How to extend an Traditional Medical Process Modeling

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<Abstract>

- *In this paper, the traditional medical engineering focused on the Medical Process Modeling, which is modeled with two ways such as Activity Centric Approach and Artifact Centric Approach. Most of medical systems focus on Disease Centric Medical Process. There are also difficult to develop and manage an efficient medical system. To solve this problem, we suggest to map medical process modeling with business process framework, which consists of five layers based on a closed architecture.*

I. Research Motivation

Problem

- Disadvantages of Traditional medical process model : Activity Centric Approach
  - Result IN, have Cure process & Patient's Data
  - The Relation is lacking, While running the data and process

- Traditional medical process
  - Traditional medical engineering focus on medical process modeling.
  - Modeling is divided into Activity Centric Approach and Artifact Centric Approach

=> It is difficult that is developed Effective Medical Support System.

The proposed method

❖ **We proposed patient centric Medical process**

- **Traditional business process framework[seochaeyun2011] + medical process modeling**
- **Method of patient centric is better than traditional disease centric system**
- **Developing Support system is better than medical decision system**
- **One of Medical Business Process proposed Especially Medical Service Modeling Method**

Ⅱ. Related Work – Business Process Framework

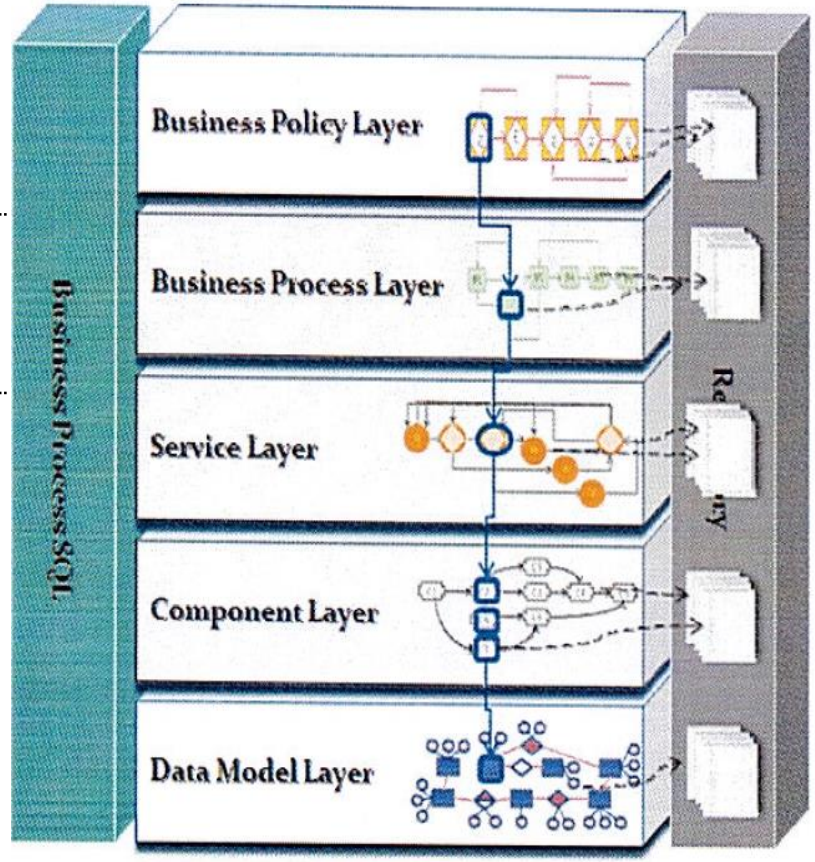
1) Business Policy Layer: Contents are rule, role, policy

2) Business Process Layer: business process

3) Service Layer:
Execution level make the several components

4) Component Layer: Implementation level is concept of dynamic workflow

5) Data Model Layer: store in physical layer

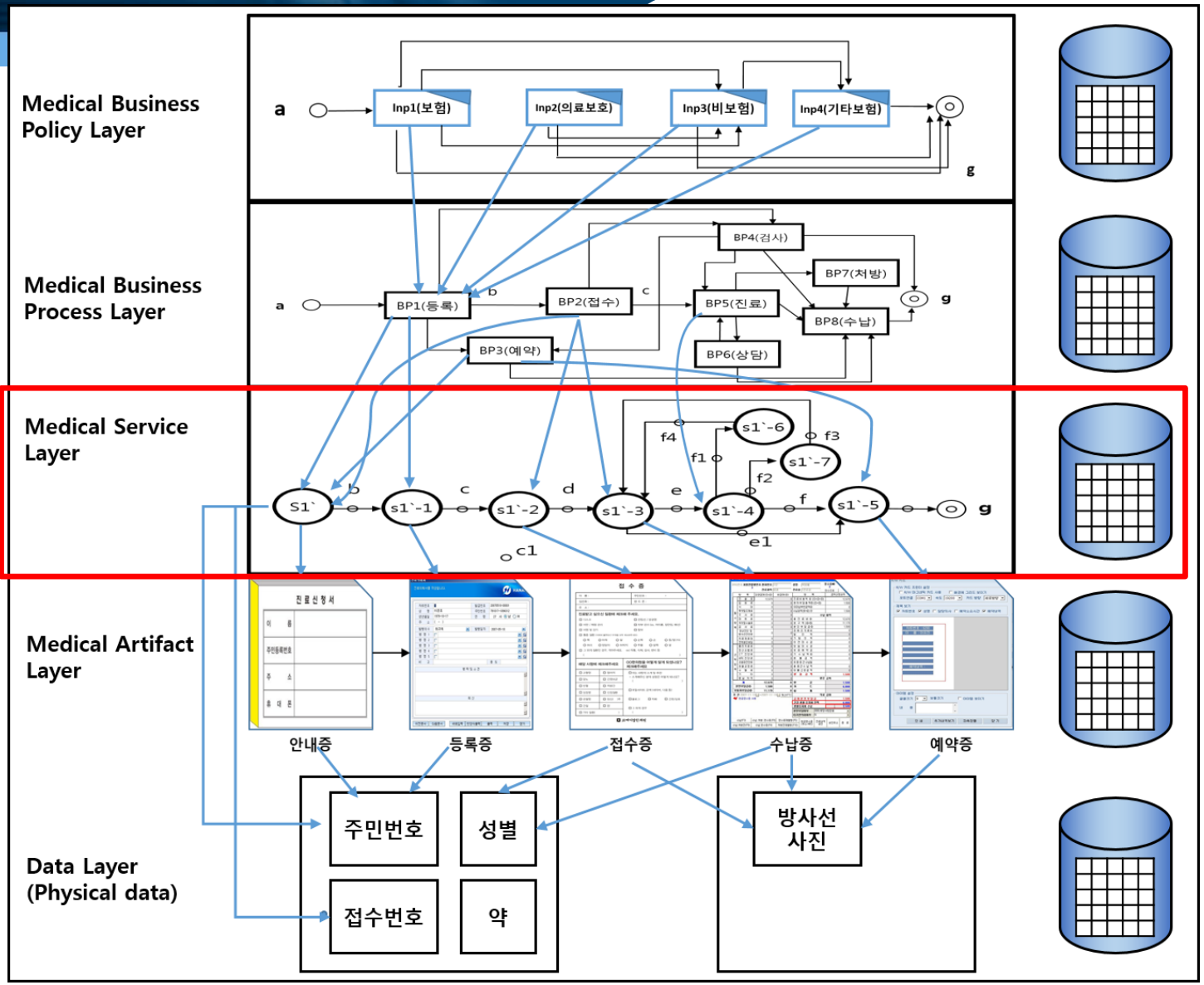


<Business Process Framework 5-Layer>

Ⅲ. Medical Business Process Framework

Medical Service Layer Modeling

1) Notation
2) Service Type
3) Condition Type



Ⅲ. Medical Business Process Framework

❖ Medical Business Process Framework

- Business policy
- insurance policy
- Each process in accordance with this rule is to influence, the process carried out in accordance with the rule

❖ Traditional Medical Process

- The purpose of treating a particular disease being focus on Activity & Artifact centric
- Based on Business Process
- BUT, It is focused on a specific disease
  - **Not interworking between process layer and data layer**
- If there is a patient with multiple disease, Each go through a different process

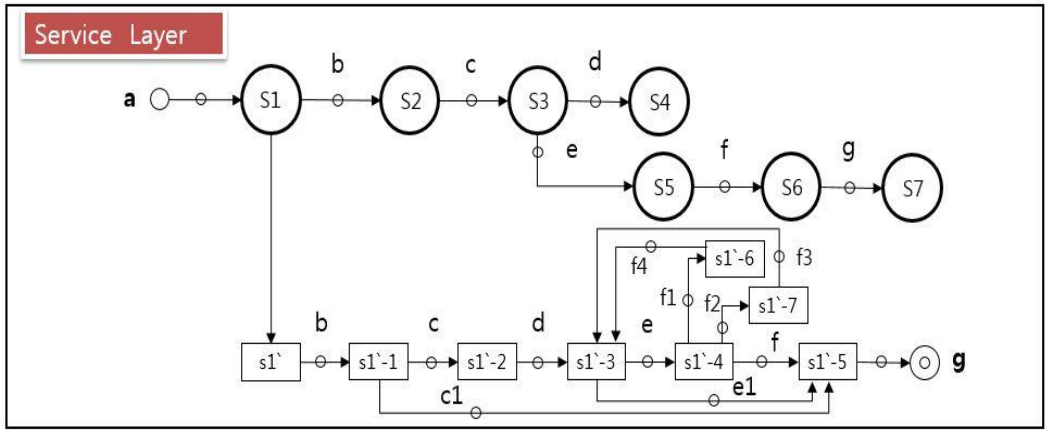
❖ To Solving, proposed "***Patient Centric Medical Process***"

- Patient Centric Medical Process make a Artifact of service according to Patient centric flow (ex: 예: prescription, Test results sheet ect…) Possible interworking between processes and data
- Confirming medical process and patient flow about Patient
- Patients in the treatment process and easy data management

Ⅲ. Medical Business Process Framework – Service Layer

Medical Service Layer

- Service: Multiple Artifacts make service, services make business process
  - Being name and descriptions, include of datas
  - Execution under medical business process
- Medical Service Layer Rule
  - It can be separated from the new service according to the service type
  - Create new service
  - Communication is possible with each of the services through the service interface



< **Medical Business Service Layer의 예** >

ex)
① A certificate issued by a registered patient is moving (s9) and prescription (s10) in the treatment process (s8) and undergo a medical examination.
② According to the medical type and also return back to multiple services

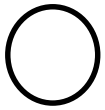
Ⅲ. Medical Business Process Framework

– Modeling Notation

type	notation	description	
service		A number of service/ A small unit that carried out within each process	Patient Registration(s1), reservation, Admission(s2)
			Patient Care(s3), Accrued management(s4)
			insurance(s5), Claim(s6)
			cut(s7)
Initial state		Start service	
flow		Flow direction	
End state		End service	

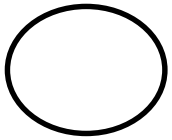
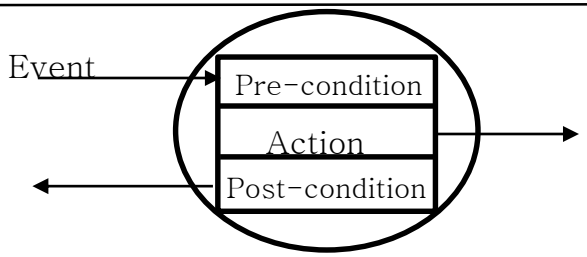
Ⅲ. Medical Business Process Framework

– Modeling Notation

구분	표기	설명	
policy		insurance policy	Insurance
			Health care
			Uninsured
			Other Insurance
process		Steps performed for a Goal	
service		Unit is performed in each process	
artifact		Artifact generated according to the movement type of the patient	
data		Stored data	

Ⅲ. Medical Business Process Framework

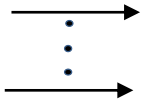
– Service Layer Notation

service notation	service structure
notation 	

ECA rule : When an **event** occurs, **check the condition**, if satisfied the **Condition**, execution the **Action**

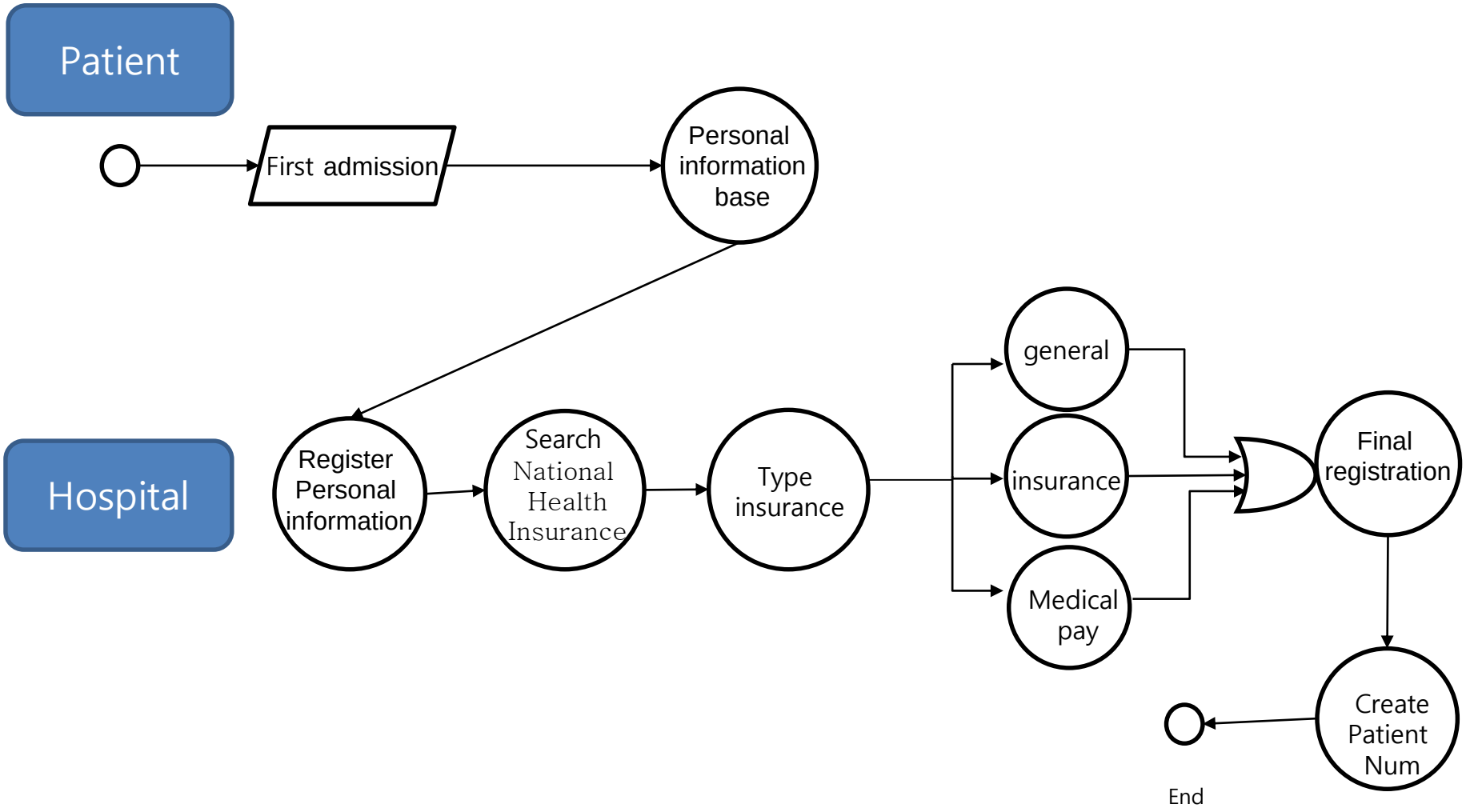
ECA form: On Event If Condition Do Action

ii) Condition

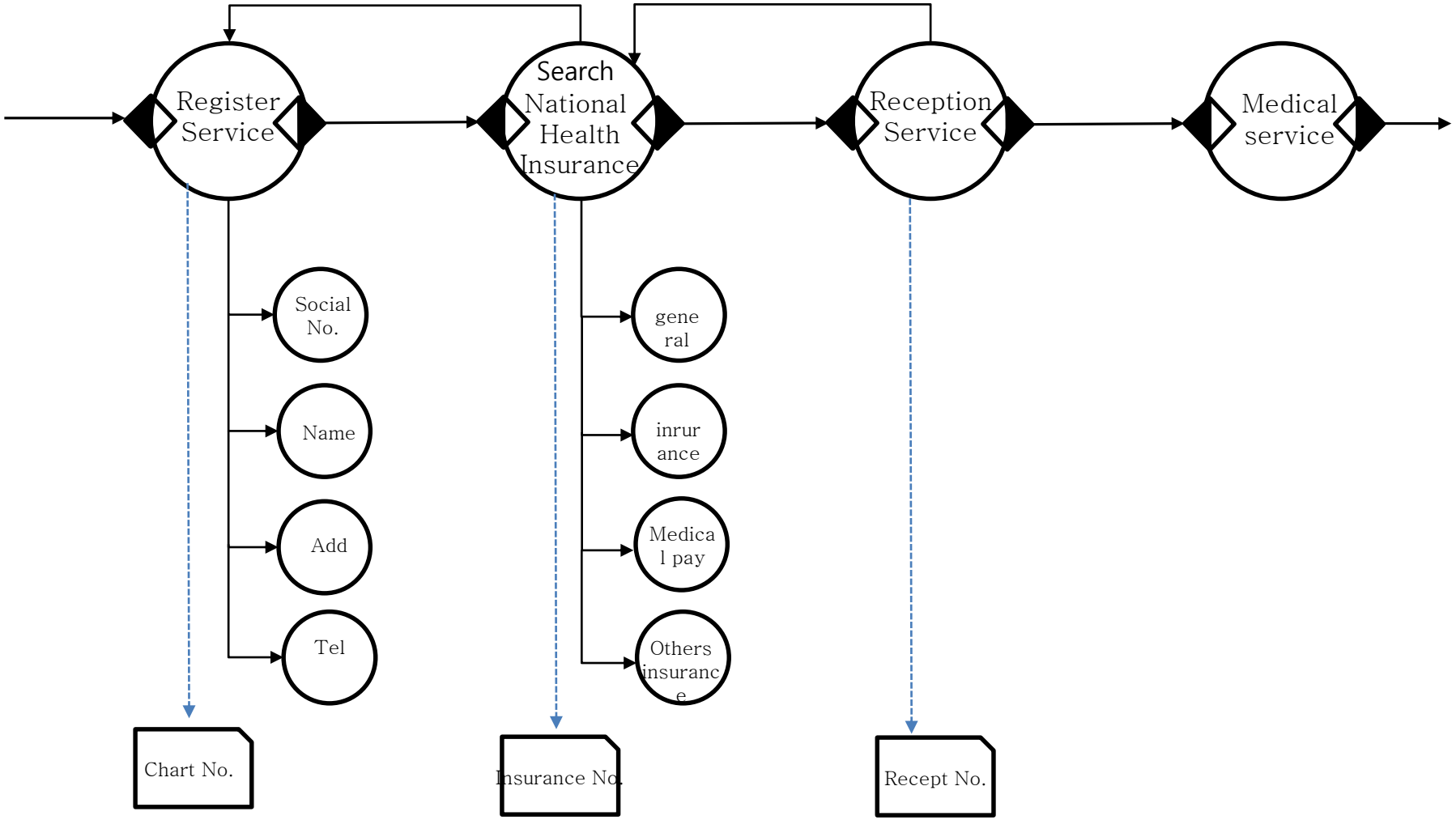
Simple condition		Composite condition
simple condition 	Pre-condition 	AND  OR  CONCURRENT 
(Default OR Null)	Post-condition 	AND  OR  CONCURRENT 
Flow		

- Medical service is a notation Simple Condition & Composite Condition
- When the service process to services, moving the service according to the decision of the condition

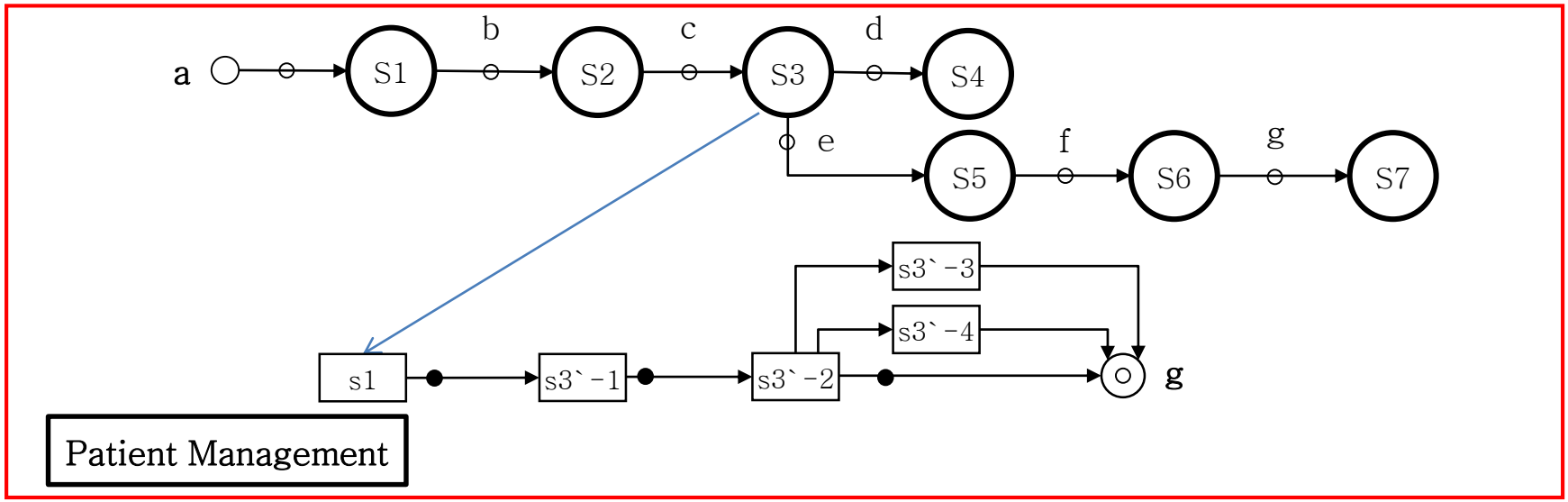
IV. Case Study – (2)



IV. Case Study – (3)



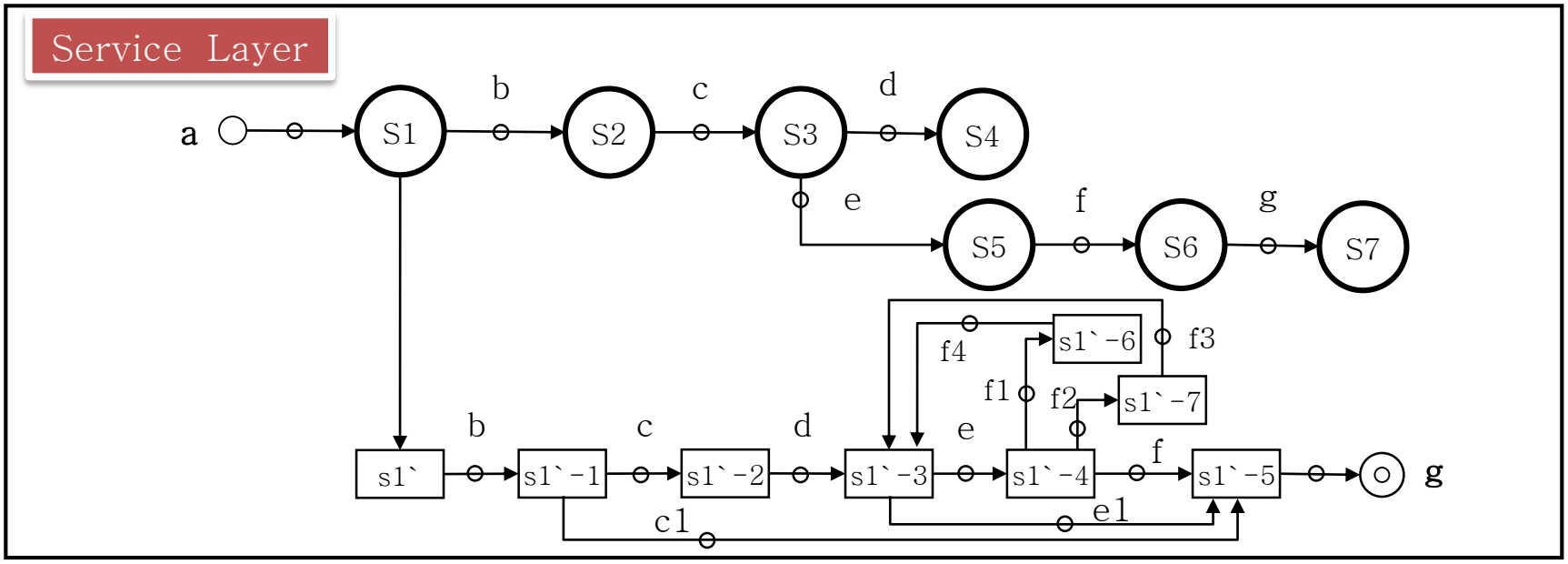
IV. Case Study – (8)



Service

1. s1: register
2. s3`-1: search
3. s3`-2: total
4. s3`-3: excel
5. s3`-4: print
6. g: end

Medical Patient Management Service(BP1-s3)



Service

1. a: Bp1
2. S1: patient register
3. S2: reserve/Admission
4. S3: patient Manage
5. S4: Accrued Manage
6. S5: Insurance process
7. S6: Billing Manage
8 .S7: Cut Manage

1. s1`: Information S
2. s1`-1: Register S
3. s1`-2: reception S
4. s1`-3: acceptance S
5. s1`-4: treat S
6. s1`-5: Reserve S
7. s1`-6: Prescription S
8. s1`-7: X-ray S

States

a: initial state

b: information accepted

c: registration accepted

c1: returning patients

d: reception accepted

e: acceptancy completed

e1: returning patients

f: medical care completed

f1: prescription accepted

f2: take an X-ray accepted

f3: returning acceptancy

f4: returning acceptancy

g: completed

Actors

Patient person- a

Reception Dept - b , c

a hospital administration - f

Bursar - d

part - e

Medical Patient registration Service(BP1-s1)

V. Conclusion & Future Works

✓ Conclusion

- Suggested for Medical Business Process Framework (Medical Service Layer Modeling)
  - Artifact Centric Approach is modeled flow a patient centric using a artifact of patient centric
  - Medical Process Framework mapping on Business Framework & Guard-Stage-Milestone(GSM)
  - **Medical Process Modeling**: result in create artifact of service accordance with the flow out of the patient-centered, Possible Interworking between processes and data
  - Therefore, it is possible to identify the medical treatment process, the flow to the patient.
  - Patients should expect to be an efficient development of the center of medical support system.

✓ Future Works

- **Modeling Another Layer Except of Medical Service Layer**
- **Development a Tool for Medical Service Layer Modeling**

Ⅳ. Q&A

THANK YOU!!