

Distributed Pervasive Services using Group Service communication supporting Body Area Networks

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Outline

- Introduction
- Related Work
- Architecture
- MORE Overview
- Group Services
- Policy Driven Goups
- Case Study
- Conclusion

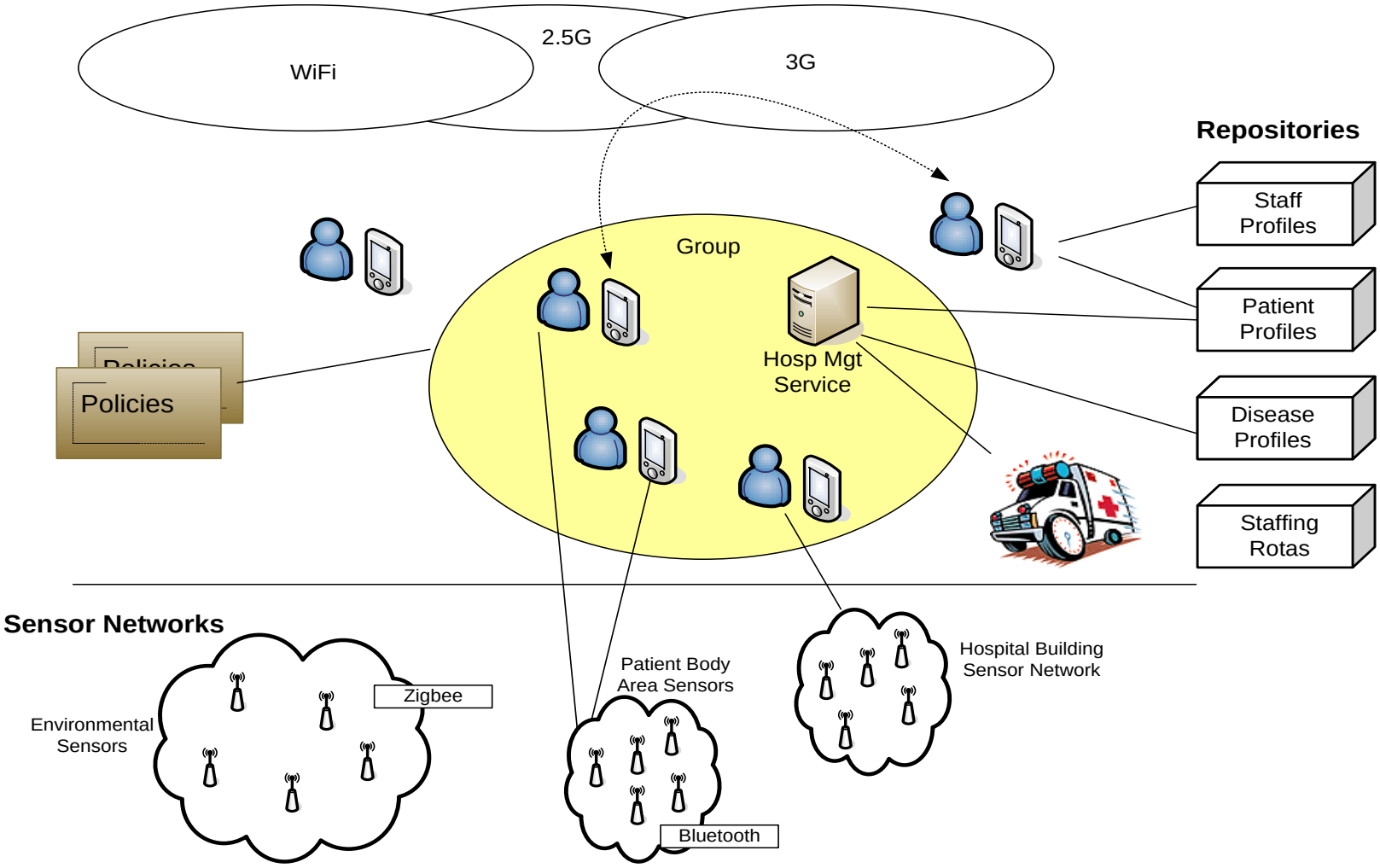
Introduction

- BANs produce critical data
- This paper looks to how this data can be harnessed
- Applied through a middleware (developed in the MORE project)
- SOA based middleware
- With a focus on service grouping and the management of these groups
- With the aid of policy based approach
- Objective: create services and service groups to support various types of BANs

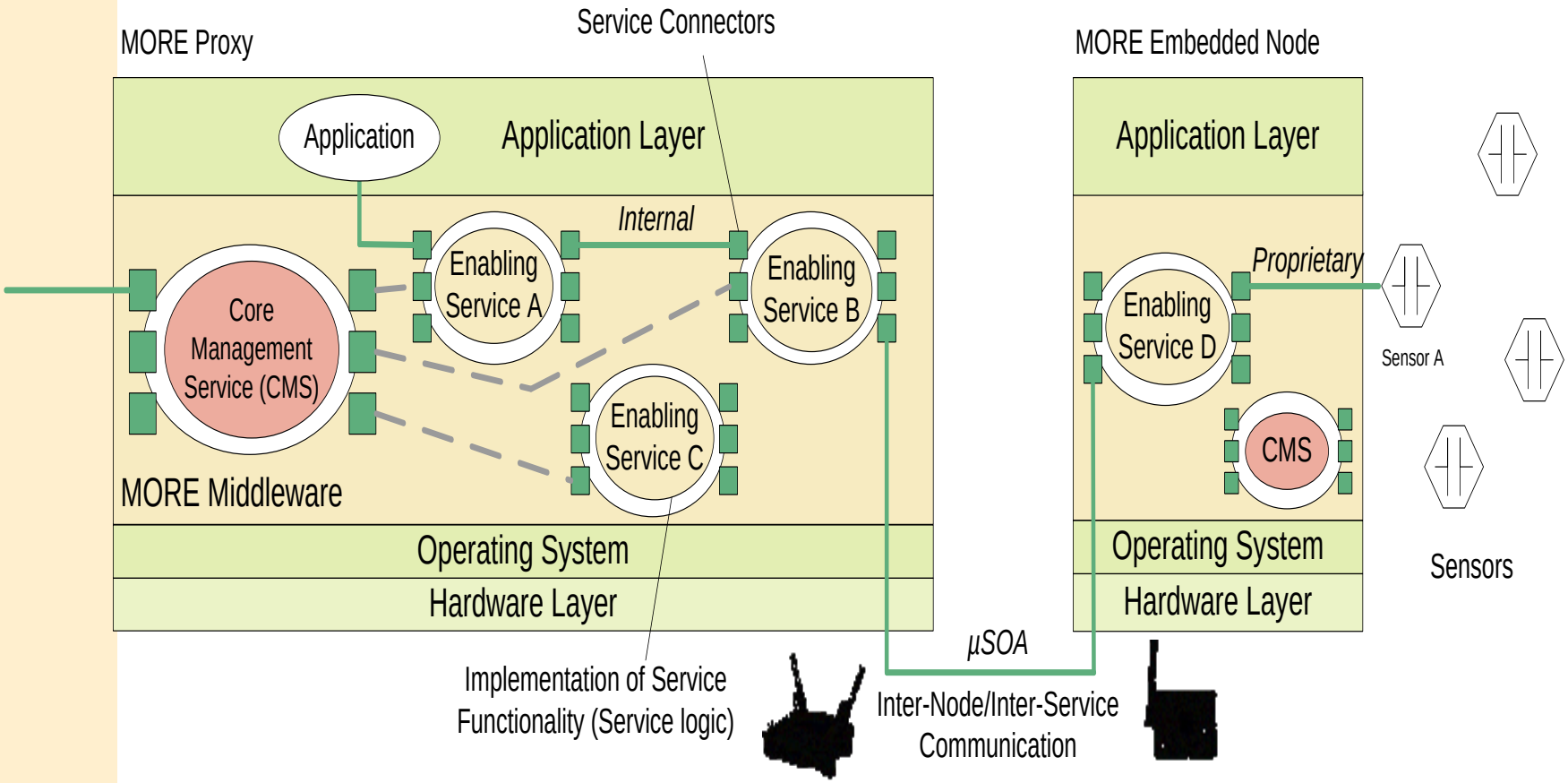
Related Work

- (Upkar Varshney) - discusses the vision of pervasive healthcare through wireless technology and the associating research challenges
- (E. Lupu et al) AMUSE project: looked at the adaptation of policies to implementing pervasive healthcare
- (Feng Wang et al) - Services and Policies for Care at Home
- (Tao Gu et al) - A service-orientated middleware for building context-aware services
- Web Services Policy 1.5 Framework W3C Recommendation 04 – provides functional assurances of services

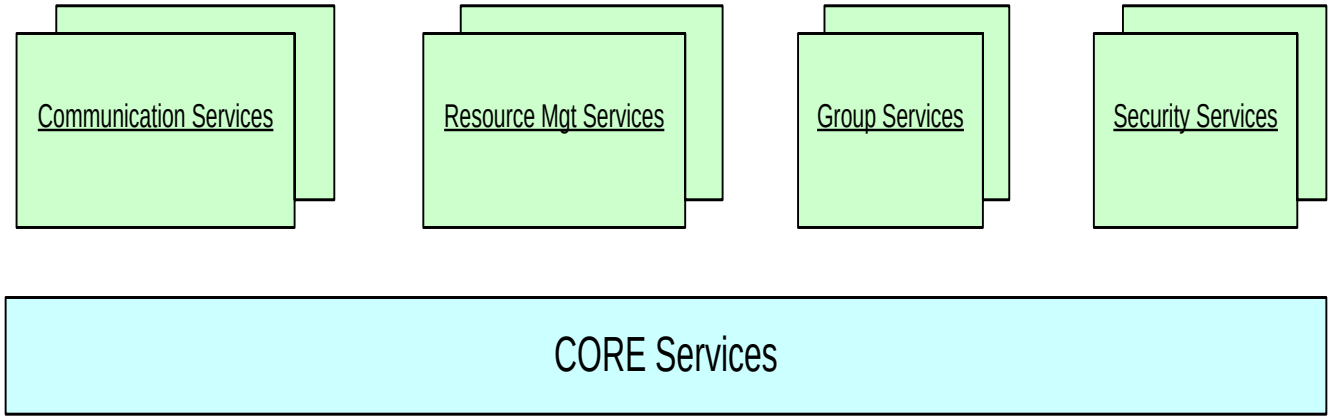
Architecture, System View



Detailed Architecture



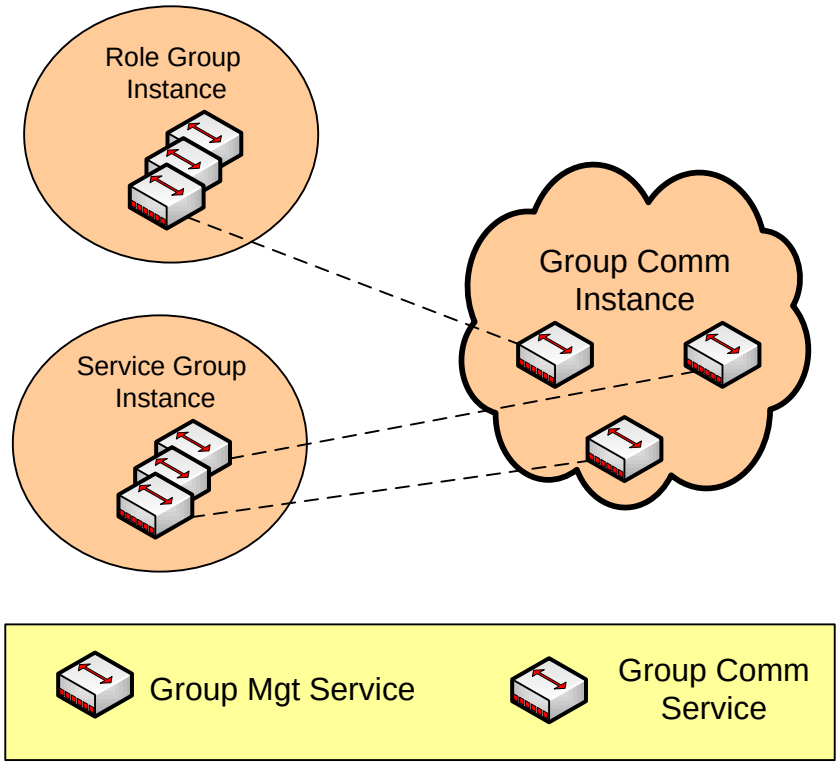
MORE IST Project



- 2 End User Scenarios – Remote health management, mitigation management in the Environmental domain
- Validation of experimental system by real end users
- Fusion of sensors and Web Services

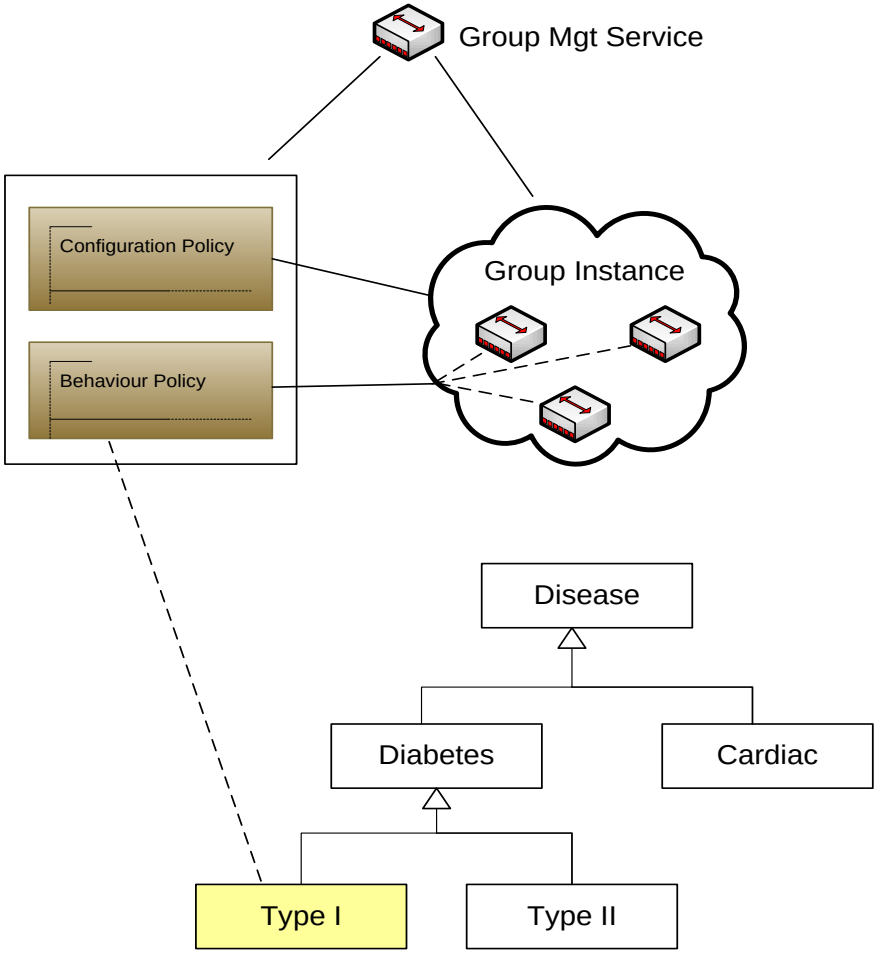
Group Types & Group Utility Services

- Group Types
  - Role Group
  - Service Group
  - Communication Group
- Group Utility Services
  - Group Management Service
  - Group Communication Service



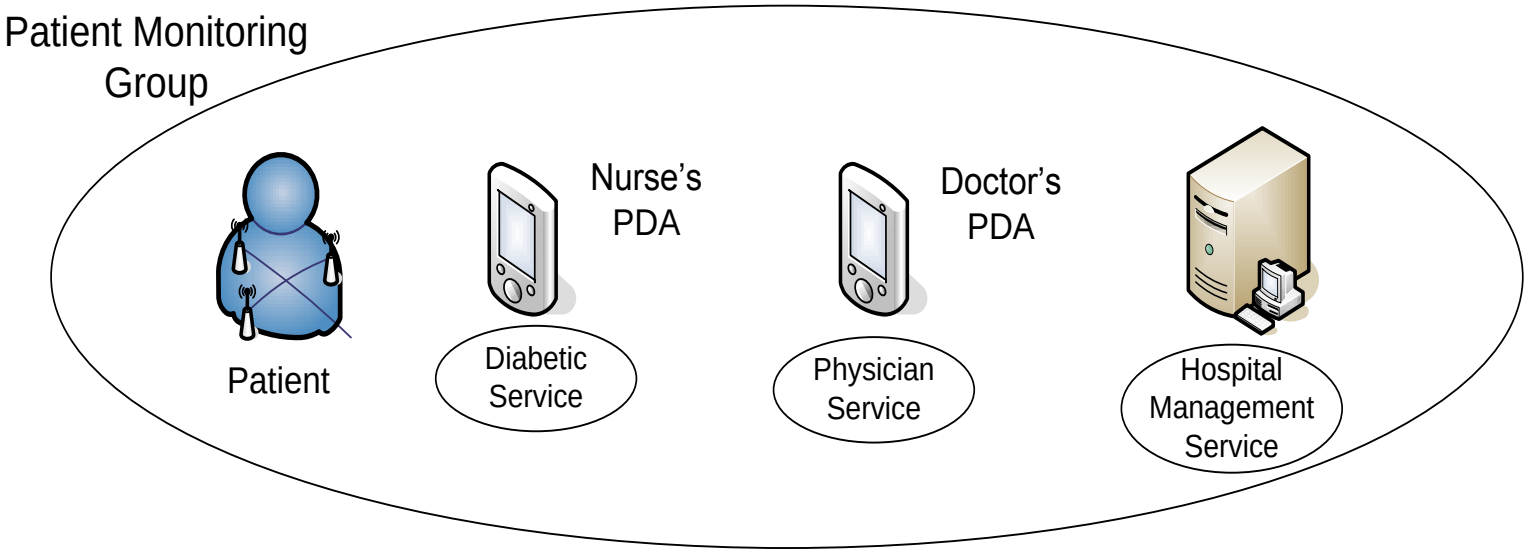
MORE – Policy controlled Groups

- Based on PBNM approach to management of network entities
- Group initialization and management controlled by policies
- Policy Components
  - Events
  - Conditions
  - Actions
  - PolicyRule -> {Events, Conditions, Actions}



Case Study – Acute Health Care

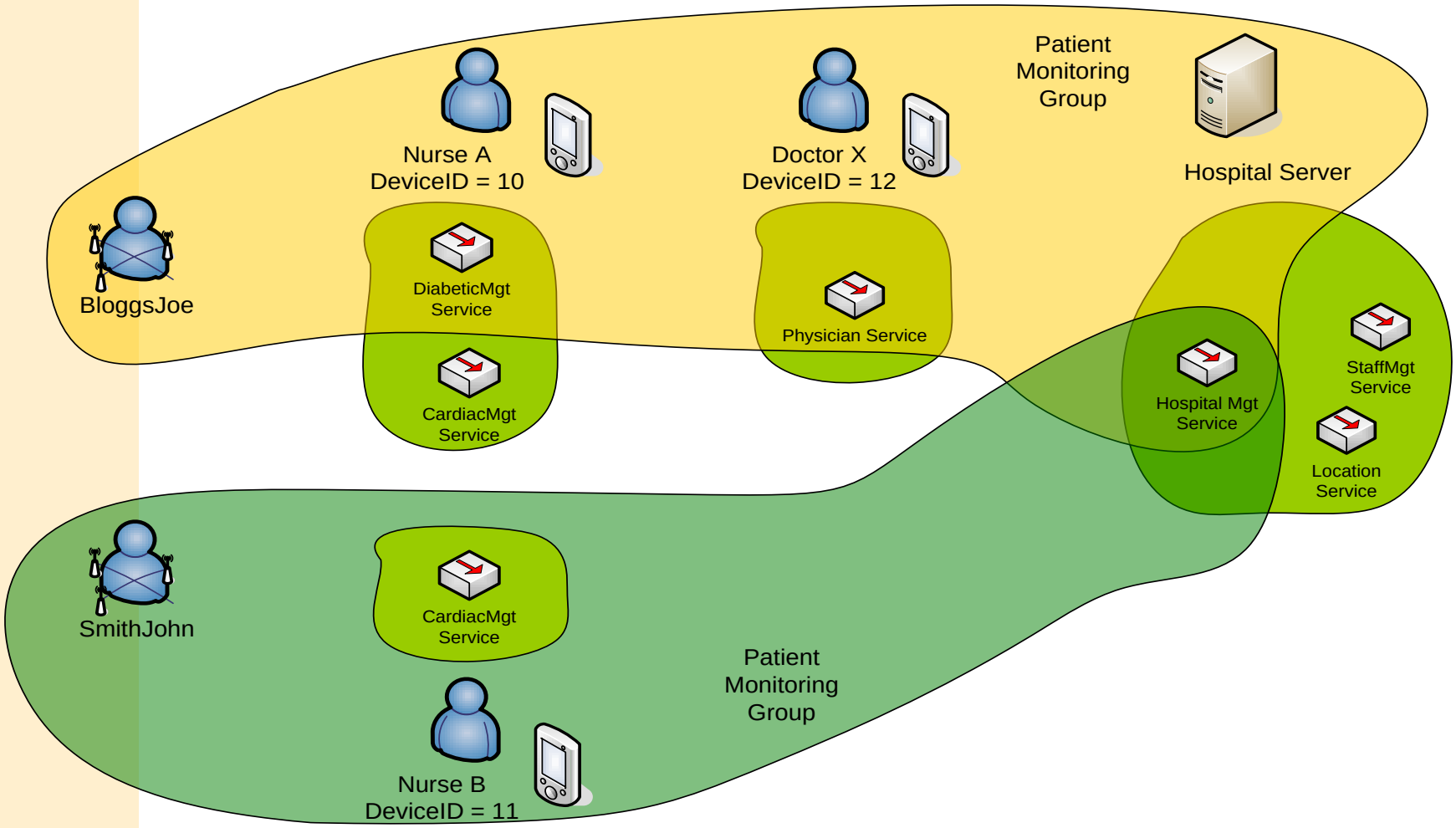
- Group Establishment
- Emergency Detection and resulting Group Reconfiguration



Case Study – Group Establishment

PolicyRule:
{
CommonName ”PatientMonitoringGroupSetup”,
Events
createGroup,
Conditions
MandatoryMember1 – Is member of DocotorsOnSite && Is Diabetologist && Is NotInSurgery
MandatoryMember2 – Is member of NursesOnSite && not high Patient Allocation
MandatoryMember3 - HospitalMgtService
Actions
initializeGroup
}

Case Study – Group Establishment



Case Study – Group Behaviour Policy (SmithJohn)

PolicyRule:
{
PolicyEvent:
{CommonName ”ECGMeasurement”, ParameterList ”PatientIdentifier”, ”ECG-Value”}
PolicyCondition:
{CommonName ”ECGHighPriority”, If ECG-Value is InDangerousRange}
PolicyCondition:
{CommonName ”hasMemberDoctor”, If Member == Doctor}
PolicyCondition:
{CommonName ”memberTypeNurse”, If Member == Nurse}
PolicyAction:
{CommonName ”sendHighPriorityAlarm”, TriggerMsg ”SendNotifToGroup” Params ”HIGH”, ”ECG values at dangerous levels”}
PolicyAction:
{CommonName ”addMemberToGroup”, TriggerMsg ”addMemberToGroup” Params ”{MemberType, Docotor}”, {BaseSelectionOn, {DoctorType,Cardiac} & {Load, !Busy} & {Location,Closest}}

Case Study – Group Behaviour Policy ... Cntd

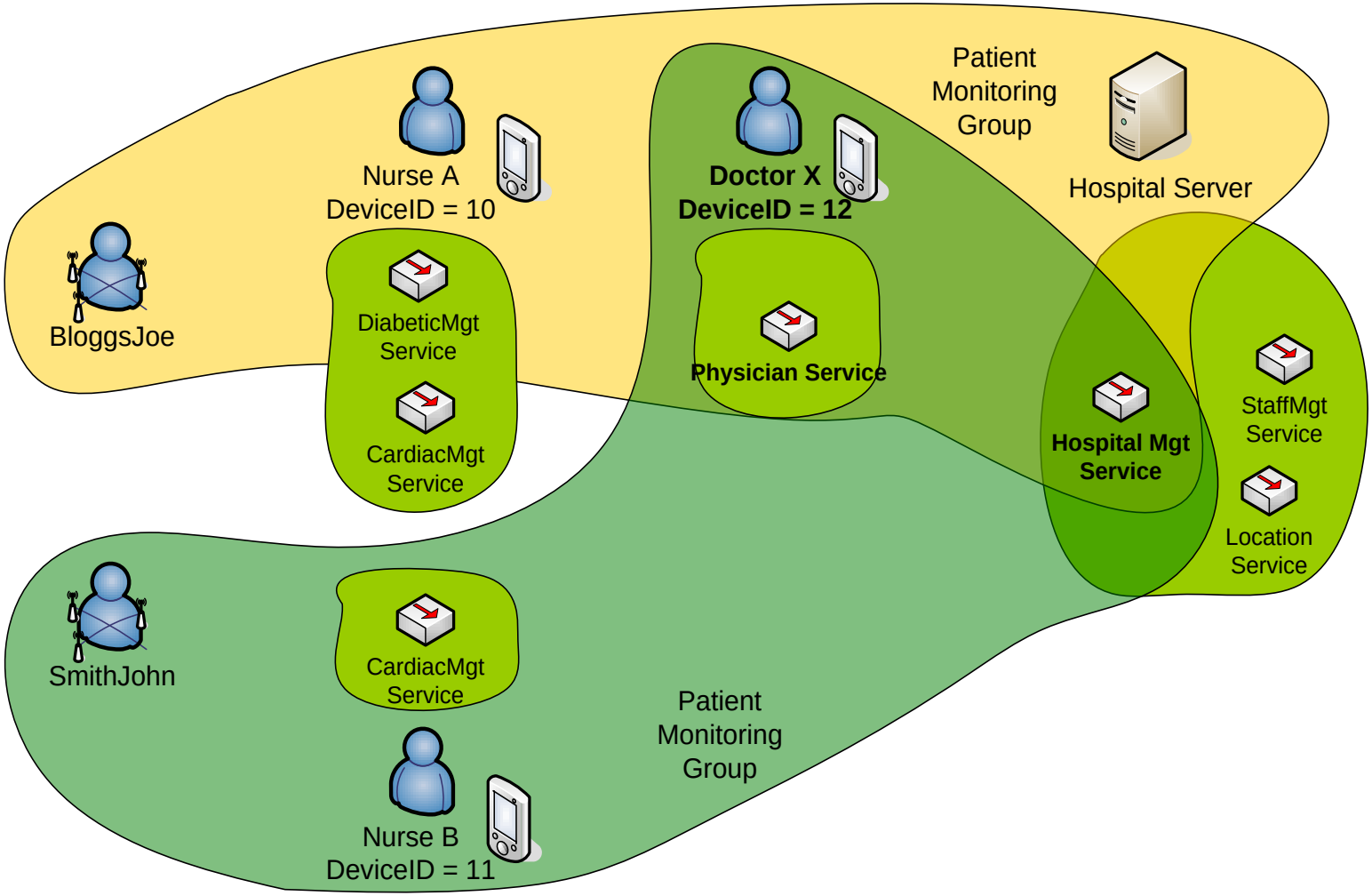
PolicyRule :
{ **CommonName** ”RULE-ECG-MEAS-ECGHIGH”,

Events
ECGMeasurementEvent

Conditions
ECGHighPriority && memberTypeNurse && !(hasMemberDoctor)

Actions
sendHighPriorityAlarm && addMemberToGroup}
}

Case Study – Reconfigured Group



Conclusion / Future Work

- Policy controlled service groups which add value to the data produced by the BANs.
- Adaptable and reconfiguration of the groups which can aid efficiency with a pervasive healthcare environment.
- Objective: support efficient monitoring and usage of BANs,
  - e.g home care monitoring
  - e.g. emergency disaster situation

Future Work

- Investigating a lightweight inference engine for policy processing

Questions ??

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