Federating OMNeT++ Simulations with Testbed Environments

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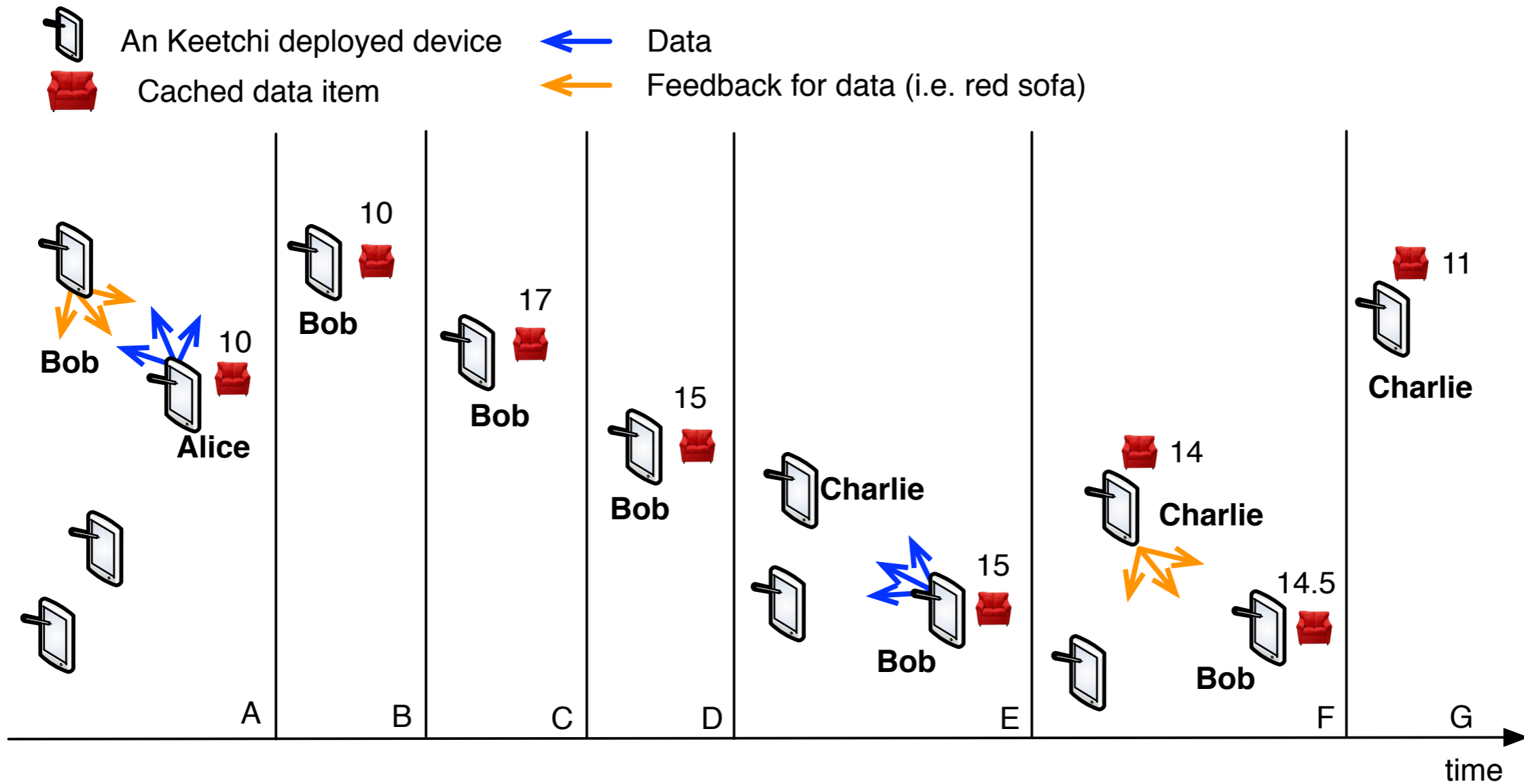- Simulated Scenarios and Evaluations

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Keetchi Architecture

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Features of Keetchi

- Information centric communications

- Distributed control

- Distributed caching

- Reinforcement learning based data handling

- Opportunistic data propagation

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Operation

- Messages: Data and Feedback
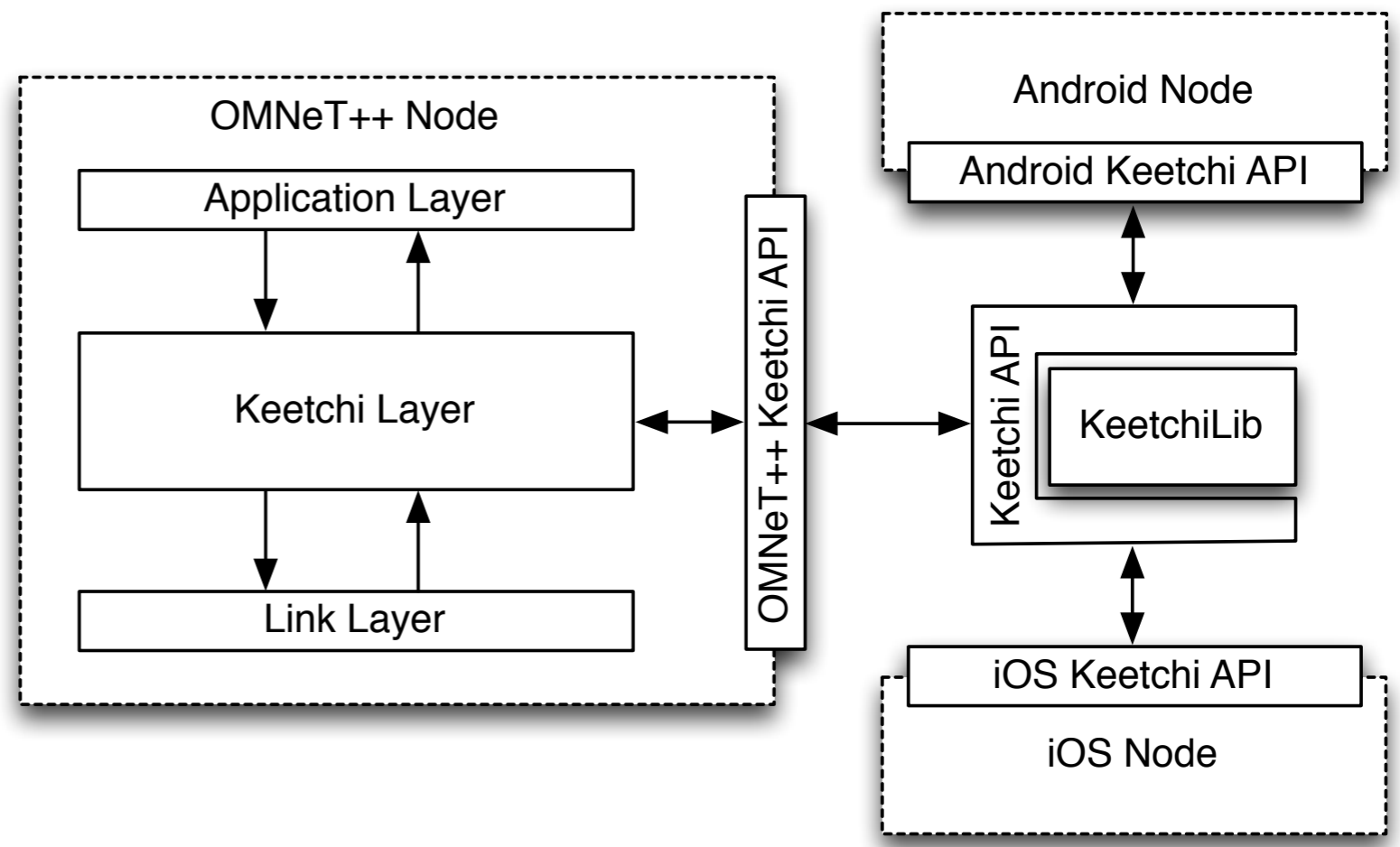
Codebase Architecture

Requirements and Architecture

- ## Requirements

  - Test-bed devices

  - OMNeT++ simulations

- ## Architecture

  - Platform dependent API

  - Keetchi functionality API

Exposed Functionality

- Incoming message processing

- Opportunistic message generations

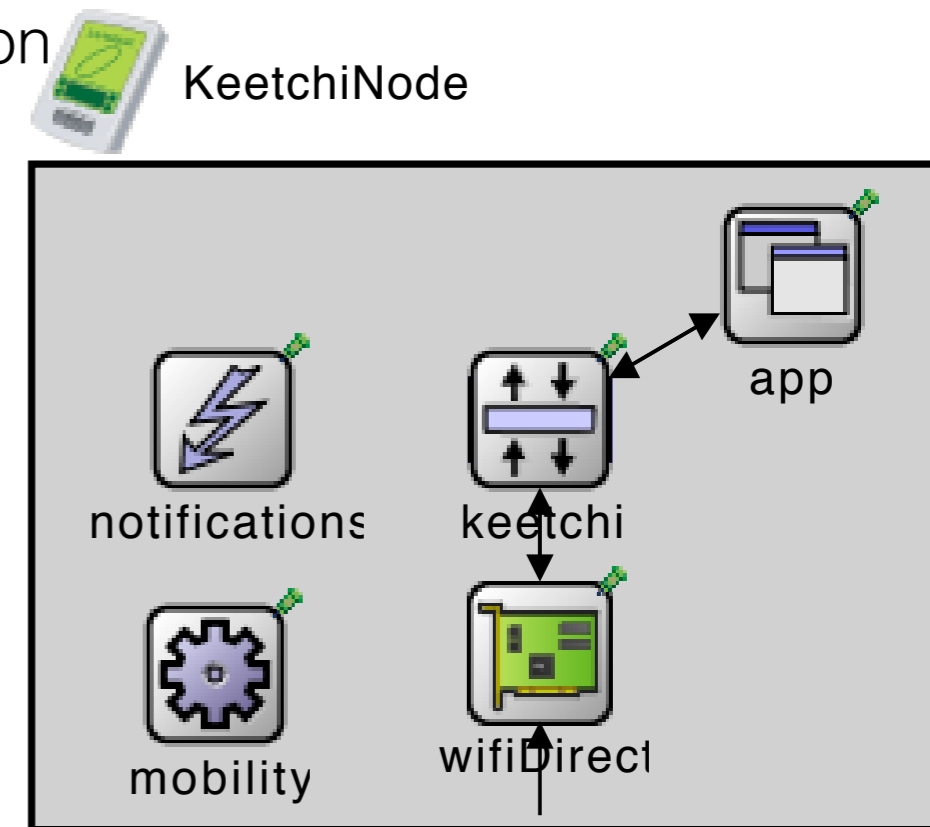- Status information servicing

- Wiring for statistics

```cpp
/**
 * Process an incoming Feedback message from either the application
 * layer or the link layer.
 *
 * @param fromWhere   The message source, application layer or link
 *                    layer.
 * @param feedbackMsg The Feedback message with its contents as a
 *                    KLFeedbackMsg instance.
 * @param currentTime The current clock time.
 * @return            A KLAction instance with all actions required
 *                    to be taken by the Keetchi layer.
 */
KLAction* processFeedbackMsg(int fromWhere, KLFeedbackMsg *feedbackMsg,
                             double currentTime);
```

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OMNeT++ Model

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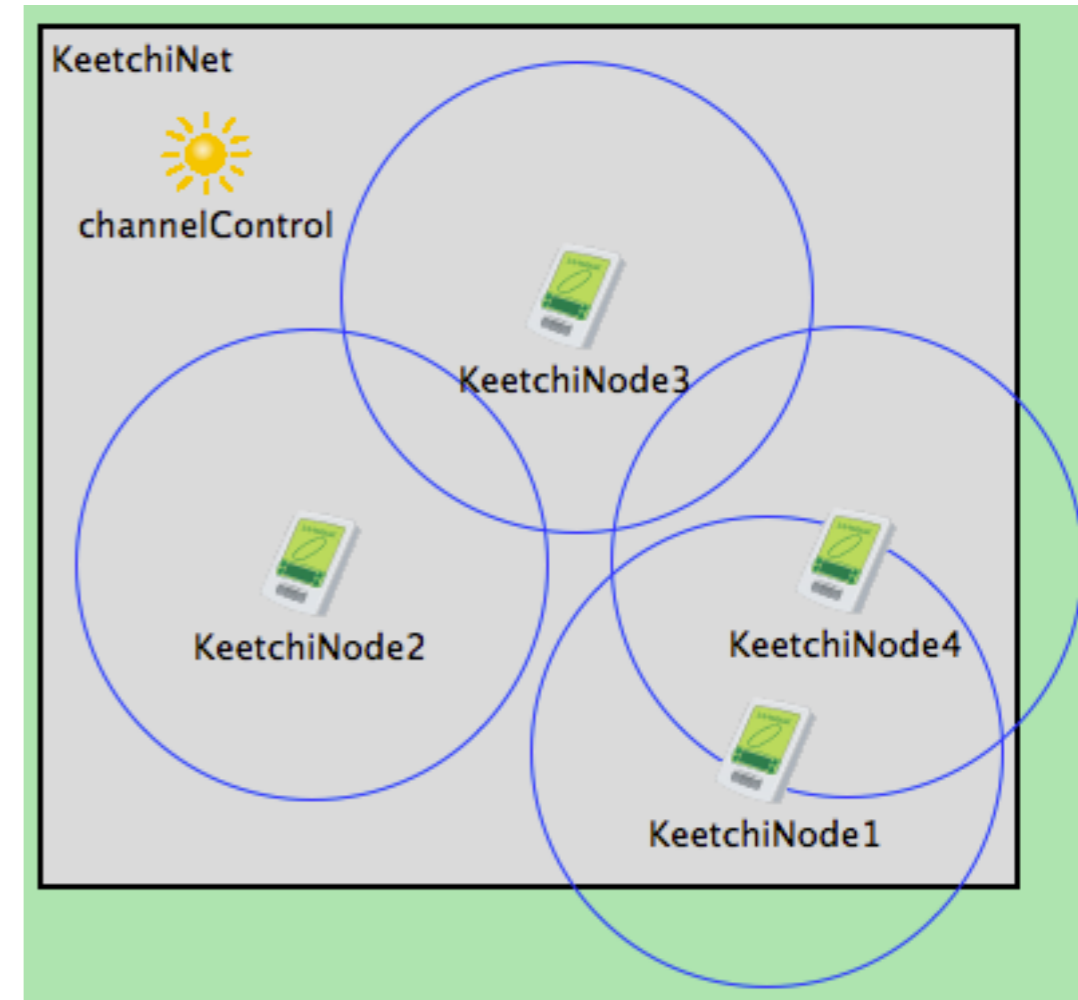comnets

Model Considerations

- ## Keetchi Architecture

  - 3 Layer Protocol Stack, Keetchi functionality API

- ## Leverage of existing OMNeT++ Models

  - Mobility models, Traffic models, Wireless propagation models

- ## New Features

  - Energy and expenditure model

  - WiFi Direct and Bluetooth Low Energy

KeetchiNode

app

notifications   keetchi

mobility   wifiDirect

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Simulated Scenarios and Performance Evaluations

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Simulated Scenarios (Applications)

- Many scenario areas

  - e.g., emergency services, social networking, etc.

- *UniRecycler* application ("grapevine")

  - peer-to-peer, decentralised and distributed communications

  - caching, opportunistic communications (store-and-forward)

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Performance Evaluations

- Feedback system

- Opportunistic data propagation strategies

- Caching

- Mobility patterns

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Summary and Future Work

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Summary and Future Work

- ## Summary

  - Design and development of a communications architecture (Keetchi)

  - Development of a common code base for test-bed devices and OMNeT++ simulations

- ## Future Work

  - Inter-working with test-beds and simulation

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Thank You.

Questions.