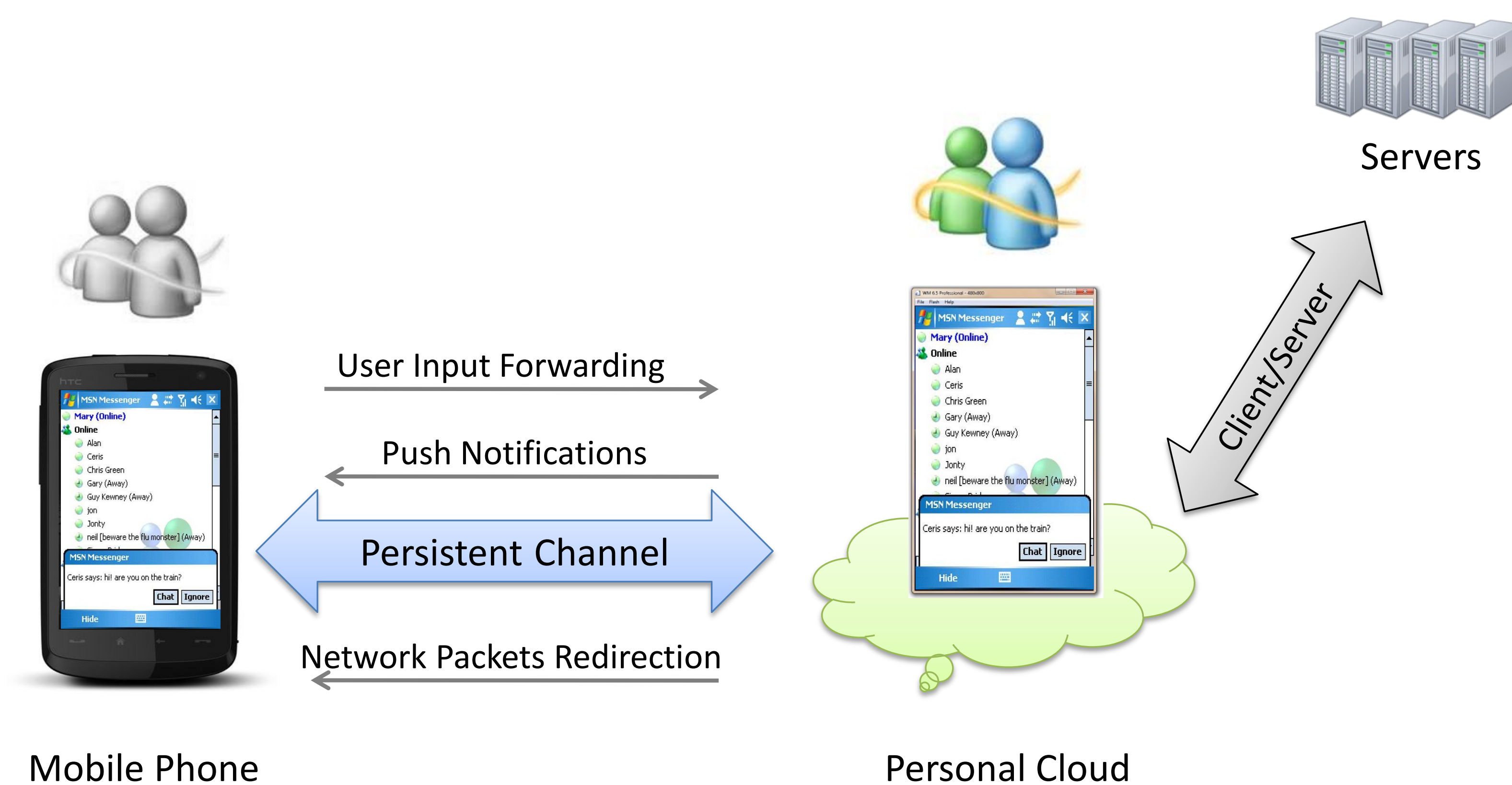
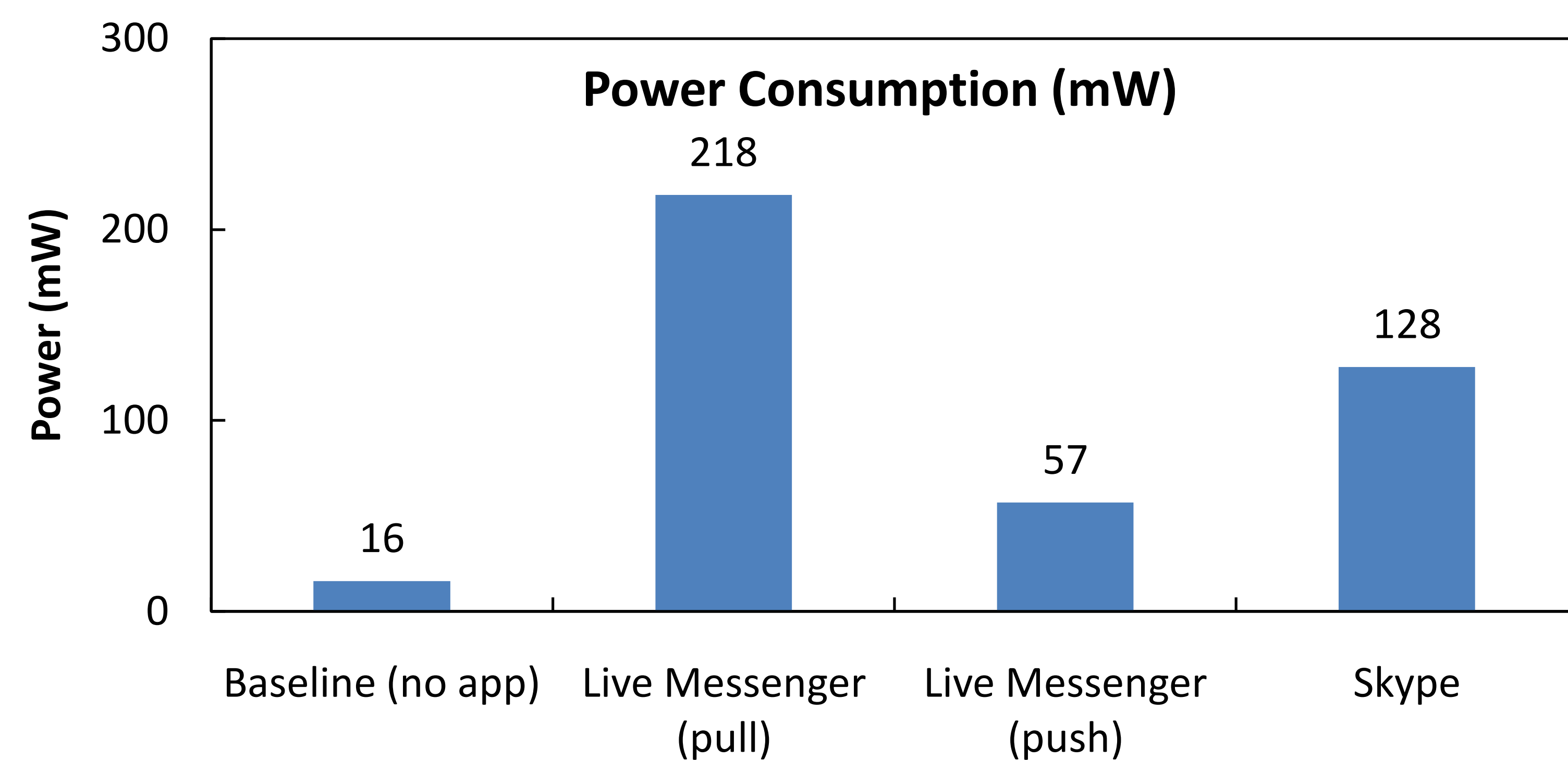
## Problem

High power consumption due to always-on applications

- Live Messenger, Skype, Facebook, Gtalk ...
- Keep running in background and sync to the servers
- Wait for incoming events (e.g., messages and voice calls)
- Infrequent user interaction

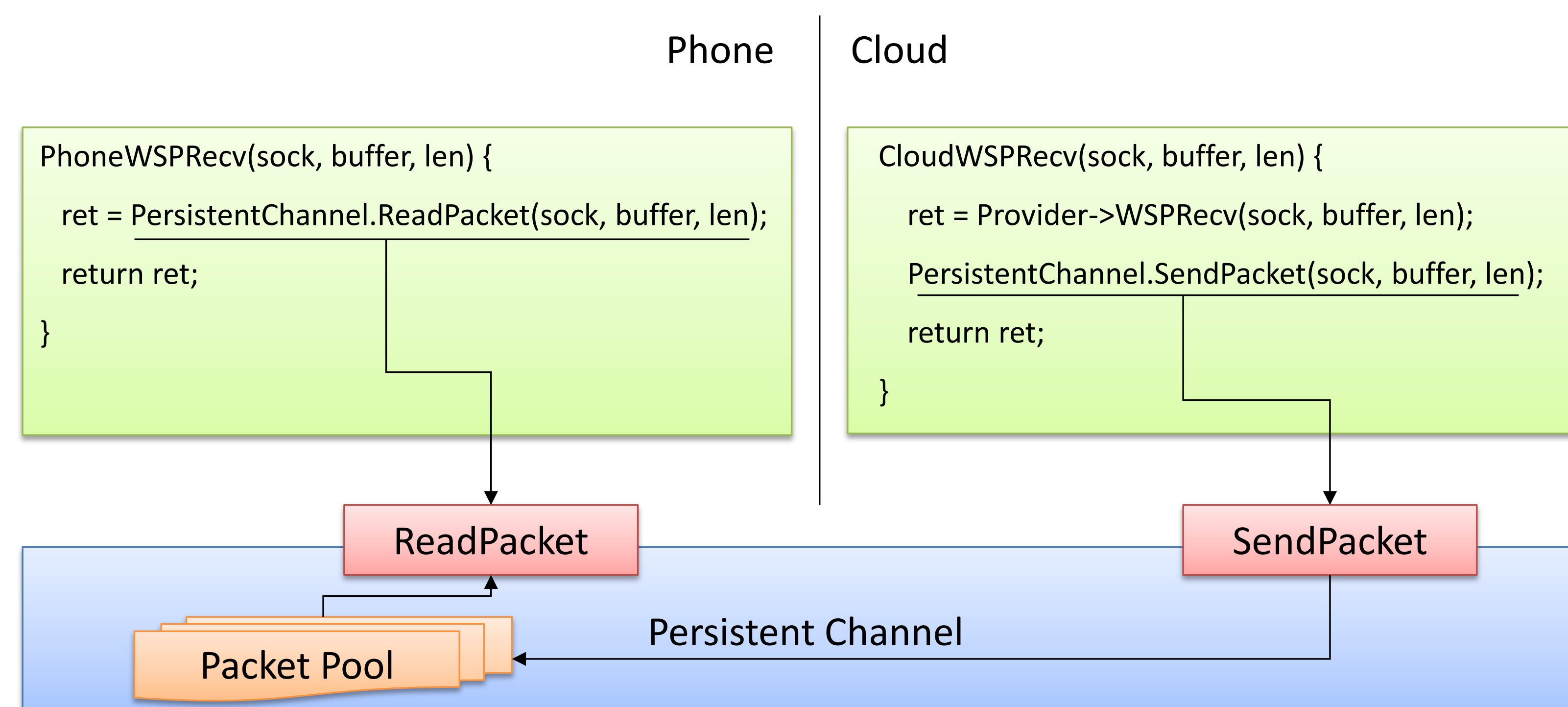
## Approach

- Always-on in cloud, on-demand wakeup on phone
  - ⇒ Wake on push notifications over a persistent data channel
- Shadow Computing
  - ⇒ Run the same application both on phone and in cloud
  - ⇒ The server is aware of only the application running in cloud
  - ⇒ Handle network events in cloud and user interaction on phone
- Lightweight state synchronization
  - ⇒ Synchronize the states between phone and cloud by re-directing user input and network traffic



## Advantages

- Minimize power consumption of phone
  - ⇒ Phone wakes up only when user intention is needed
- Achieve native user experience
  - ⇒ User interacts with local applications
- Support legacy applications and services
  - ⇒ No changes required to existing applications and services



Layered Service Provider (LSP) Based Implementation