

Tongo: A Framework for Supporting Mobile Application Architectures

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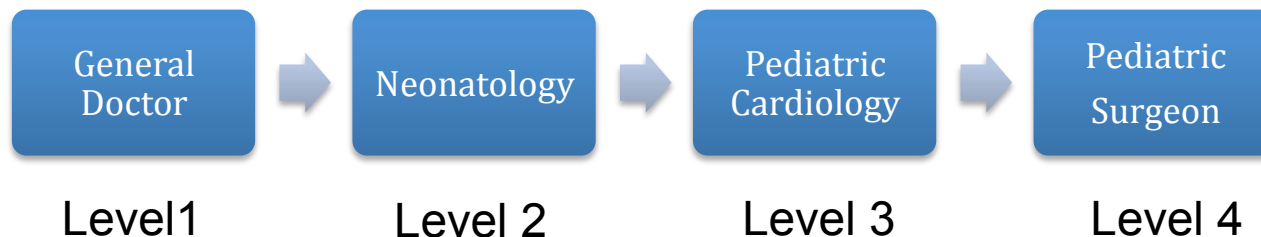
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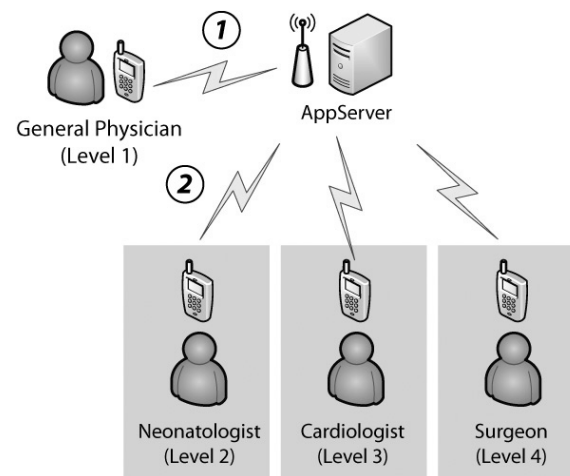
- **Motivation**
- Tongo
- TongoMobile
- Experimentation and Results
- Conclusions

The Neonate Care Support Application

- When a newborn arrives the first minutes are really important
- General doctors need to conduct specific tests to find out if the baby comes with a complication
 - i.e. Cardiology Problems
- Sometimes general doctors need to request clinical advise from greater complexity centers
 - They are located in hard to reach places or rural areas



- A Level 1 doctor interacts remotely with a specialist answering the emergency
 - Depending on the diagnostic, the emergency must be routed to a high level doctor in a transparent way
 - The application must dynamically adapt itself to provide medical services of growing complexity



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Context

- Framework for developing and executing Service-Oriented Applications
- Developed at Los Andes University (2004)

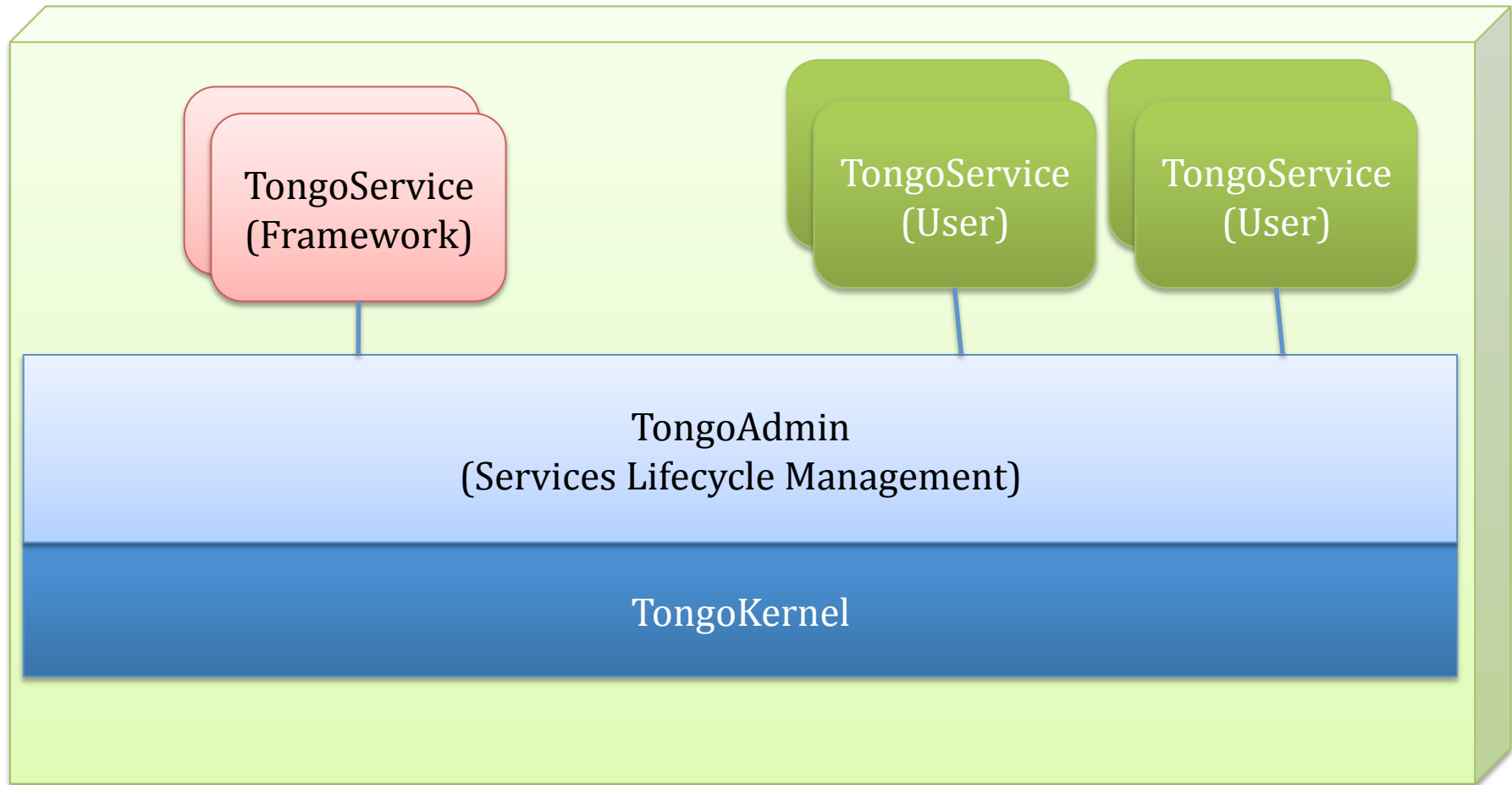
Main Elements

- *TongoService*
 - XML Interface Definition
 - Java Class implementation (multiple)
- *TongoApplication*: Set of related *TongoServices*

Main Advantage

- The capacity of changing the implementation (selfadaptation) of *TongoServices* at runtime

TONGO ARCHITECTURE

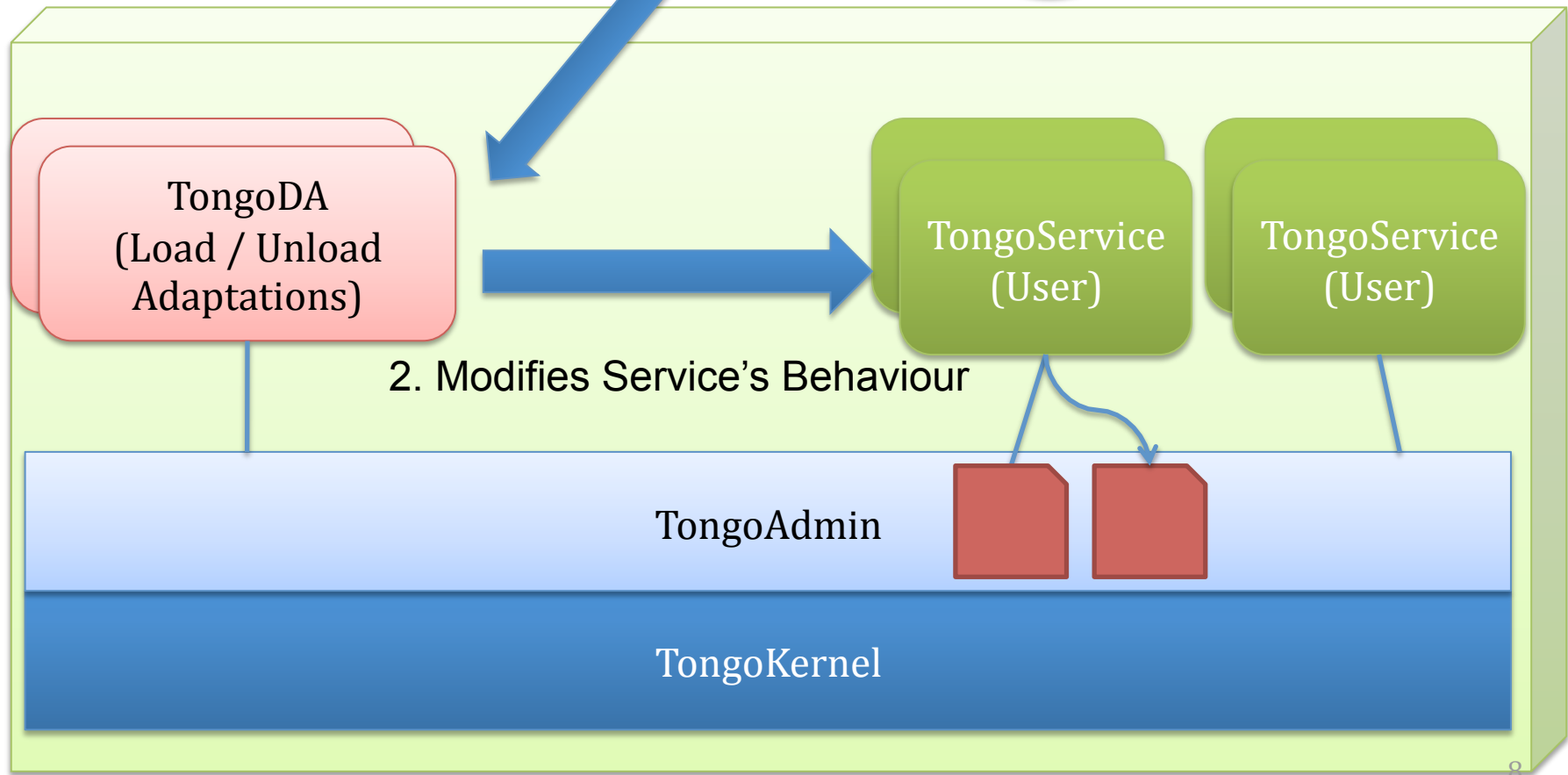


Application Server

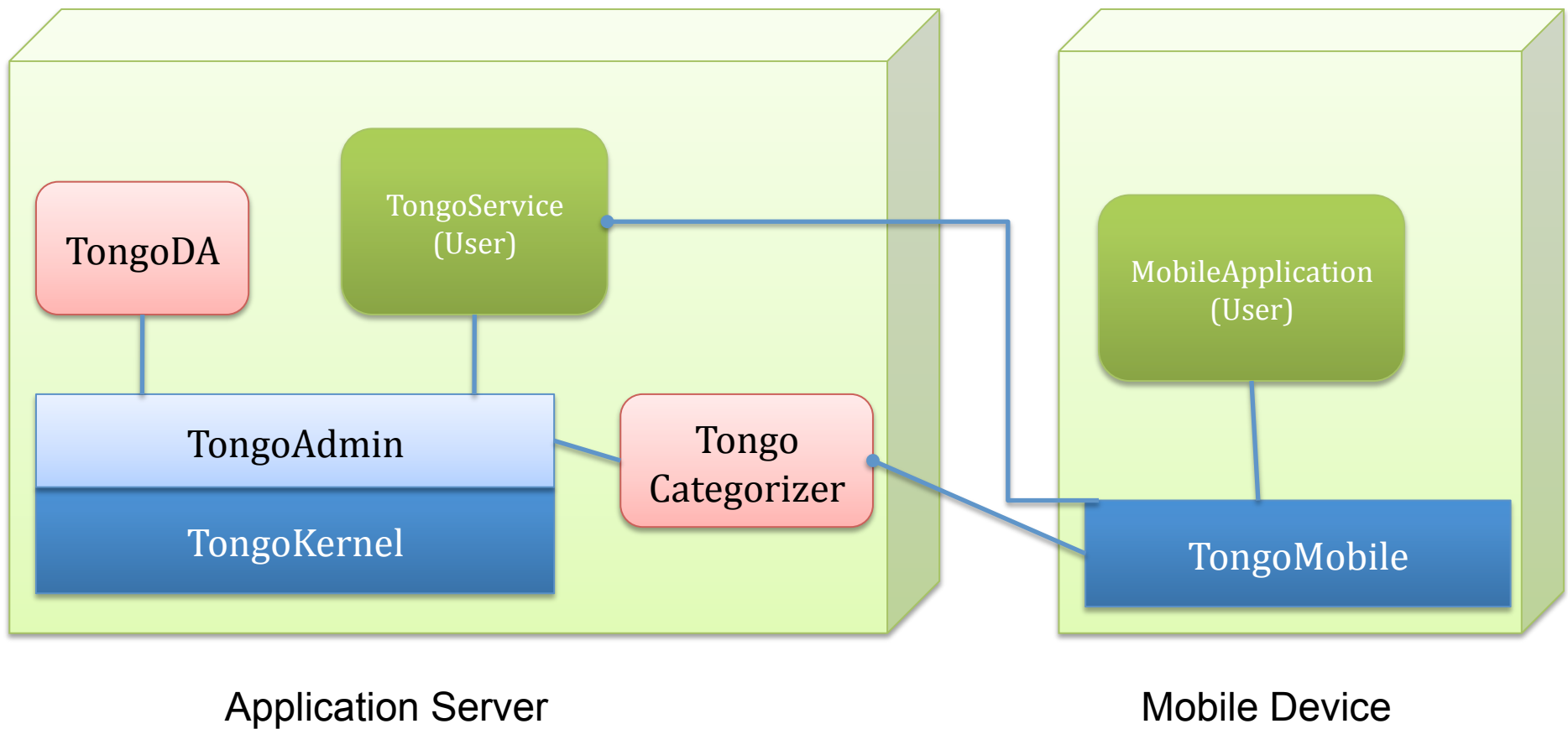
SELF-ADAPTATION IN TONGO



1. Domain-Specific Language
TongoDAL

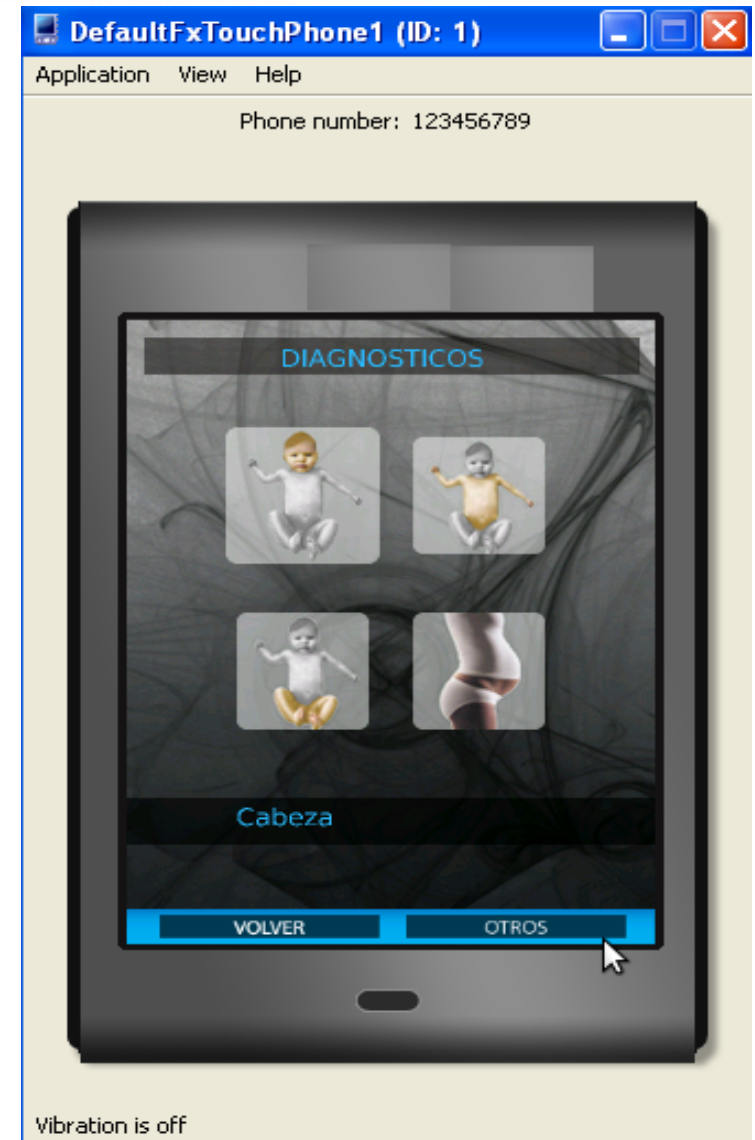


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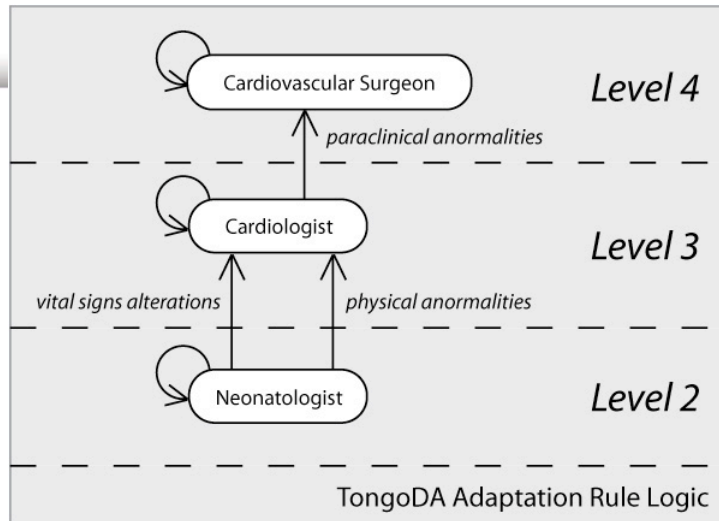


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- **Experimentation and Results**
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- Experimentation Scenario
 - Simon Bolivar Hospital – Bogotá
 - Three level 1 medical centers -
Located at the outskirts of the city
 - One specialist of each level (2,3,
and 4) geographically distributed
 - TongoService:
NeonatologistService
 - Four different adaptation rules
 - Simulated conditions



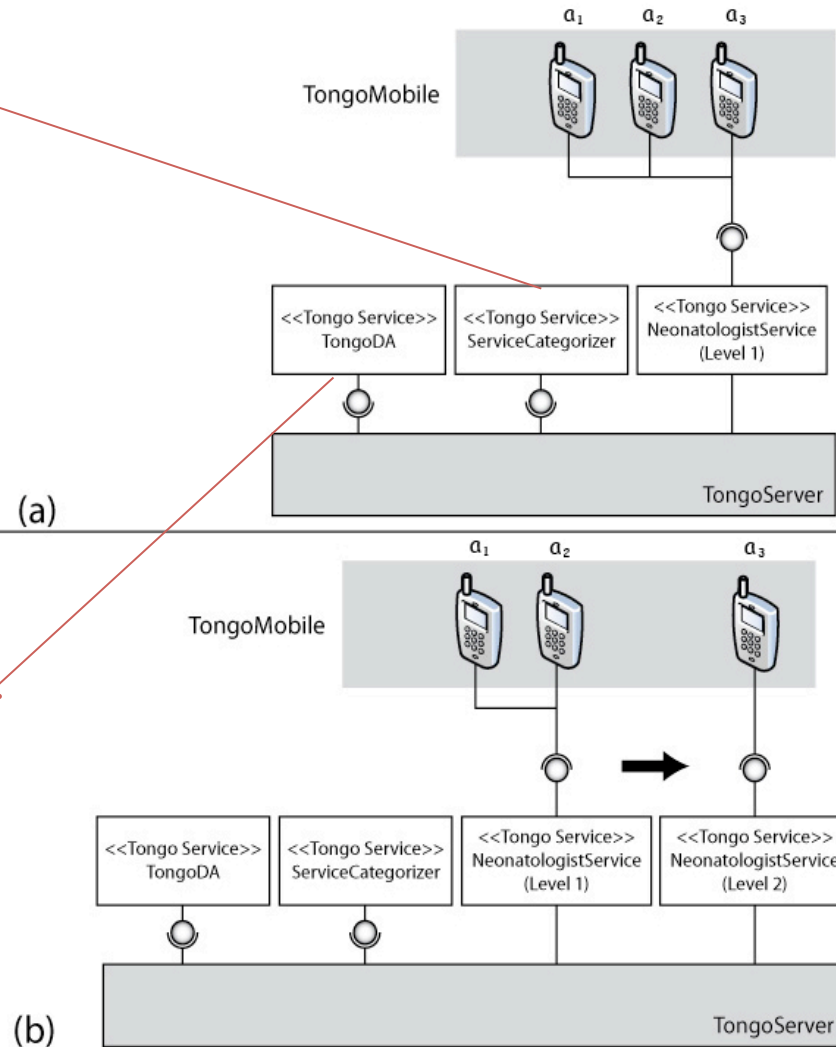
EXPERIMENTATION AND RESULTS



```

1 scenario serviceLevelAdaptation
2   with params incomingForm
3   adaptation serviceLevelAdaptation
4     when invoke-method in neonatologistService
5     on consultingSpecialistRegister
6     read as follows
7     ...
8     endread
9     before apply rule switchLevelOfService3;
10    before apply rule switchLevelOfService4;
11    endadaptation
12  endscenario
13
14  rule switchLevelOfService3
15    on categoryOfService == 3
16    and actualImpl == "neonatos.neonatologist_n2"
17    do operation replaceIntances (serviceName, implN_3);
18  endrule
    
```

TongoDAL



- We are testing the architecture in a different context
 - Chronic Headache Characterization



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- During the experimentation phase the dynamic service swapping goes unnoticed to the mobile applications
- The physicians involved had a general feeling of satisfaction

However

- We need to consider legal and cultural boundaries
- Communication across mobile networks is prone to congestion and high latency
- We are designing a more usable interface (Mobile Application)

Thank you

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