Aggregating, Operating, Sharing and Utilizing Internet-based Services with the VINCA Approach

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Issues Addressed

(1) Abstraction, Modeling, Virtualization of Services

Effects

Models

(2) Service Communities: Partitioning the Cyberspace with the Community Mechanism / Basis for Service Monitoring and Dependability Assurance; Third-party Operation and Optimization

(3) User Involvement and Human-Machine Synergy; User-end Control and Privacy Protection: Upgrading EAI systems with Cloud Services; Cloud BPM

(4) Rationale of the VINCA Approach;
The Software Suite (incl. Demos);
Application Potentials

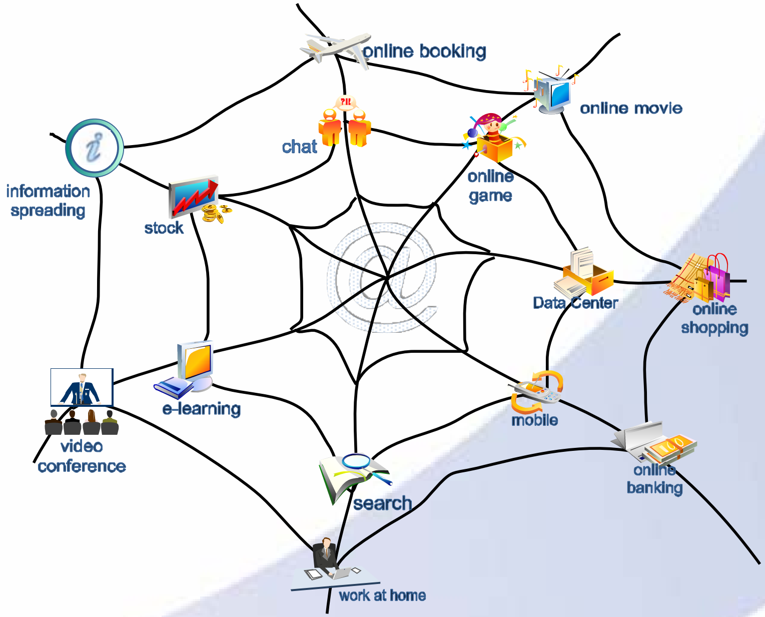
The Internet → A Cyberspace for Problem-solving

networked computers → networked documents → networked services

- biggest information reservoir
- emergence of a huge platform for cooperative computing
- sharp increase of programmable resources (WS, OpenAPI…)

www. fsbd. com. cn

social infrastructure for human interaction and collaboration


online booking
online movie
chat
online game
information spreading
stock
Data Center
online shopping
e-learning
video conference
mobile
online banking
search
work at home

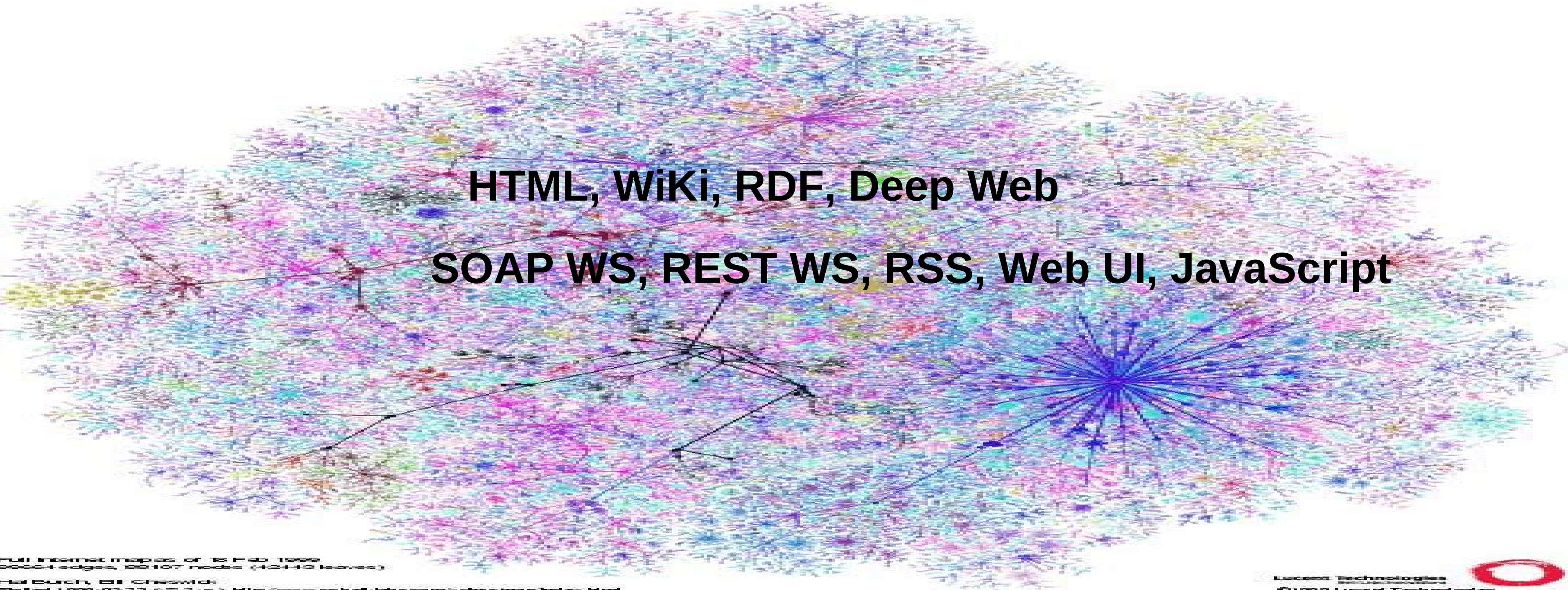
Internet of services

Software on the Internet: Some Observations

New principle of “good enough”

New challenges of dynamism, openness, uncertainty and human-machine synergy

New challenges of not-directly-interoperable/consistent programming models and programmable resources



HTML, WiKi, RDF, Deep Web

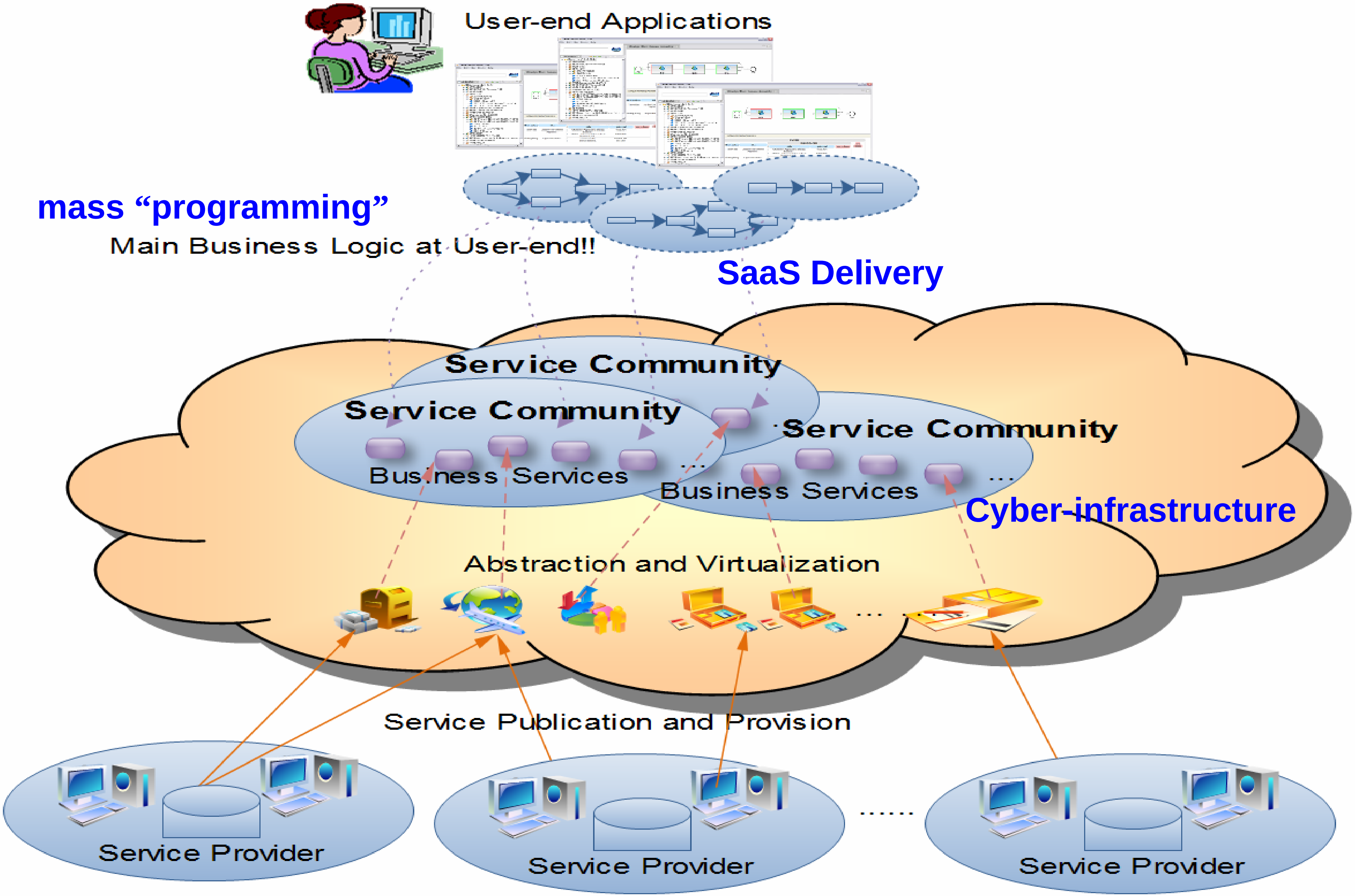
SOAP WS, REST WS, RSS, Web UI, JavaScript

＝》 Internet-scale Systems

- Internet Computing on the basis of “Internet is the computer’

- Internet-based distributed systems with Internet-based resources, computing models and algorithms, as well as models of service delivery and usage

Applications as a Virtual Organization (VO)



User-end Applications
Service Community
Service Community
Service Community
Business Services
Business Services
...
...
Abstraction and Virtualization
... ...
Service Publication and Provision
Service Provider
Service Provider
......
Service Provider

mass "programming"

Main Business Logic at User-end!!

SaaS Delivery

Cyber-infrastructure

A fundamental problem：

Transforming
Internet-based Collections of Imperfect Resources
to
Non-trivial, Definite, Dependable and QoS-competitive Services

The Internet, the Web and Internet-based distributed systems have brought up challenges and make our (IT people) lives different (and harder if we don’t change)。。。

However, we ‘professionals’ deliver applications (still) on the following basis:

- Implicit assumption: we program computers with clear boundary
- We produce ad hoc, artificial structures and procedures, and turn to mimic our human society
- The most common mistake: try to solve problems with means of same complexity
- Fundamental elements：structure and relationship、models、algorithms
- Basic means：establishing abstractions；divide-and-conquer
- Major Concerns: constraints, limitation, computability, complexity

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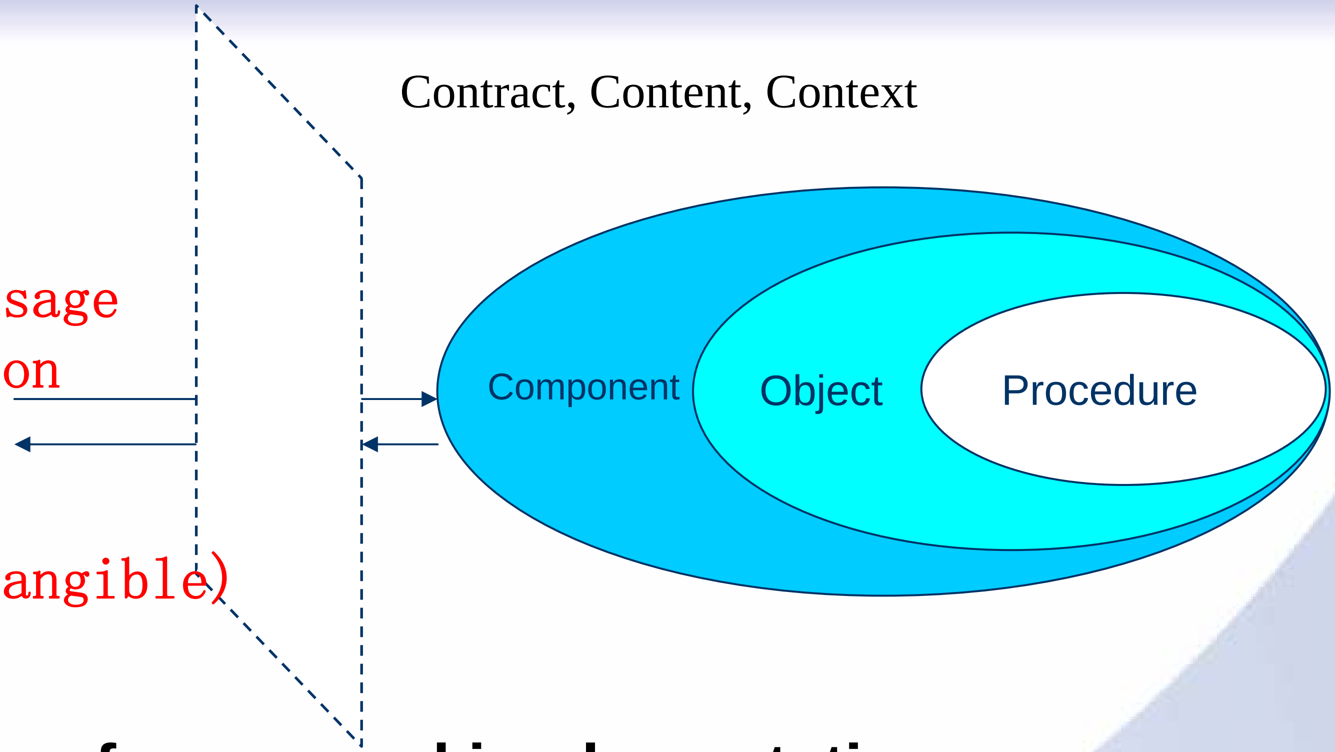
We need to:

- Support application integration in a loosely-coupled way
- Support open, dynamic formation of VO
- Support flexible annexation and association of Internet-based resources
- Optimize the value chain of software production, operation and maintenance (third-party operation in particular)
- Enable end-users involvement in information integration and business process execution

Services become first-class entities

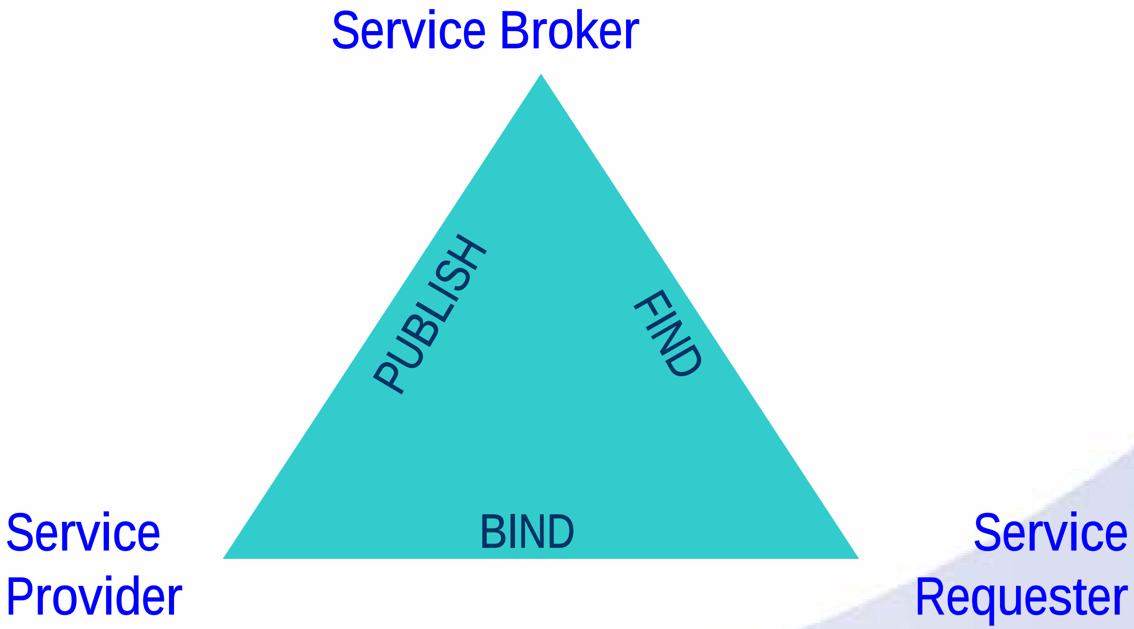
A service＝ usage and interaction patterns
＋
a set of (intangible) actions


Contract, Content, Context
Component
Object
Procedure

- Separation of usage and implementation
- Separation of roles：provider, consumer and mediator
- Self-contained
- Discoverable

SOA(Service-Oriented Architecture) and Web Services Technology brought forth excitements

The programming model is publish-find-bind


Service Broker

PUBLISH

FIND

Service Provider

BIND

Service Requester

Annoying Issues behind the Nice Promises

Low-cost

High-efficiency

Value-added services

Uses of other’s commodity

Network effects

Devils behind:

Service quality

Uncertainty

Efficiency

Security

Transaction

Privacy

Engineering Approaches

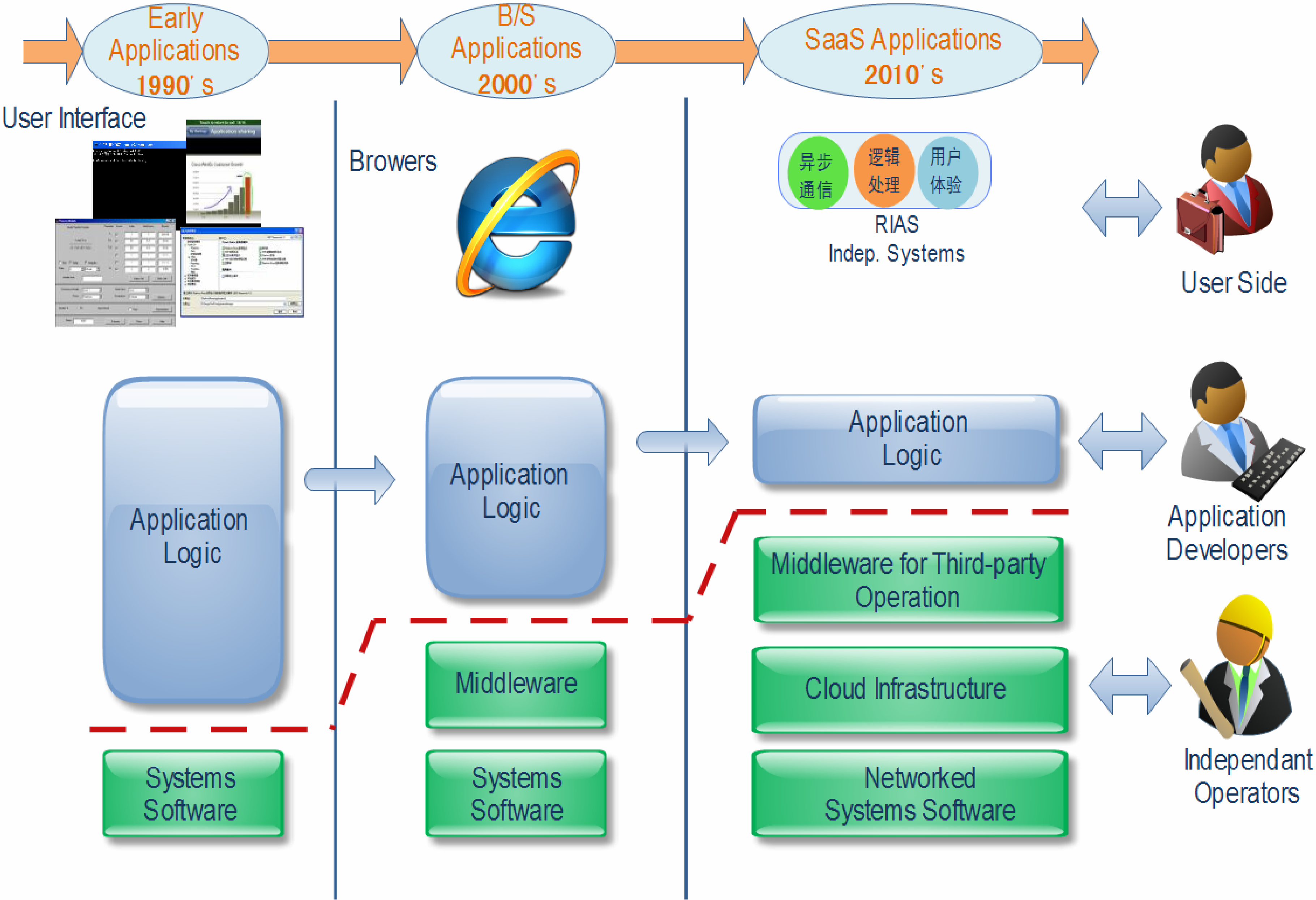
Usage Patterns

Operation and optimization

Some Lessons Learnt

1. Toy examples won’t help
2. Data does matter
3. The distance between prototypes and products is much longer than expected
4. There are always legacies
5. USPs are important for sustainability
6. Too broad coverage hinders progress
7. Ad-hoc approaches increase danger of failures
8. Right approach to standardization is a must
9. Automatic match-making isn’t universally applicable yet

Second Wave of Services Computing with the following Ongoing Transformation



Early Applications 1990’ s

B/S Applications 2000’ s

SaaS Applications 2010’ s

User Interface

Browers

异步通信

逻辑处理

用户体验

RIAS
Indep. Systems

User Side

Application Logic

Systems Software

Application Logic

Middleware

Systems Software

Application Logic

Middleware for Third-party Operation

Cloud Infrastructure

Networked Systems Software

Application Developers

Independant Operators

The VINCA Approach…

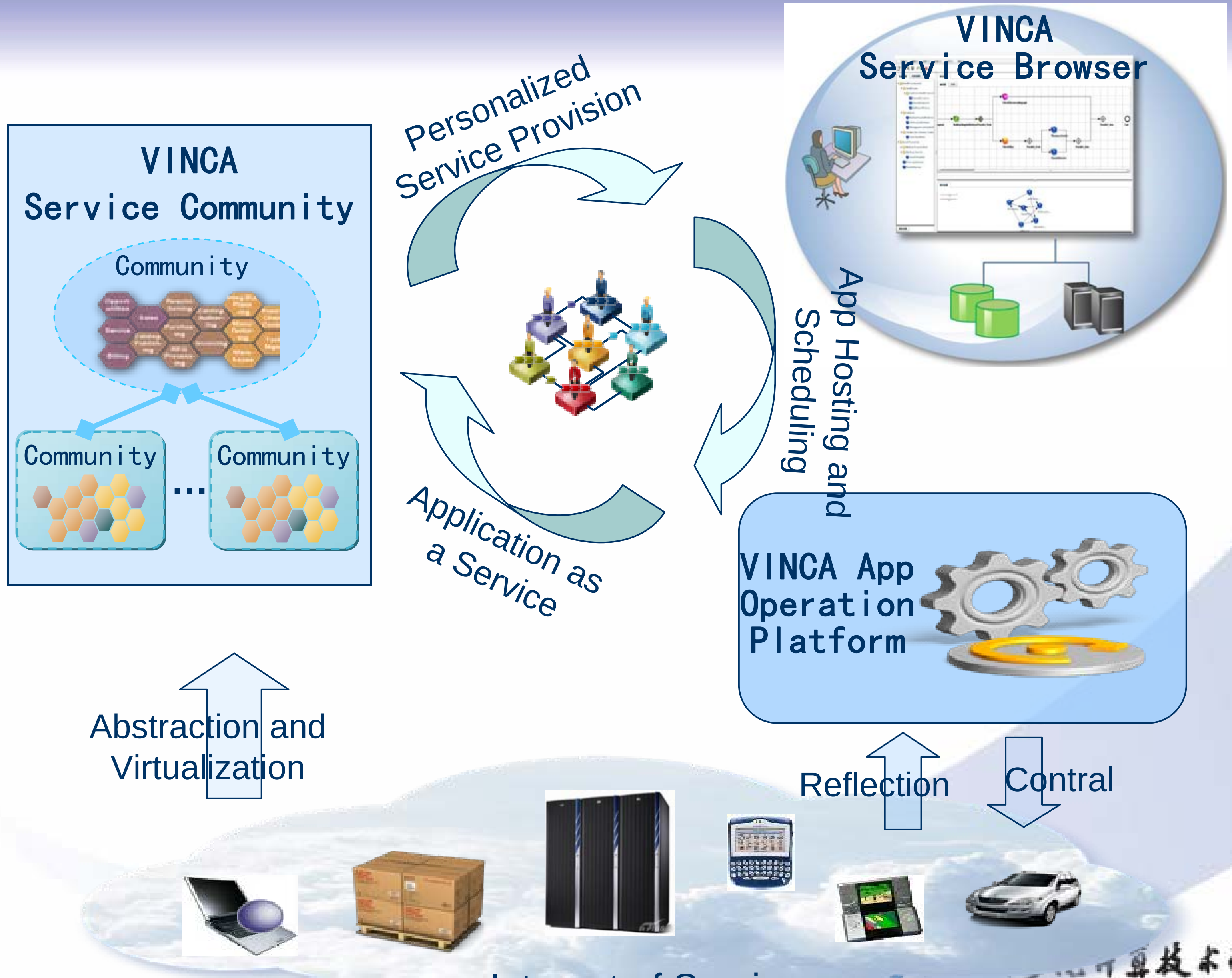
VINCA is an initiative and a brand of the Institute of Computing Technology, CAS.

The initiative was kicked-off in 2002 with the perspective of “business computing / business grid” to enable user-centric and business-oriented programming as well as collaborative EAI on the Internet

While focusing on EAI problems, we have received major funding on internet-based scientific exploration (eScience) and internet services for the mass (Users as Contributors)

Recent support relates to SaaS/Cloud, aiming at optimizing the value chain of the Chinese IT industry and at reducing energy consumption

The VINCA Suite



VINCA Service Community

Community

Community … Community

Personalized Service Provision

VINCA Service Browser

App Hosting and Scheduling

VINCA App Operation Platform

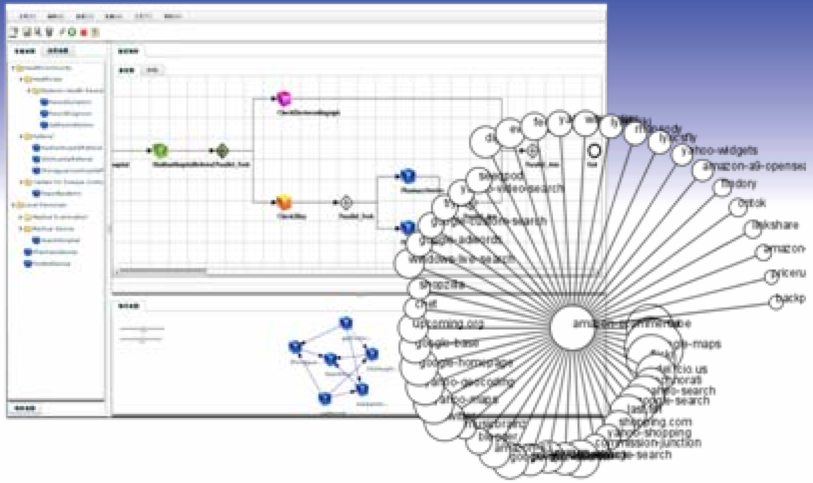
Application as a Service

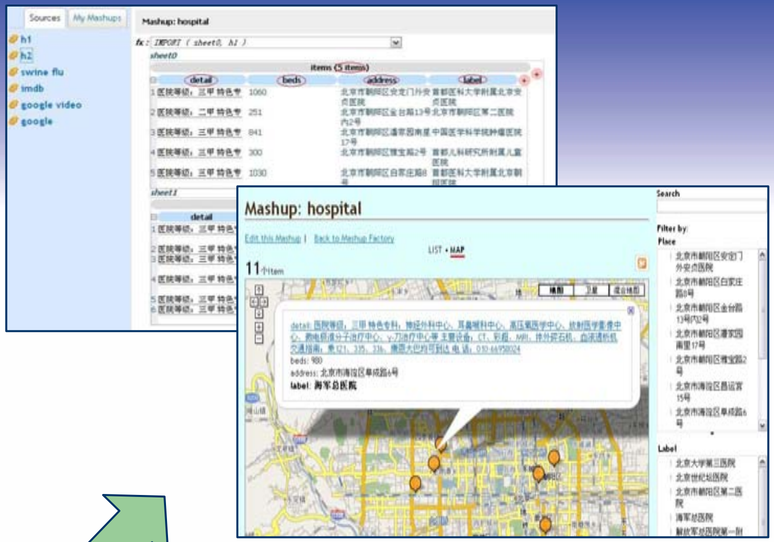
Abstraction and Virtualization

Reflection

Contral

Internet of Services




Sources
My Mashups
Mashup: hospital
h1
h2
swine flu
imdb
google video
google
sheet0
sheet1
detail
beds
address
label
Mashup: hospital
Edit this Mashup
Back to Mashup Factory
LIST • MAP
Search
Filter by:
Place
Label

End-user Programming

Web Information Integration

VINCA Suite

Service Management

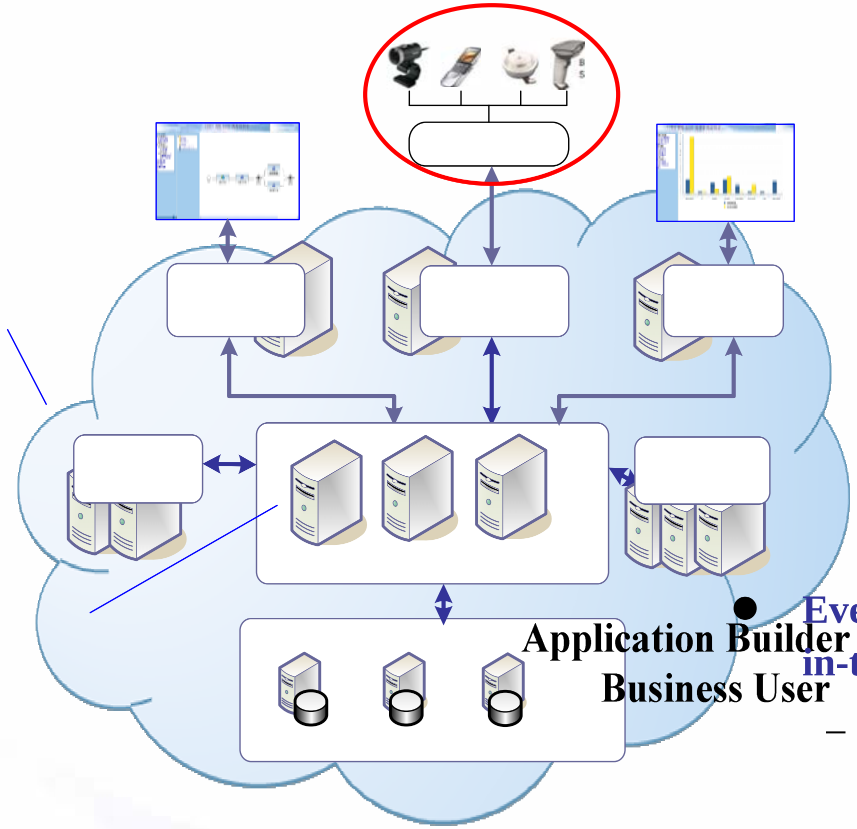
Hosting and monitoring

服务资产库系统
服务资产库系统

服务资产库系统
管理控制台：管理、监控
网格工作流门户

The VINCA Platform for Third-party Operation

A high-performance and high-availability hosting environment for event-driven business process applications which can cope with the various emergency and high concurrency demand in dynamic Internet or IOT applications.


Front End of IOT
Sensors
Application Builder for Business User
Management Cons
System Administ
Middleware for Sensors
Public Cloud or
Business User
Event-driven
VINCA

- **High-performance and High-availability Application Hosting Environment for Tenants**
  - Providing resources insulation and usage control mechanisms for different tenants;
  - Providing scalable engine cluster management technology with hot-swap workflow engines, and supporting dynamic business process scheduling;
  - Enabling dependable workflow enactment environment with engine-level exception handling mechanisms and cluster-level workflow rescheduling and backing out on healthy servers during others' downtime.
- **Event-driven Collaborative Application Building and Just-in-time Enactment**
  - Turning a general deployed business process into a proactive event-aware application in several minutes;
  - Integrated with RFID middleware, supporting rule based event-driven application execution;

Service Abstraction and Virtualization

With VINCA Business Service Model

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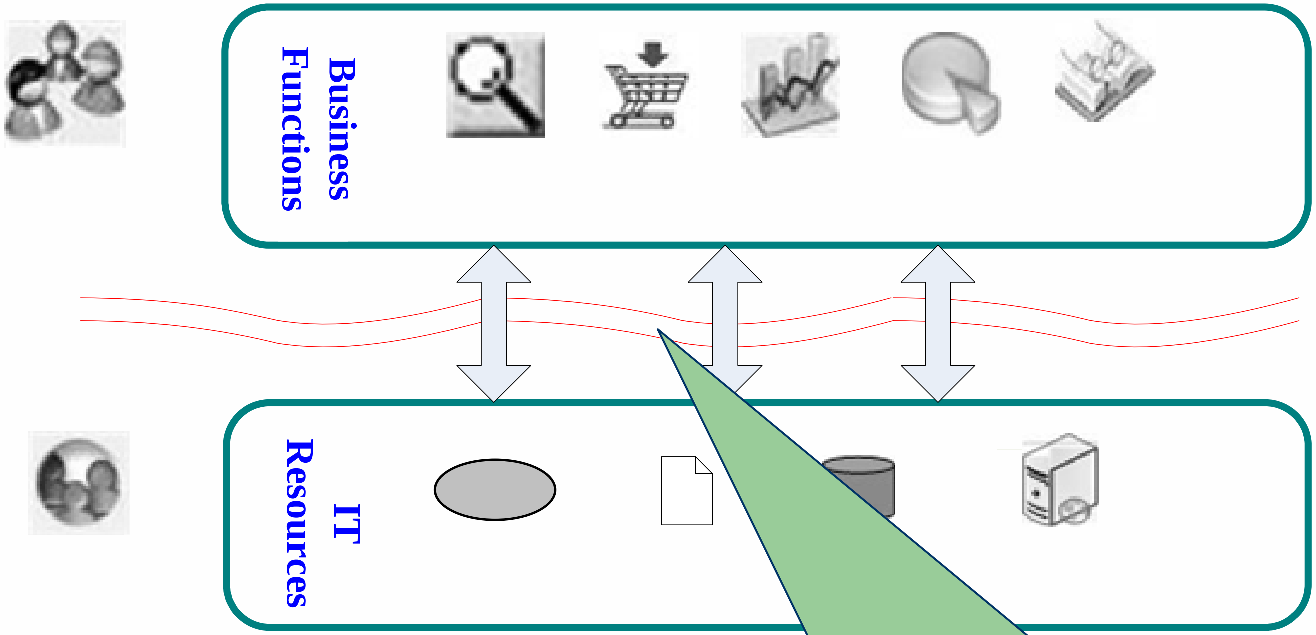
Gap between Problem Space & Solution Space



Dynamic changes in specific business requirements

Dynamic changes in heterogeneous IT resources

End User

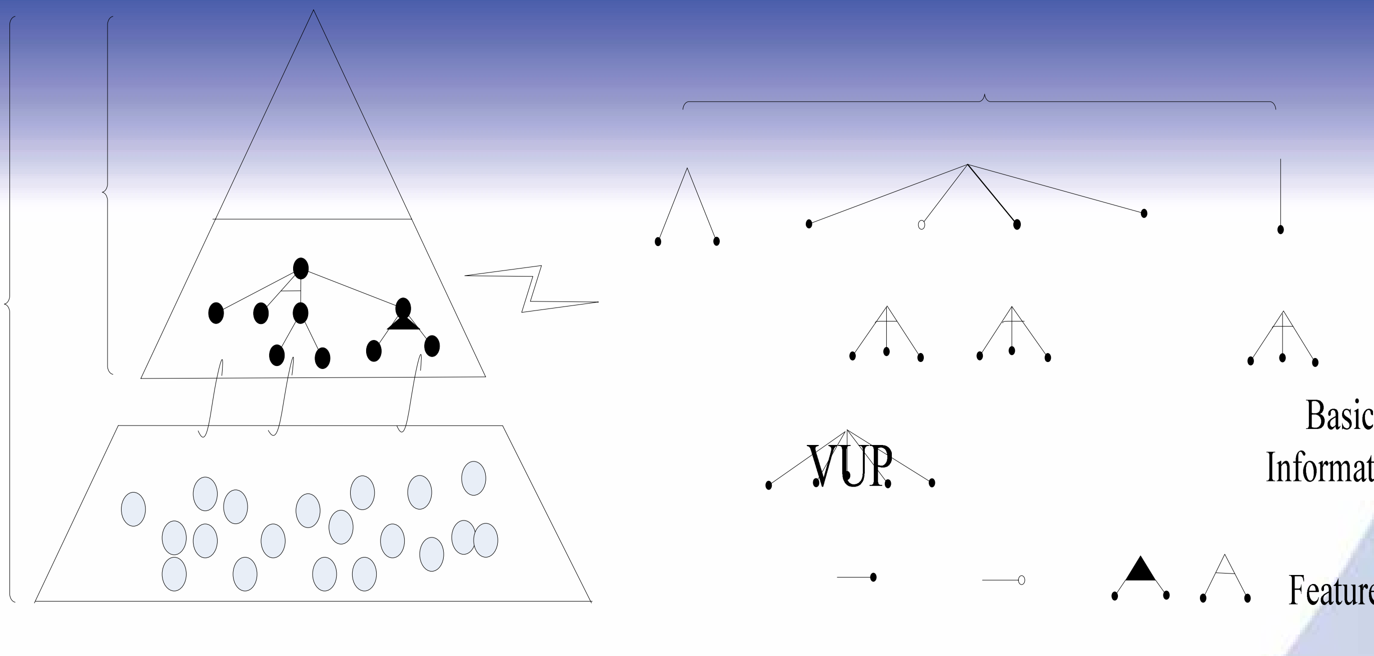
Shopping

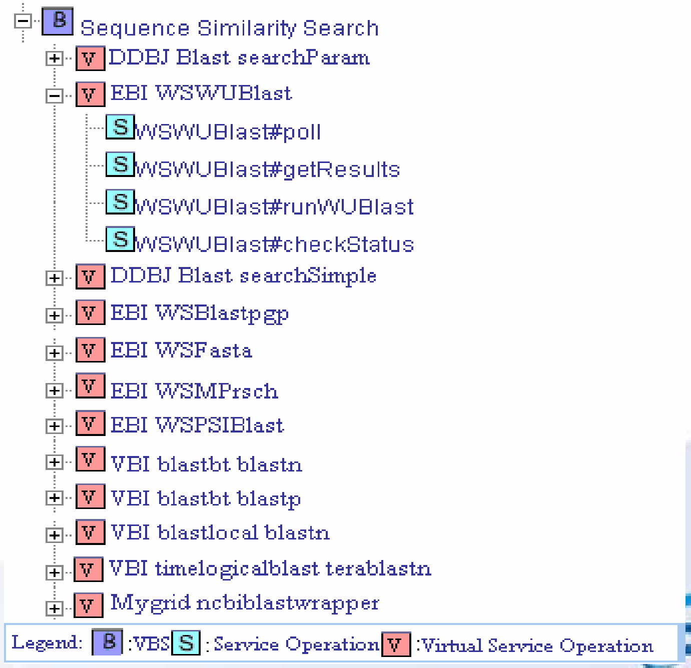
Business-IT Gap

How to bridge the gap of semantic, granularity incompatibility between business requirements and IT resources?

How to satisfy the dynamic business requirements on the fly?

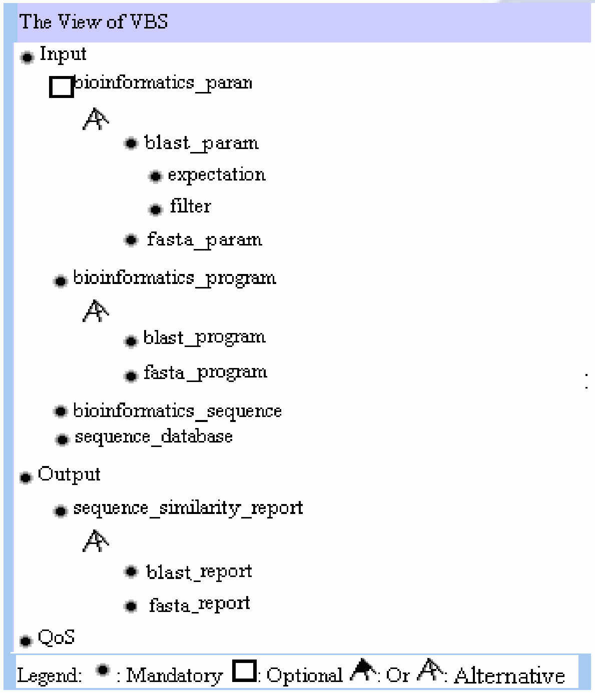
Business Service Modeling





- [B] Sequence Similarity Search
  - [V] DDBJ Blast searchParam
  - [V] EBI WSWUBlast
    - [S] WSWUBlast#poll
    - [S] WSWUBlast#getResults
    - [S] WSWUBlast#runWUBlast
    - [S] WSWUBlast#checkStatus
  - [V] DDBJ Blast searchSimple
  - [V] EBI WSBlastpgp
  - [V] EBI WSFasta
  - [V] EBI WSMPrsch
  - [V] EBI WSPSIBlast
  - [V] VBI blastbt blastn
  - [V] VBI blastbt blastp
  - [V] VBI blastlocal blastn
  - [V] VBI timelogicalblast terablastn
  - [V] Mygrid ncbiblastwrapper

Legend: [B] :VBS [S] : Service Operation [V] :Virtual Service Operation



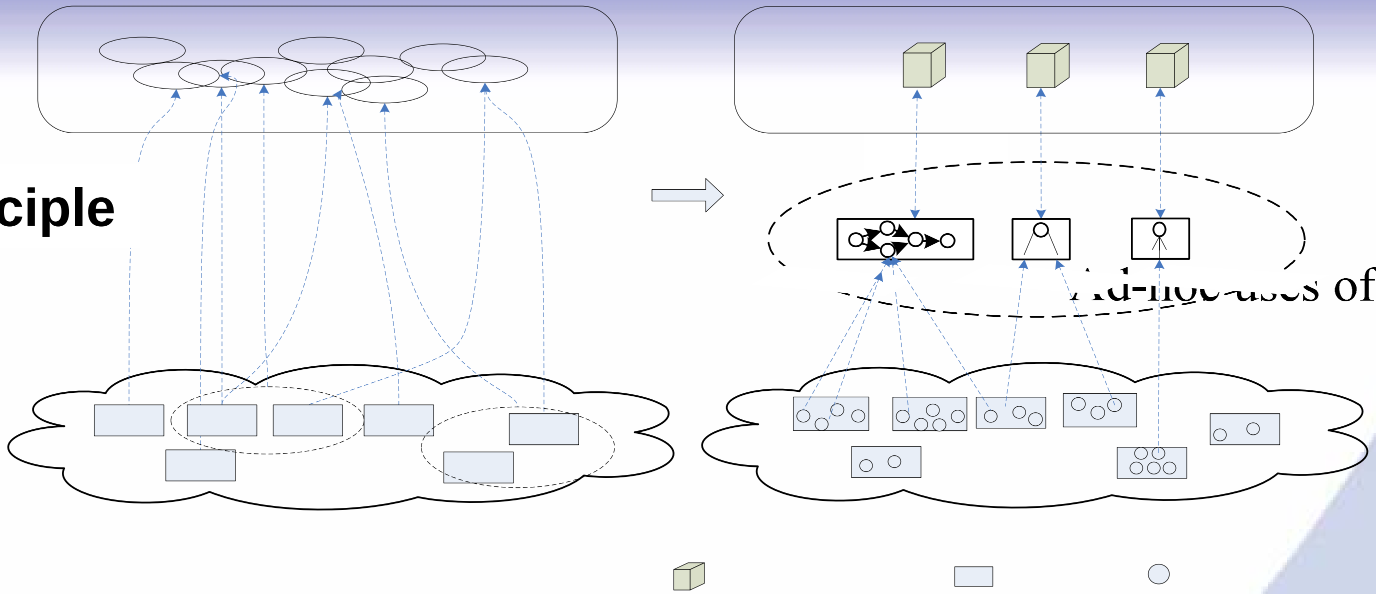
The View of VBS

- ● Input
  - ☐ bioinformatics_param
    - Alternative
      - ● blast_param
        - ● expectation
        - ● filter
      - ● fasta_param
  - ● bioinformatics_program
    - Alternative
      - ● blast_program
      - ● fasta_program
  - ● bioinformatics_sequence
  - ● sequence_database
- ● Output
  - ● sequence_similarity_report
    - Alternative
      - ● blast_report
      - ● fasta_report
- ● QoS

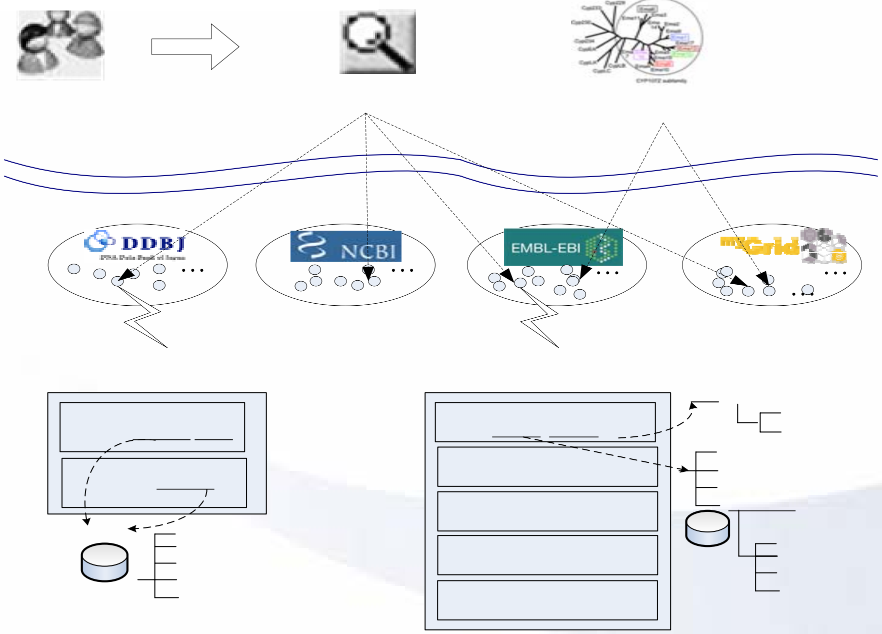
Legend: ● : Mandatory ☐: Optional : Or : Alternative

Service Virtualization

The Principle

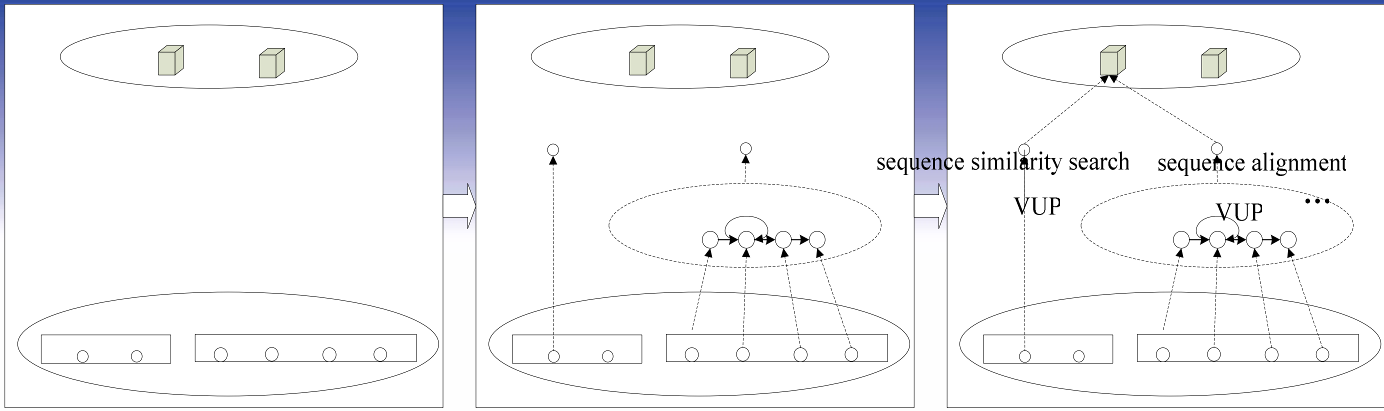

Ad-hoc uses of

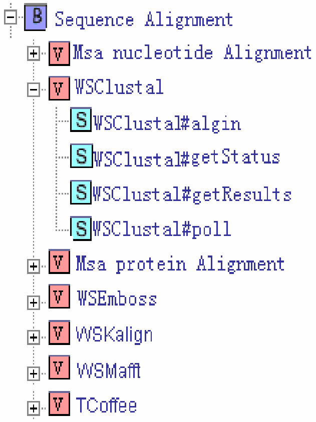
An Example

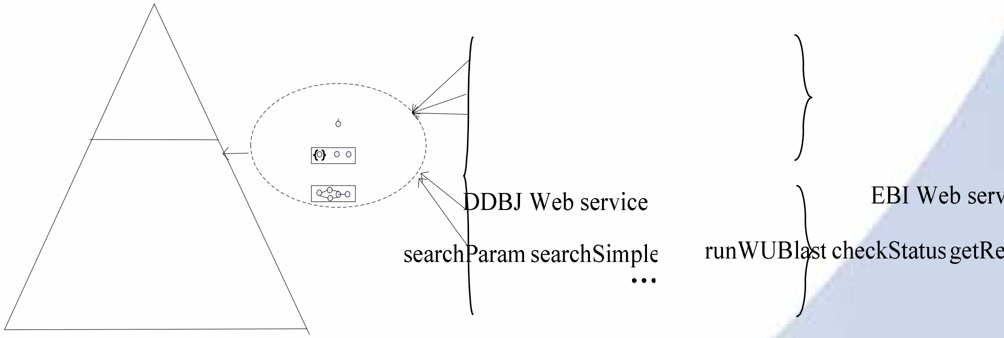

DDBJ
DNA Data Bank of Japan
NCBI
EMBL-EBI
myGrid

Web servic

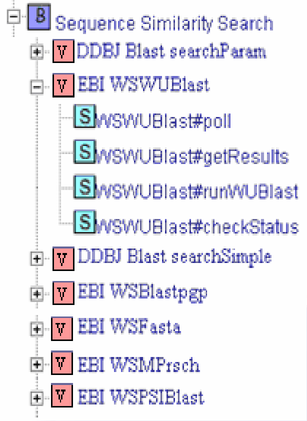
Their Use in Genome Comparison

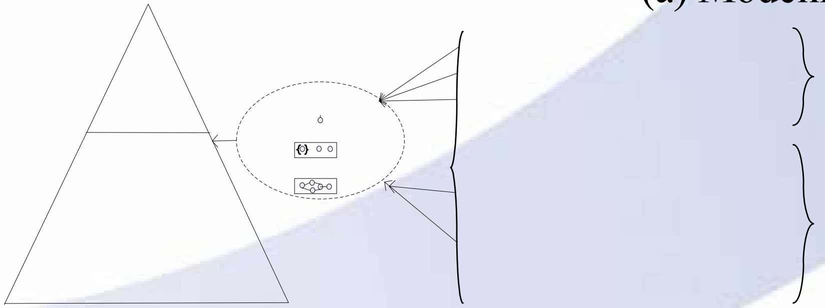

sequence similarity search
sequence alignment
VUP
VUP
…


- Sequence Alignment
  - Msa nucleotide Alignment
  - WSClustal
    - WSClustal#algin
    - WSClustal#getStatus
    - WSClustal#getResults
    - WSClustal#poll
  - Msa protein Alignment
  - WSEmboss
  - WSKalign
  - WSMafft
  - TCoffee


DDBJ Web service
EBI Web serv
searchParam searchSimple
…
runWUBlast checkStatus getRe

(a) Modeling


- Sequence Similarity Search
  - DDBJ Blast searchParam
  - EBI WSWUBlast
    - WSWUBlast#poll
    - WSWUBlast#getResults
    - WSWUBlast#runWUBlast
    - WSWUBlast#checkStatus
  - DDBJ Blast searchSimple
  - EBI WSBlastpgp
  - EBI WSFasta
  - EBI WSMPrsch
  - EBI WSPSIBlast

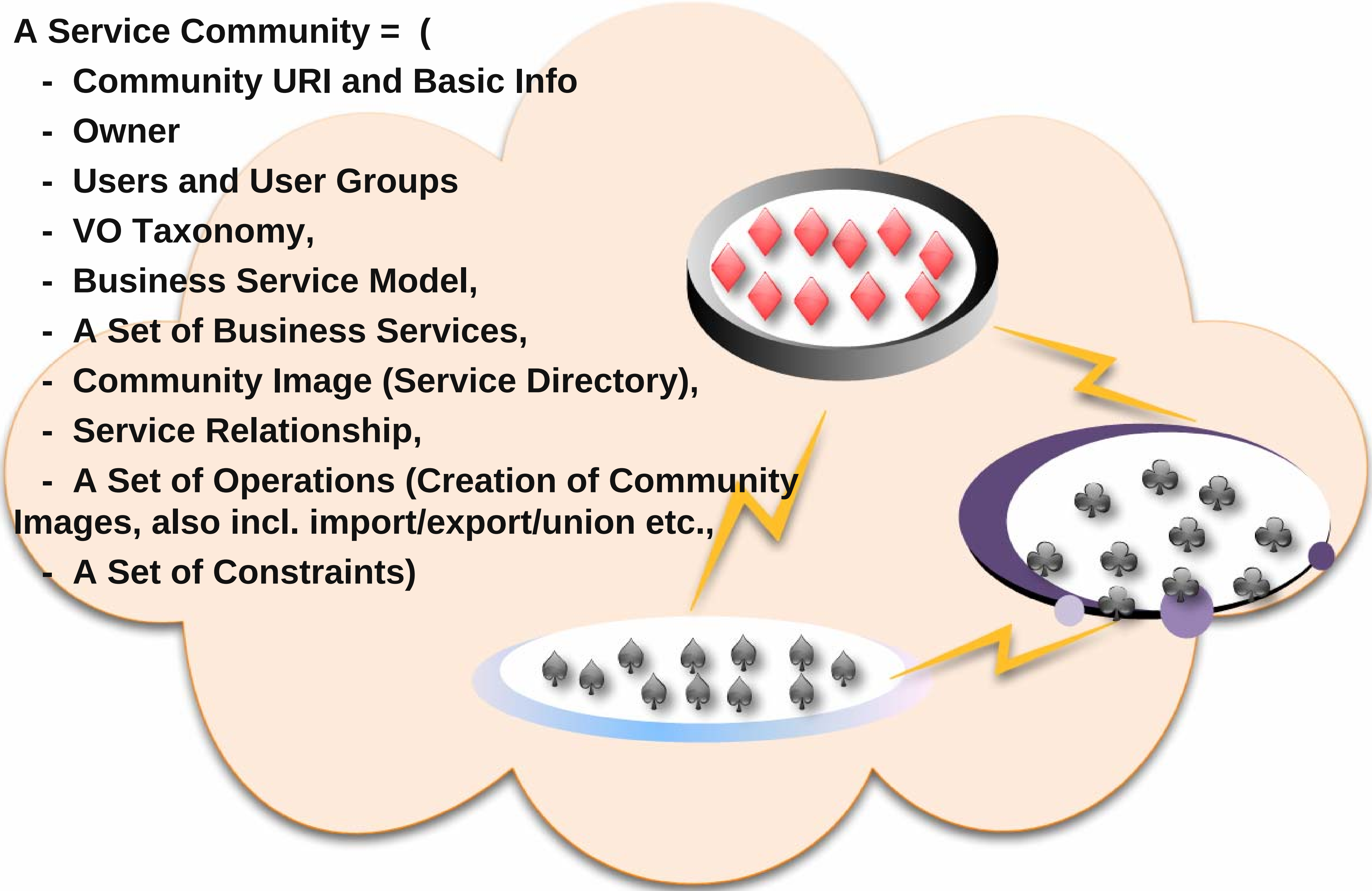


Cyberspace Partitioning, Service Management, Resource Monitoring, Dependability Assurance and SaaS Provision

with

Service Community

Service Community

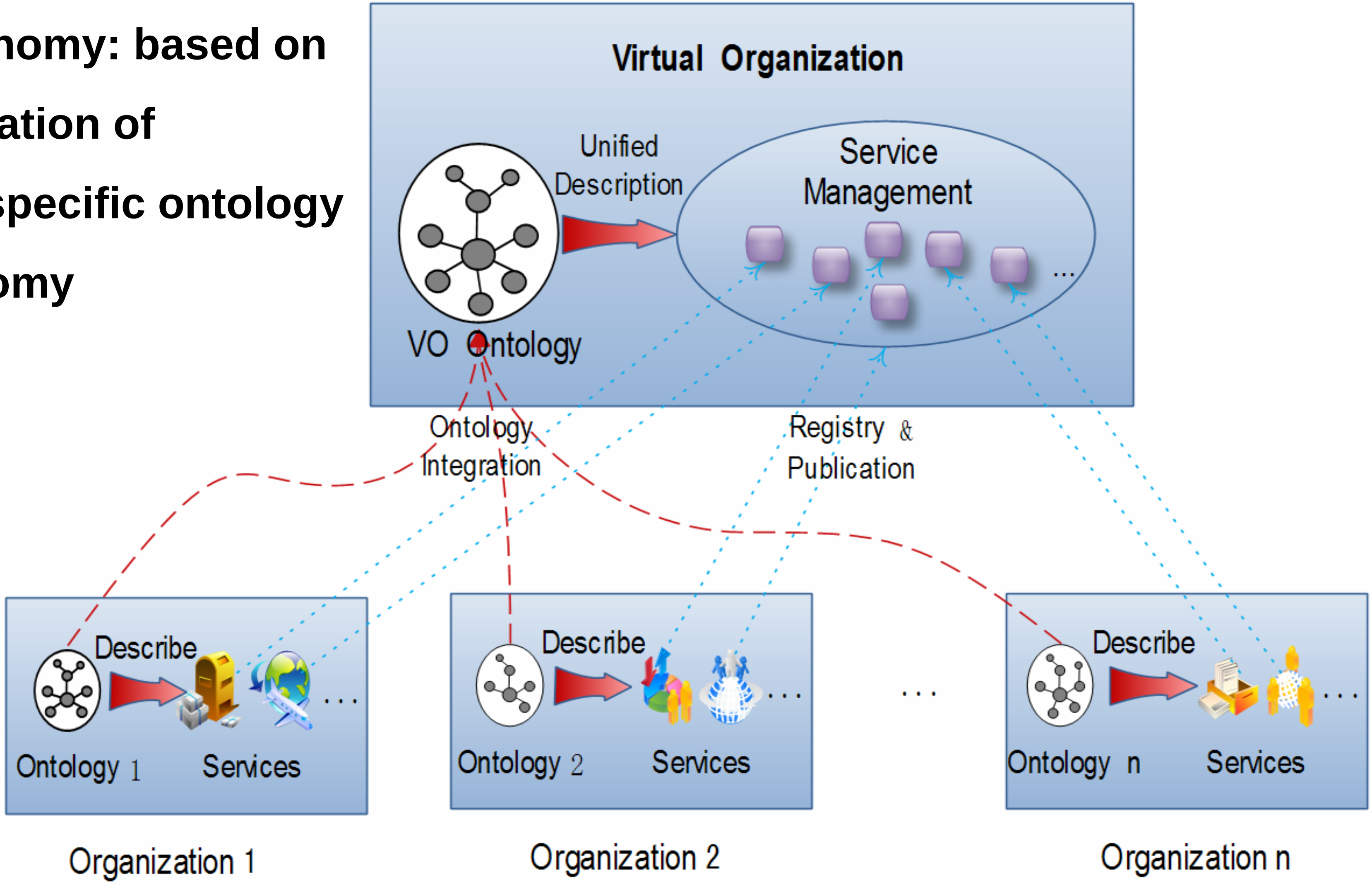


A Service Community = (

- **Community URI and Basic Info**
- **Owner**
- **Users and User Groups**
- **VO Taxonomy,**
- **Business Service Model,**
- **A Set of Business Services,**
- **Community Image (Service Directory),**
- **Service Relationship,**
- **A Set of Operations (Creation of Community Images, also incl. import/export/union etc.,**
- **A Set of Constraints)**

Semantic Basis

VO Taxonomy: based on an integration of domain-specific ontology or taxonomy


Virtual Organization
Unified Description
Service Management
...
VO Ontology
Ontology Integration
Registry & Publication
Describe
Ontology 1
Services
. . .
Organization 1
Describe
Ontology 2
Services
. . .
Organization 2
. . .
Describe
Ontology n
Services
. . .
Organization n

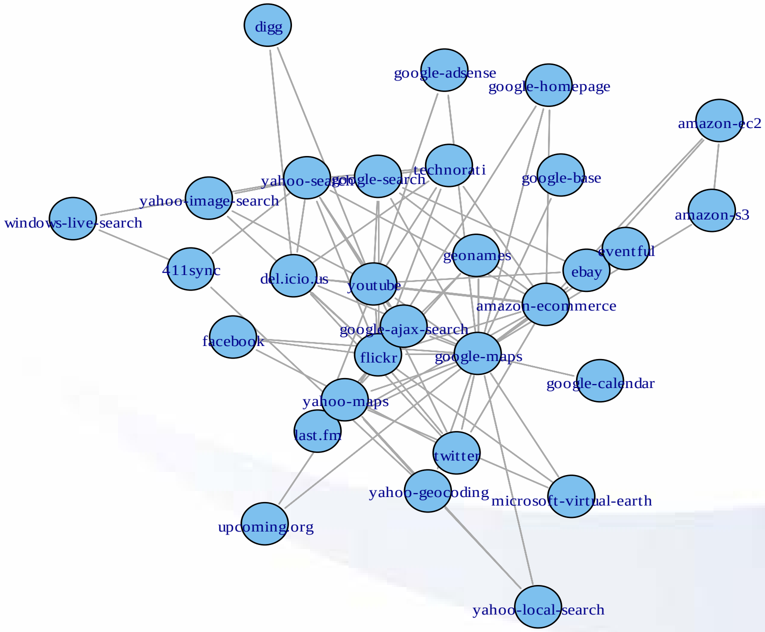
Service Relationship Modeling (based on Service Community)

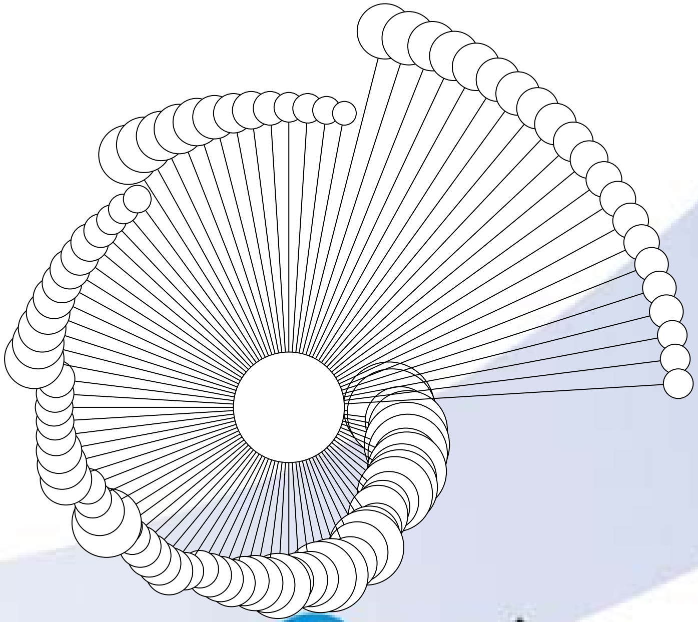
$$\begin{array}{c|ccccc|} & R1 & R2 & R3 & \cdots\cdots & Rm \\ U1 & V1 & 0 & V3 & \cdots\cdots & 0 \\ U1 & \cdots\cdots & & & & \\ & & & & \cdots\cdots & \\ & & \cdots\cdots & & & \\ Un & 0 & V2 & 0 & \cdots\cdots & Vm \end{array}$$

- **Service Hyperlink**
- **Centrality measurement**

$$Centrality(a) = \frac{1}{N-1} \sum_{b(\neq a)} \frac{1}{d_{ab}}$$

- **Experiments with “Programmable Web”, data from Sept. 2005 to June 2009**


digg
google-adsense
google-homepage
amazon-ec2
technorati
yahoo-search
google-search
google-base
yahoo-image-search
amazon-s3
windows-live-search
eventful
geonames
ebay
411sync
del.icio.us
youtube
amazon-ecommerce
google-ajax-search
facebook
flickr
google-maps
google-calendar
yahoo-maps
last.fm
twitter
yahoo-geocoding
microsoft-virtual-earth
upcoming.org
yahoo-local-search



VINCA Service Community

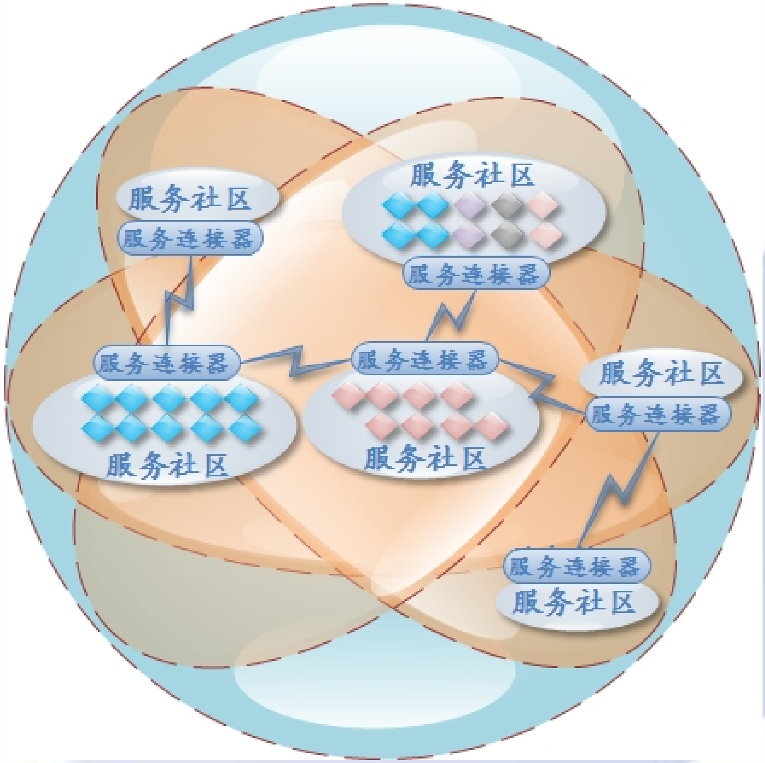
A tool to easily construct, manage virtual service community for autonomy service application domain, and also support the dynamic creation of VO from decentralized service community.

(1) partition service cyberspace based on application domain

- Support easy community creation
- Enable the merge of multiple communities
- Support personalized community view

(2) unified management for multi-source web services

- Extensible service model for service description
- Business-level service abstraction
- Flexible service monitoring to satisfy personalized runtime monitor requirements



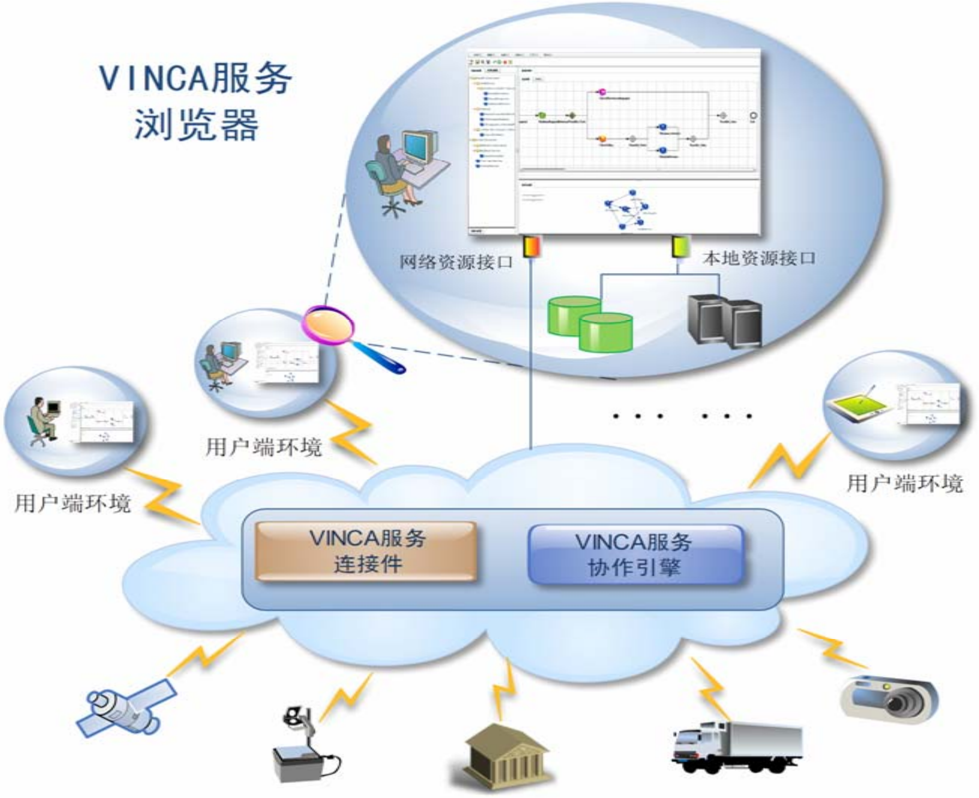
Service Utilization:

Mass “Programming” + Cloud BPM

VINCA Service Browser

——Integrated usage and development environment for internet service-based applications. It enables business users to browser and use resources registered in VINCA Service Community, visually construct and flexibly adjust service-based applications.

- **Personalized View：** Community Images + Local Resource Schema
- **Intelligent Assistance：** Service Recommendation and Verification based on Service Relationships
- **User-end Programming：** Pre-defined Workflow Template + Exploratory User-end Programming
- **Information Mashup：** Multi-source Data Aggregation Based on Nested Table

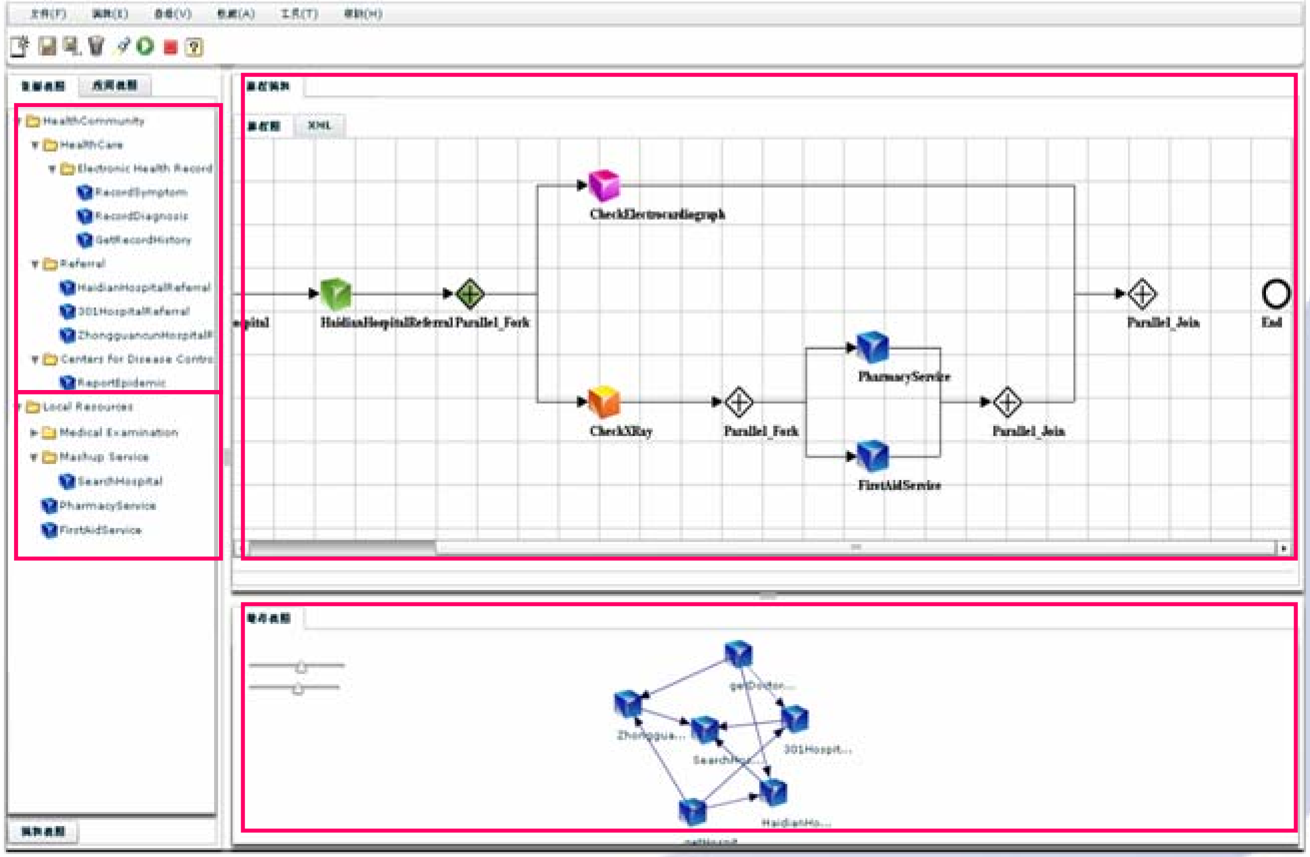


VINCA Service Browser and User-end Software

- Scoping:

  Community Images + Local Resources Schema

- User-end Programming:
  - Pre-defined Workflow + Exploratory Programming (user-end Exploration)
  - Service Recommendation and Verification based on Service Relationship


XML
HealthCommunity
HealthCare
Electronic Health Record
RecordSymptom
RecordDiagnosis
GetRecordHistory
Referral
HaidianHospitalReferral
301HospitalReferral
ZhongguancunHospitalR
Centers for Disease Contro
ReportEpidemic
Local Resources
Medical Examination
Mashup Service
SearchHospital
PharmacyService
FirstAidService
CheckElectrocardiograph
HaidianHospitalReferral
Parallel_Fork
Parallel_Join
End
PharmacyService
CheckXRay
Parallel_Fork
Parallel_Join
FirstAidService
getDoctor...
Zhongua...
301Hospit...
SearchHo...
HaidianHo...

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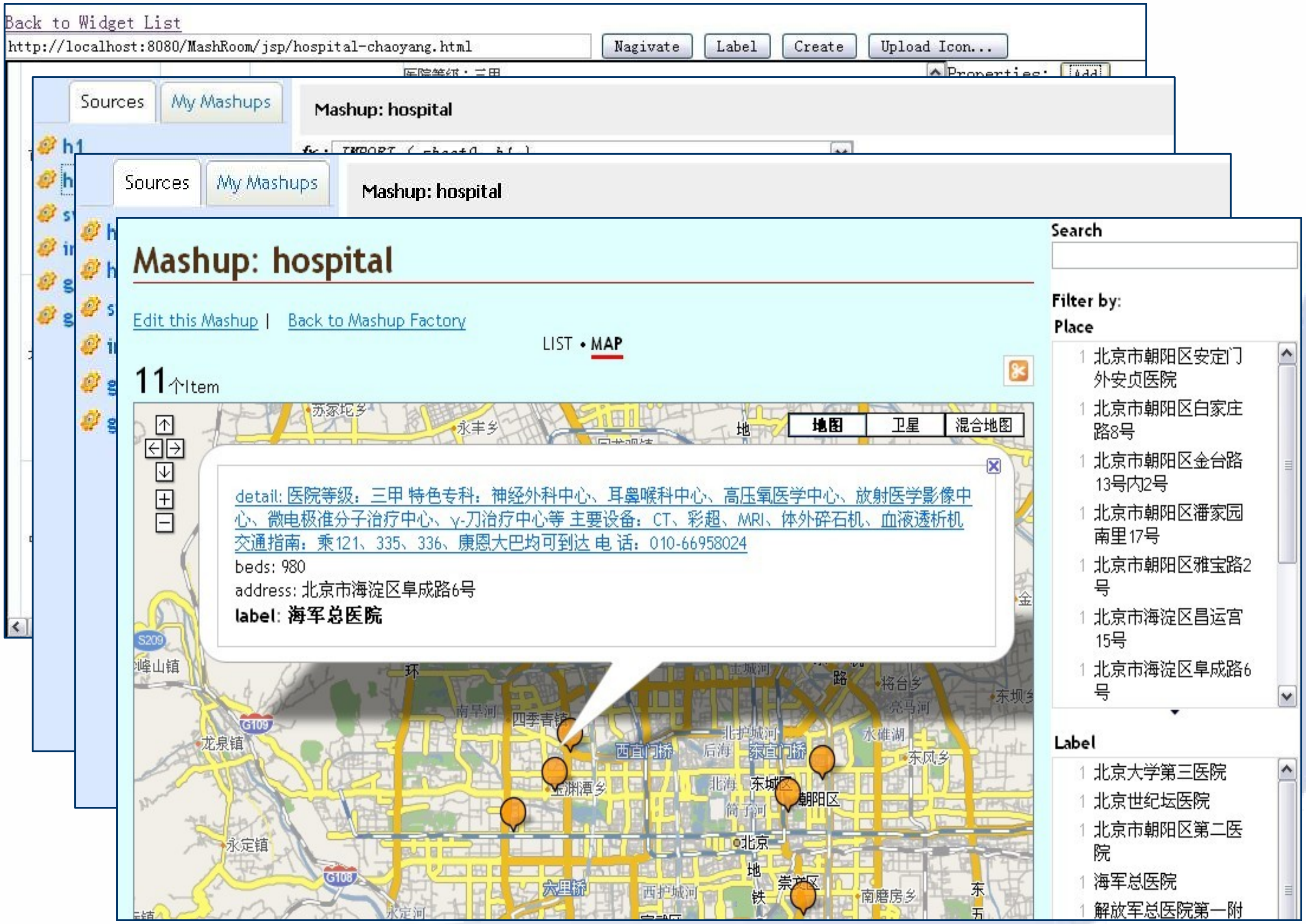
INSTITUTE OF COMPUTING TECHNOLOGY, CHINESE ACADEMY OF SCIENCES

VINCA Service Browser and User-end Software (2)

- Information Mashup:
  - Resource Wrapping
  - A Novel Data Structure based on Nested Table*


Back to Widget List
Nagivate
Label
Create
Upload Icon...
Sources
My Mashups
Mashup: hospital
Edit this Mashup | Back to Mashup Factory
LIST • MAP
地图
卫星
混合地图
Search
Filter by:

http://localhost:8080/MashRoom/jsp/hospital-chaoyang.html

Mashup: hospital

11个Item

detail: 医院等级：三甲 特色专科：神经外科中心、耳鼻喉科中心、高压氧医学中心、放射医学影像中心、微电极准分子治疗中心、γ-刀治疗中心等 主要设备：CT、彩超、MRI、体外碎石机、血液透析机 交通指南：乘121、335、336、康恩大巴均可到达 电 话：010-66958024

beds: 980

address: 北京市海淀区阜成路6号

label: **海军总医院**

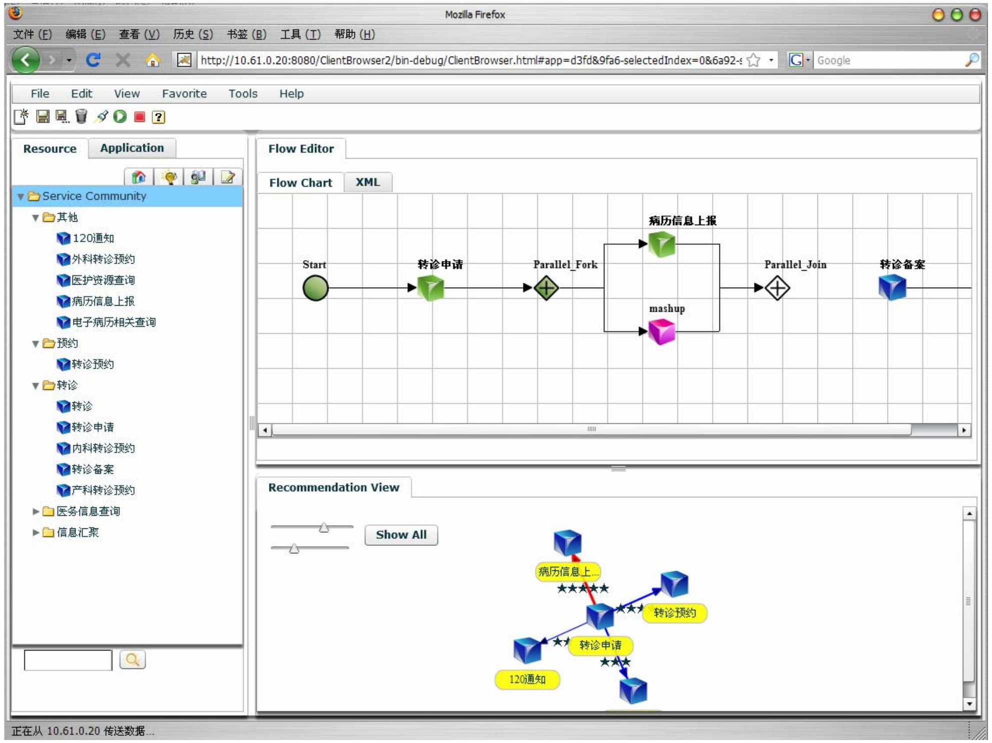
Place

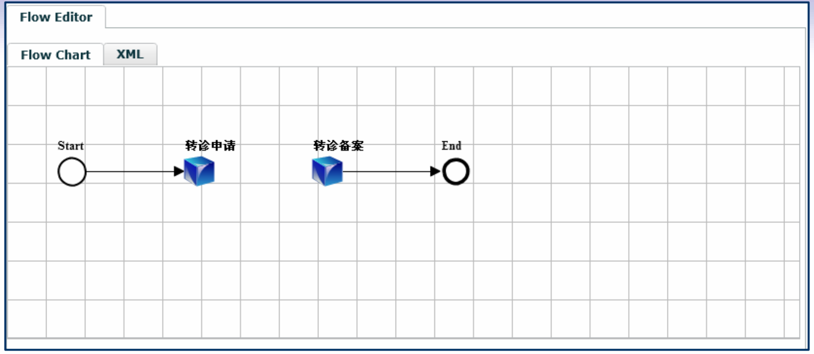
1 北京市朝阳区安定门外安贞医院
1 北京市朝阳区白家庄路8号
1 北京市朝阳区金台路13号内2号
1 北京市朝阳区潘家园南里17号
1 北京市朝阳区雅宝路2号
1 北京市海淀区昌运宫15号
1 北京市海淀区阜成路6号

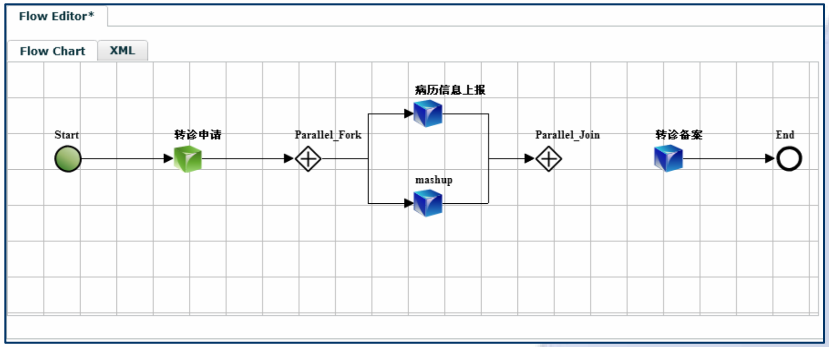
Label

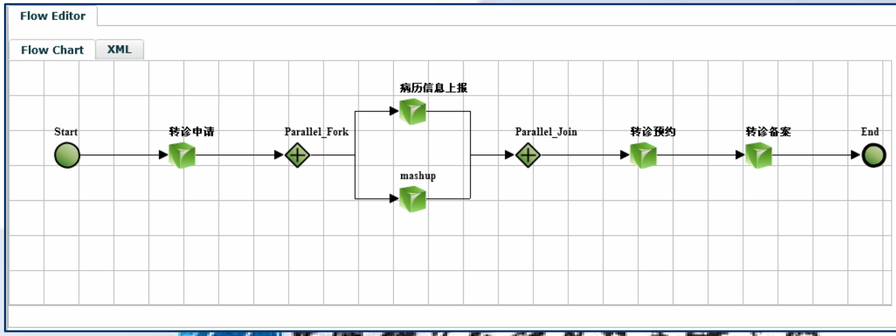
1 北京大学第三医院
1 北京世纪坛医院
1 北京市朝阳区第二医院
1 海军总医院
1 解放军总医院第一附

User-steered Service Composition


Mozilla Firefox
文件 (F) 编辑 (E) 查看 (V) 历史 (S) 书签 (B) 工具 (T) 帮助 (H)
http://10.61.0.20:8080/ClientBrowser2/bin-debug/ClientBrowser.html#app=d3fd&9fa6-selectedIndex=0&6a92-
Google
File Edit View Favorite Tools Help
Resource
Application
Service Community
其他
120通知
外科转诊预约
医护资源查询
病历信息上报
电子病历相关查询
预约
转诊预约
转诊
转诊
转诊申请
内科转诊预约
转诊备案
产科转诊预约
医务信息查询
信息汇聚
Flow Editor
Flow Chart
XML
病历信息上报
Start
转诊申请
Parallel_Fork
Parallel_Join
转诊备案
mashup
Recommendation View
Show All
病历信息上...
转诊预约
转诊申请
120通知
正在从 10.61.0.20 传送数据...


Flow Editor
Flow Chart
XML
Start
转诊申请
转诊备案
End


Flow Editor*
Flow Chart
XML
病历信息上报
Start
转诊申请
Parallel_Fork
Parallel_Join
转诊备案
End
mashup


Flow Editor
Flow Chart
XML
病历信息上报
Start
转诊申请
Parallel_Fork
Parallel_Join
转诊预约
转诊备案
End
mashup

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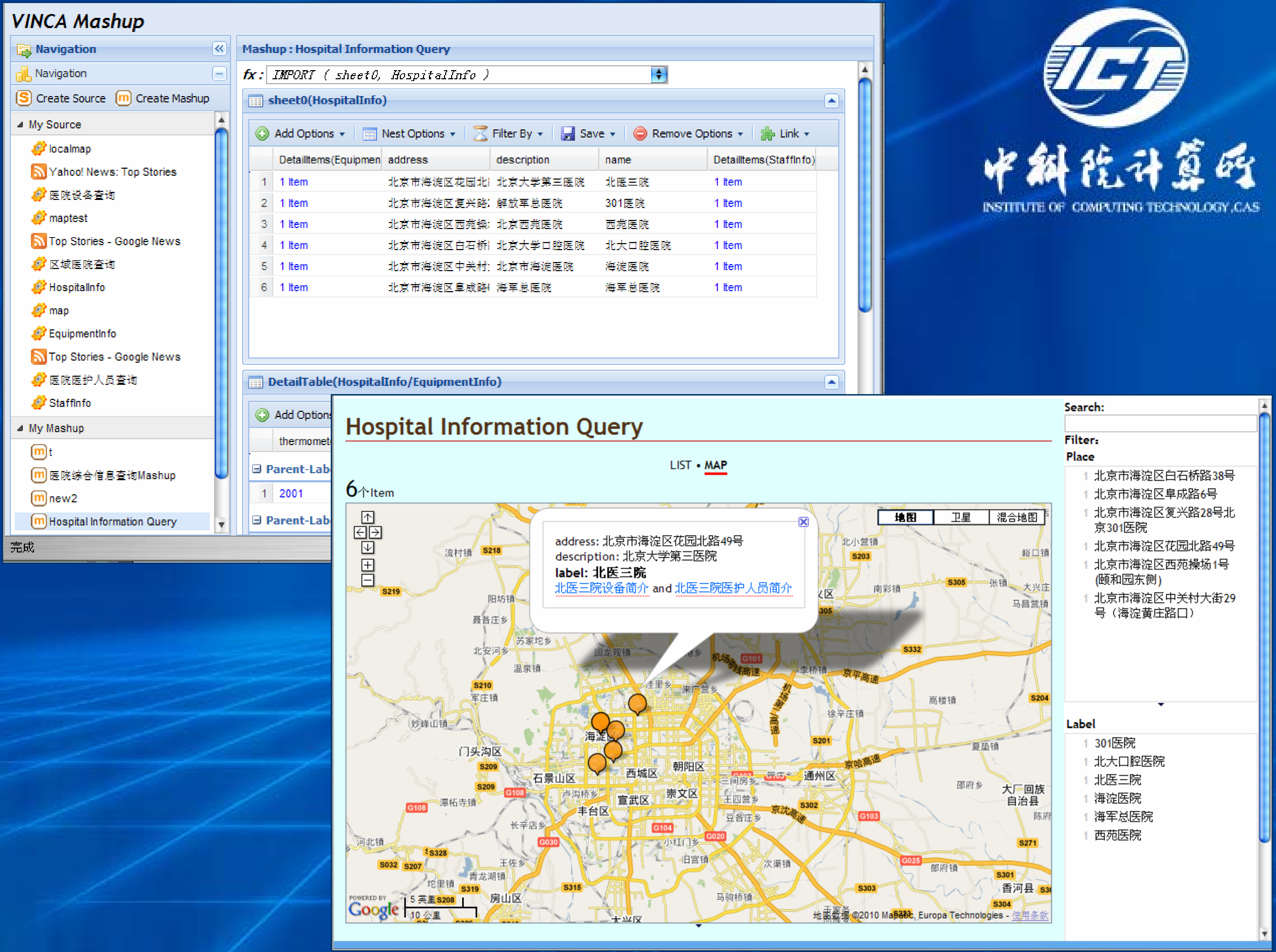
INSTITUTE OF COMPUTING TECHNOLOGY, CAS



VINCA Mashup

Navigation
Navigation
Create Source
Create Mashup
My Source
localmap
Yahoo! News: Top Stories
医院设备查询
maptest
Top Stories - Google News
区域医院查询
HospitalInfo
map
EquipmentInfo
Top Stories - Google News
医院医护人员查询
StaffInfo
My Mashup
t
医院综合信息查询Mashup
new2
Hospital Information Query
完成

Mashup : Hospital Information Query

fx : `IMPORT ( sheet0, HospitalInfo )`

sheet0(HospitalInfo)

Add Options
Nest Options
Filter By
Save
Remove Options
Link

	DetailItems(Equipmen	address	description	name	DetailItems(StaffInfo)
1	1 Item	北京市海淀区花园北	北京大学第三医院	北医三院	1 Item
2	1 Item	北京市海淀区复兴路	解放军总医院	301医院	1 Item
3	1 Item	北京市海淀区西苑操	北京西苑医院	西苑医院	1 Item
4	1 Item	北京市海淀区白石桥	北京大学口腔医院	北大口腔医院	1 Item
5	1 Item	北京市海淀区中关村	北京市海淀医院	海淀医院	1 Item
6	1 Item	北京市海淀区阜成路	海军总医院	海军总医院	1 Item

DetailTable(HospitalInfo/EquipmentInfo)

Add Options
thermomet
Parent-Lab
1 2001
Parent-Lab

Hospital Information Query

LIST • MAP

6个Item

address: 北京市海淀区花园北路49号
description: 北京大学第三医院
label: 北医三院
北医三院设备简介 and 北医三院医护人员简介

地图
卫星
混合地图
海淀区
西城区
朝阳区
石景山区
宣武区
崇文区
丰台区
门头沟区
通州区
房山区
POWERED BY Google
5 英里
10 公里
地图数据 ©2010 Mapabc, Europa Technologies - 使用条款

Search:

Filter:

Place
- 1 北京市海淀区白石桥路38号
- 1 北京市海淀区阜成路6号
- 1 北京市海淀区复兴路28号北京301医院
- 1 北京市海淀区花园北路49号
- 1 北京市海淀区西苑操场1号(颐和园东侧)
- 1 北京市海淀区中关村大街29号（海淀黄庄路口）

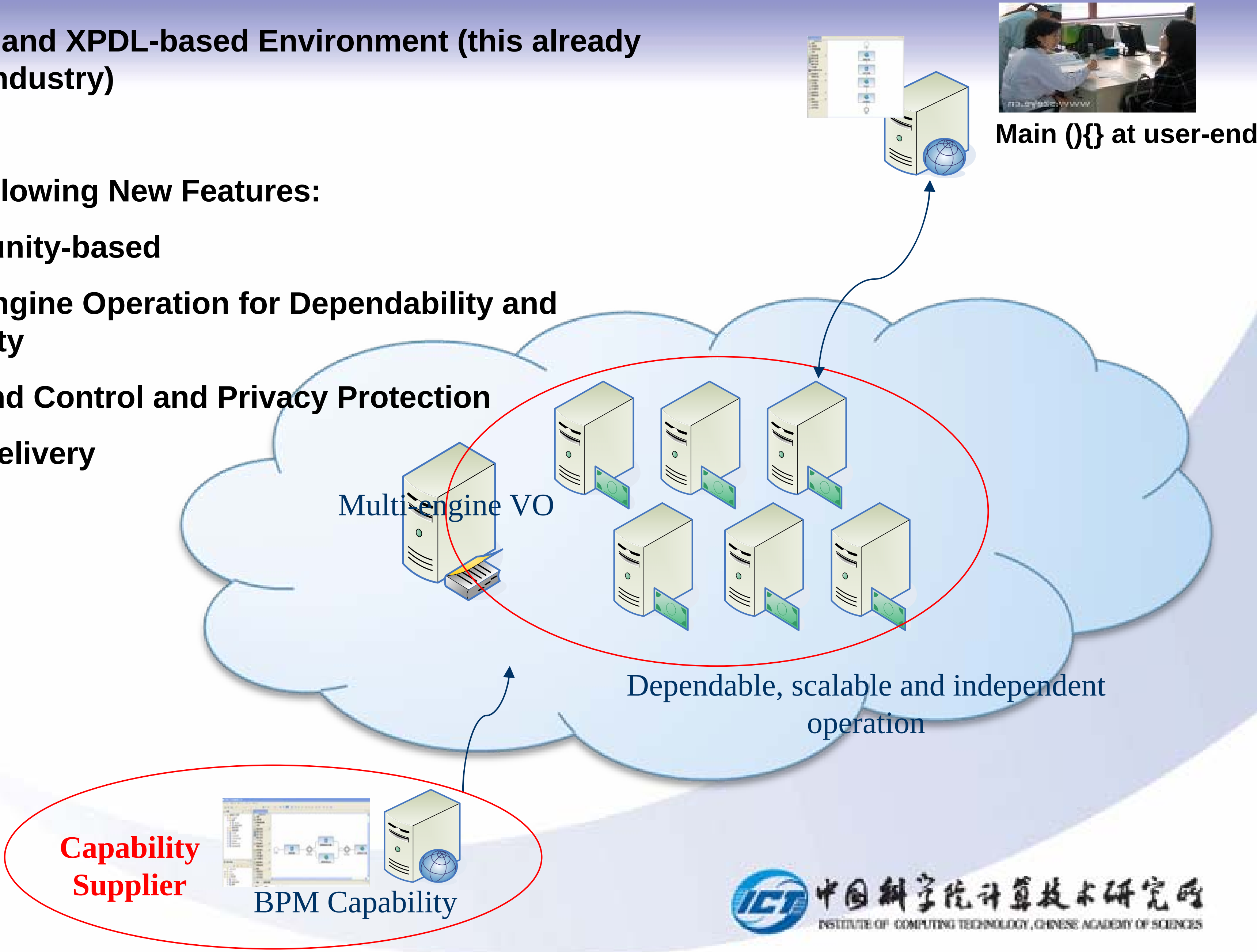
Label
- 1 301医院
- 1 北大口腔医院
- 1 北医三院
- 1 海淀医院
- 1 海军总医院
- 1 西苑医院

VINCA BPM: Cloud BPM

A BPMN and XPDL-based Environment (this already sold to industry)

+

- The Following New Features:
- Community-based
- Multi-engine Operation for Dependability and Scalability
- User-end Control and Privacy Protection
- PaaS Delivery


Main (){} at user-end
Multi-engine VO
Dependable, scalable and independent operation
Capability Supplier
BPM Capability

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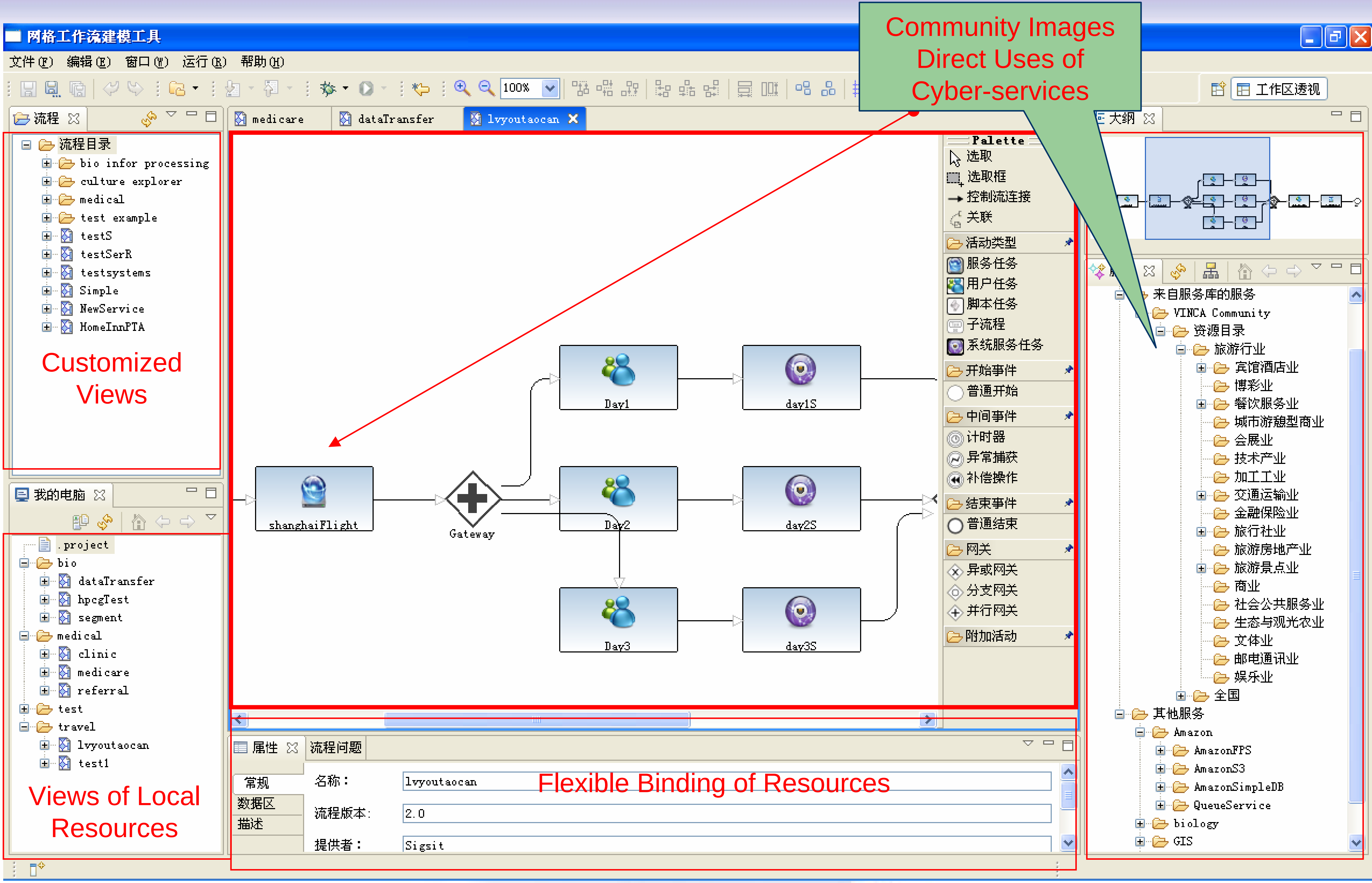
Community-based VINCA BPM


网格工作流建模工具
文件(F) 编辑(E) 窗口(W) 运行(R) 帮助(H)
100%
工作区透视
流程
流程目录
bio infor processing
culture explorer
medical
test example
testS
testSerR
testsystems
Simple
NewService
HomeInnPTA
我的电脑
.project
bio
dataTransfer
hpcgTest
segment
medical
clinic
medicare
referral
test
travel
lvyoutaocan
test1
medicare
dataTransfer
lvyoutaocan
shanghaiFlight
Gateway
Day1
day1S
Day2
day2S
Day3
day3S
Palette
选取
选取框
控制流连接
关联
活动类型
服务任务
用户任务
脚本任务
子流程
系统服务任务
开始事件
普通开始
中间事件
计时器
异常捕获
补偿操作
结束事件
普通结束
网关
异或网关
分支网关
并行网关
附加活动
大纲
来自服务库的服务
VINCA Community
资源目录
旅游行业
宾馆酒店业
博彩业
餐饮服务业
城市游憩型商业
会展业
技术产业
加工工业
交通运输业
金融保险业
旅行社业
旅游房地产业
旅游景点业
商业
社会公共服务业
生态与观光农业
文体业
邮电通讯业
娱乐业
全国
其他服务
Amazon
AmazonFPS
AmazonS3
AmazonSimpleDB
QueueService
biology
GIS
属性
流程问题
常规
数据区
描述

名称：lvyoutaocan

流程版本: 2.0

提供者：Sigsit

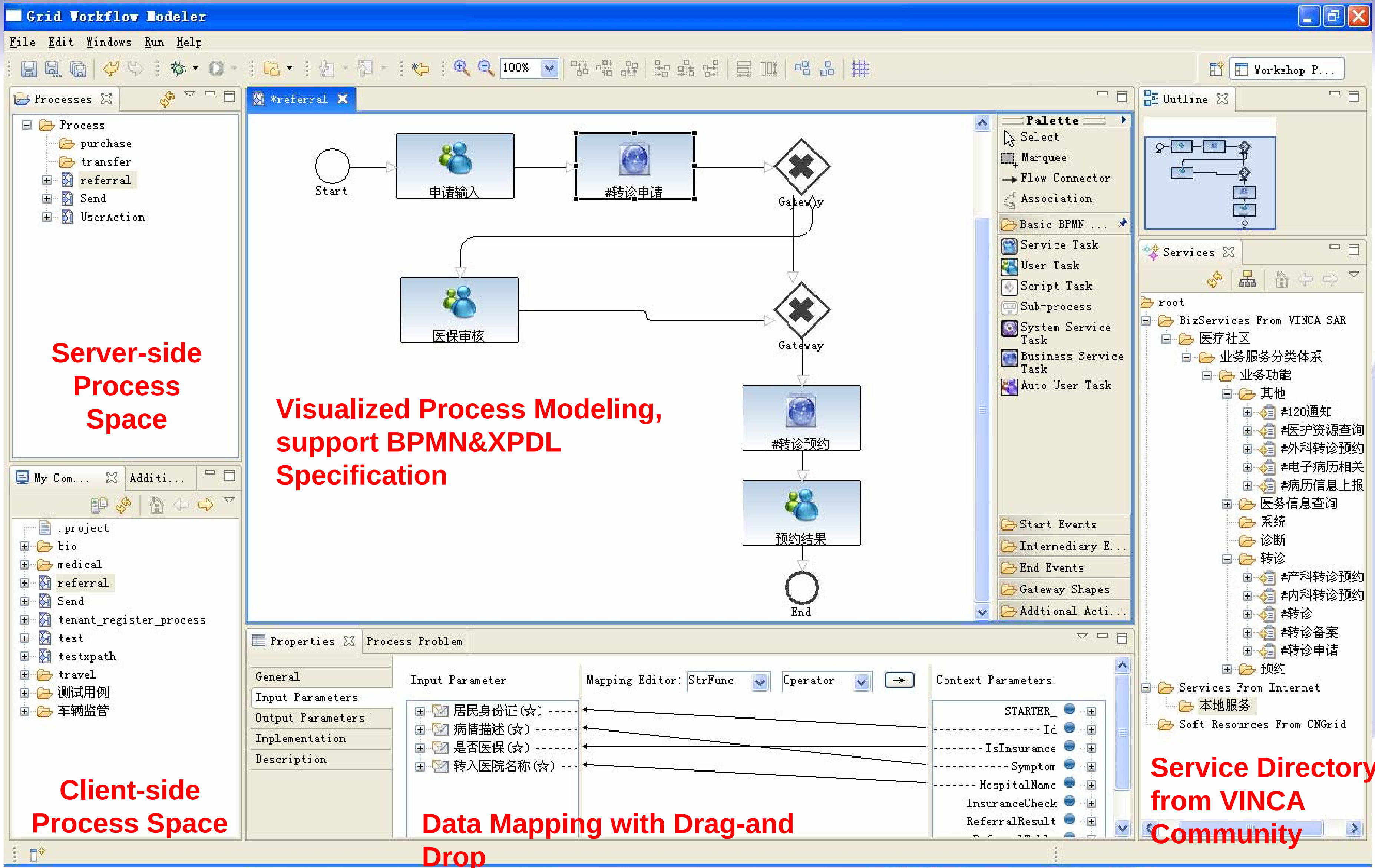
Community Images Direct Uses of Cyber-services

Customized Views

Flexible Binding of Resources

Views of Local Resources

Process as a service



Grid Workflow Modeler
File Edit Windows Run Help
100%
Workshop P...
Processes
Process
purchase
transfer
referral
Send
UserAction
*referral
Start
申请输入
#转诊申请
Gateway
医保审核
Gateway
#转诊预约
预约结果
End
Palette
Select
Marquee
Flow Connector
Association
Basic BPMN ...
Service Task
User Task
Script Task
Sub-process
System Service Task
Business Service Task
Auto User Task
Start Events
Intermediary E...
End Events
Gateway Shapes
Addtional Acti...
Outline
Services
root
BizServices From VINCA SAR
医疗社区
业务服务分类体系
业务功能
其他
#120通知
#医护资源查询
#外科转诊预约
#电子病历相关
#病历信息上报
医务信息查询
系统
诊断
转诊
#产科转诊预约
#内科转诊预约
#转诊
#转诊备案
#转诊申请
预约
Services From Internet
本地服务
Soft Resources From CNGrid
My Com...
Additi...
.project
bio
medical
referral
Send
tenant_register_process
test
testxpath
travel
测试用例
车辆监管
Properties
Process Problem
General
Input Parameters
Output Parameters
Implementation
Description
Input Parameter
Mapping Editor: StrFunc
Operator
Context Parameters:
居民身份证(☆)
病情描述(☆)
是否医保(☆)
转入医院名称(☆)
STARTER_
Id
IsInsurance
Symptom
HospitalName
InsuranceCheck
ReferralResult

Server-side Process Space

Visualized Process Modeling, support BPMN&XPDL Specification

Client-side Process Space

Data Mapping with Drag-and Drop

Service Directory from VINCA Community

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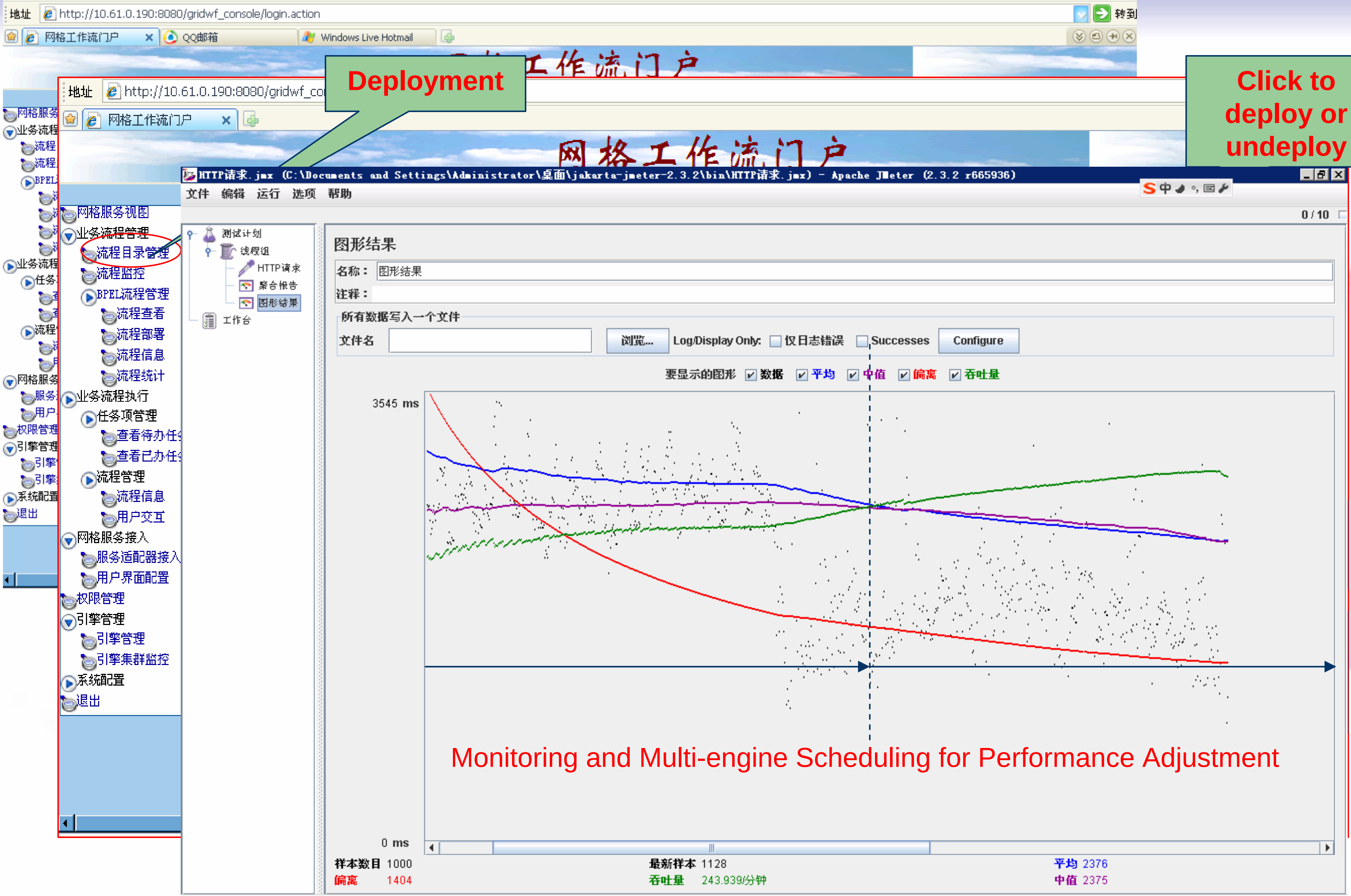
Monitoring and Dynamic Scheduling

流程执行：启动、使用和监控


地址
http://10.61.0.190:8080/gridwf_console/login.action
转到
网格工作流门户
QQ邮箱
Windows Live Hotmail
http://10.61.0.190:8080/gridwf_co
网格工作流门户
网格服务视图
业务流程管理
流程目录管理
流程监控
BPEL流程管理
流程查看
流程部署
流程信息
流程统计
业务流程执行
任务项管理
查看待办任务
查看已办任务
流程管理
流程信息
用户交互
网格服务接入
服务适配器接入
用户界面配置
权限管理
引擎管理
引擎管理
引擎集群监控
系统配置
退出
HTTP请求.jmx (C:\Documents and Settings\Administrator\桌面\jakarta-jmeter-2.3.2\bin\HTTP请求.jmx) - Apache JMeter (2.3.2 r665936)
文件
编辑
运行
选项
帮助
0 / 10
测试计划
线程组
HTTP请求
聚合报告
图形结果
工作台
图形结果
所有数据写入一个文件
浏览...
Configure
要显示的图形
3545 ms
0 ms

名称：图形结果

注释：

文件名

Log/Display Only: ☐ 仅日志错误 ☐ Successes

要显示的图形 ☑ 数据 ☑ 平均 ☑ 中值 ☑ 偏离 ☑ 吞吐量

样本数目 1000

偏离 1404

最新样本 1128

吞吐量 243.939/分钟

平均 2376

中值 2375

Deployment

Click to deploy or undeploy

Monitoring and Multi-engine Scheduling for Performance Adjustment

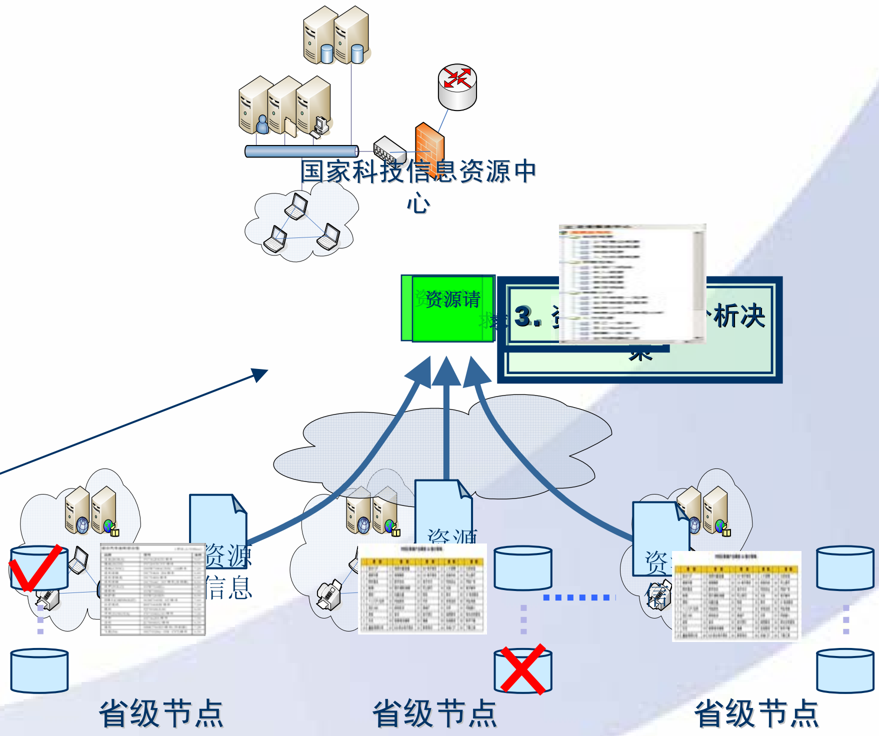
Past and On-going VINCA-related Practices

For the Mass:

- User DIY with Mobile Widgets
- Personal Problem Solving Environment for Bioinformatics Research

For Enterprises:

- eSciece
- eGovernment
- eHealth
- SME Promotion
- National Platform for Sharing Scientific and Technological Information


国家科技信息资源中心
资源请
3.
析决
策
资源信息
资源
资
省级节点
省级节点
省级节点

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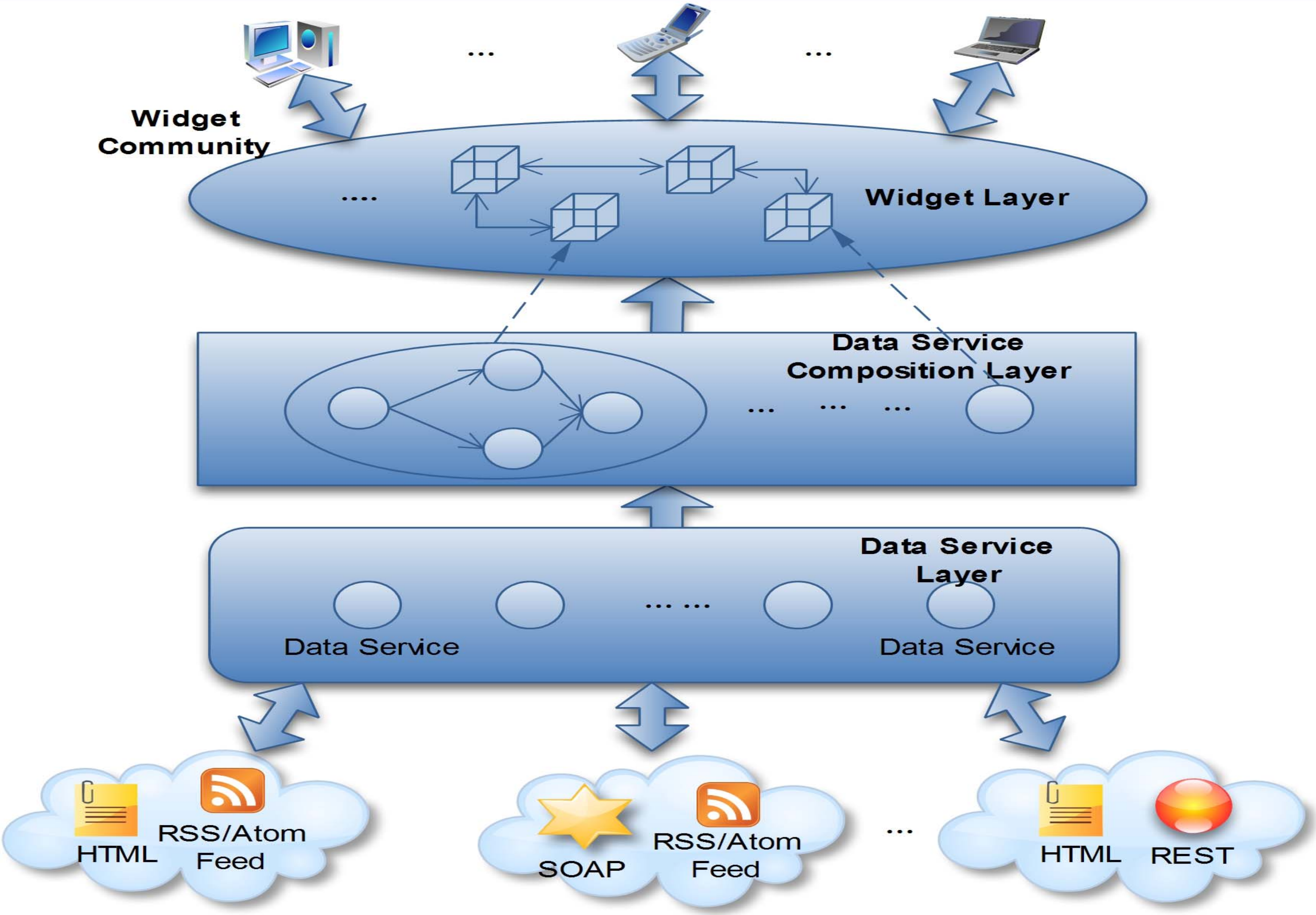
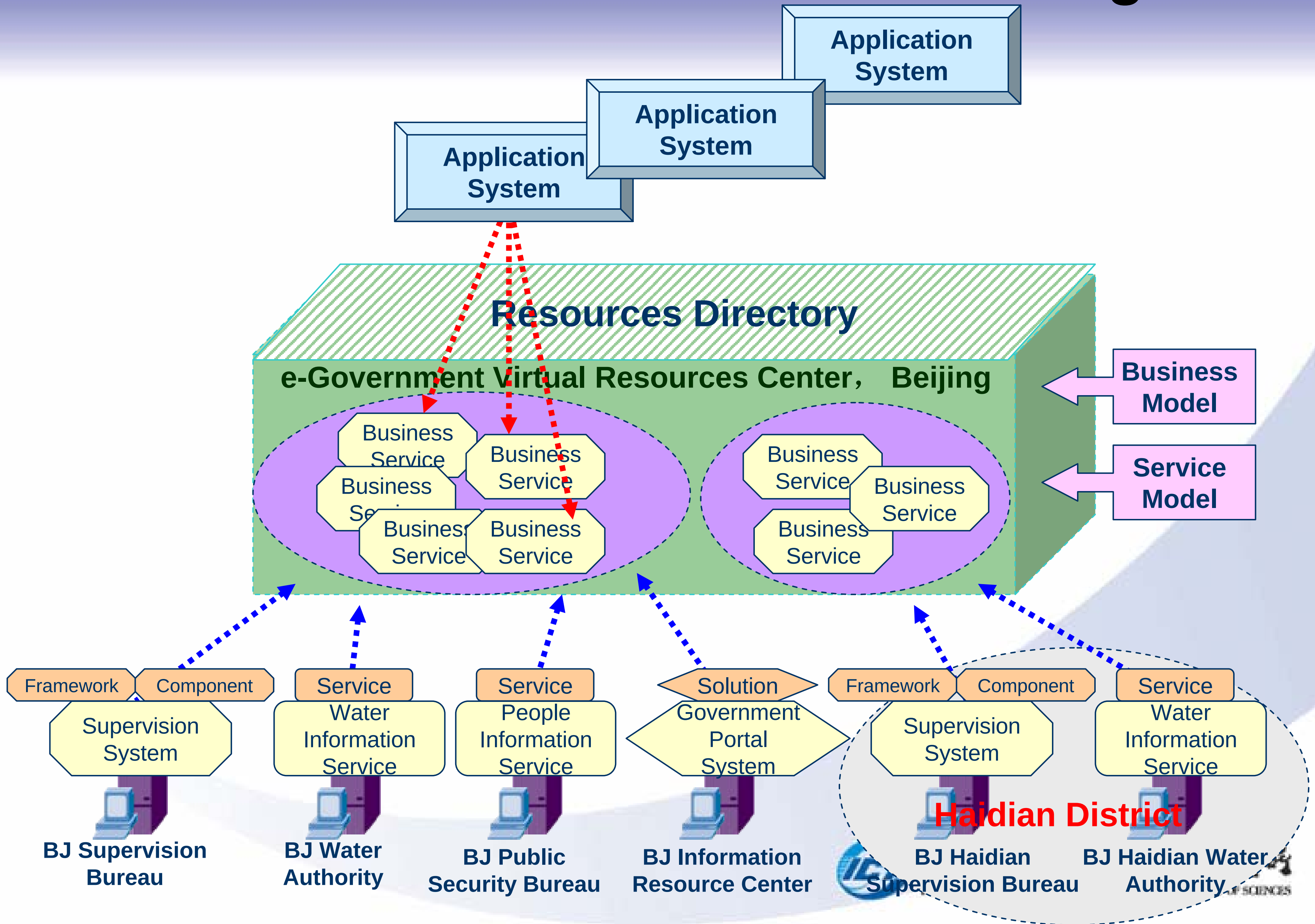
DIY Communities for Mobile Users


…
…
Widget Community
….
Widget Layer
Data Service Composition Layer
… … …
Data Service Layer
… …
Data Service
Data Service
HTML
RSS/Atom Feed
SOAP
RSS/Atom Feed
…
HTML
REST

Virtual Resource Center for eGov Integration



Application System

Application System

Application System

Resources Directory

e-Government Virtual Resources Center， Beijing

Business Service

Business Service

Business Se

Business Service

Busines Service

Business Service

Business Service

Business Service

Business Service

Business Model

Service Model

Framework

Component

Supervision System

BJ Supervision Bureau

Service

Water Information Service

BJ Water Authority

Service

People Information Service

BJ Public Security Bureau

Solution

Government Portal System

BJ Information Resource Center

Framework

Component

Supervision System

BJ Haidian Supervision Bureau

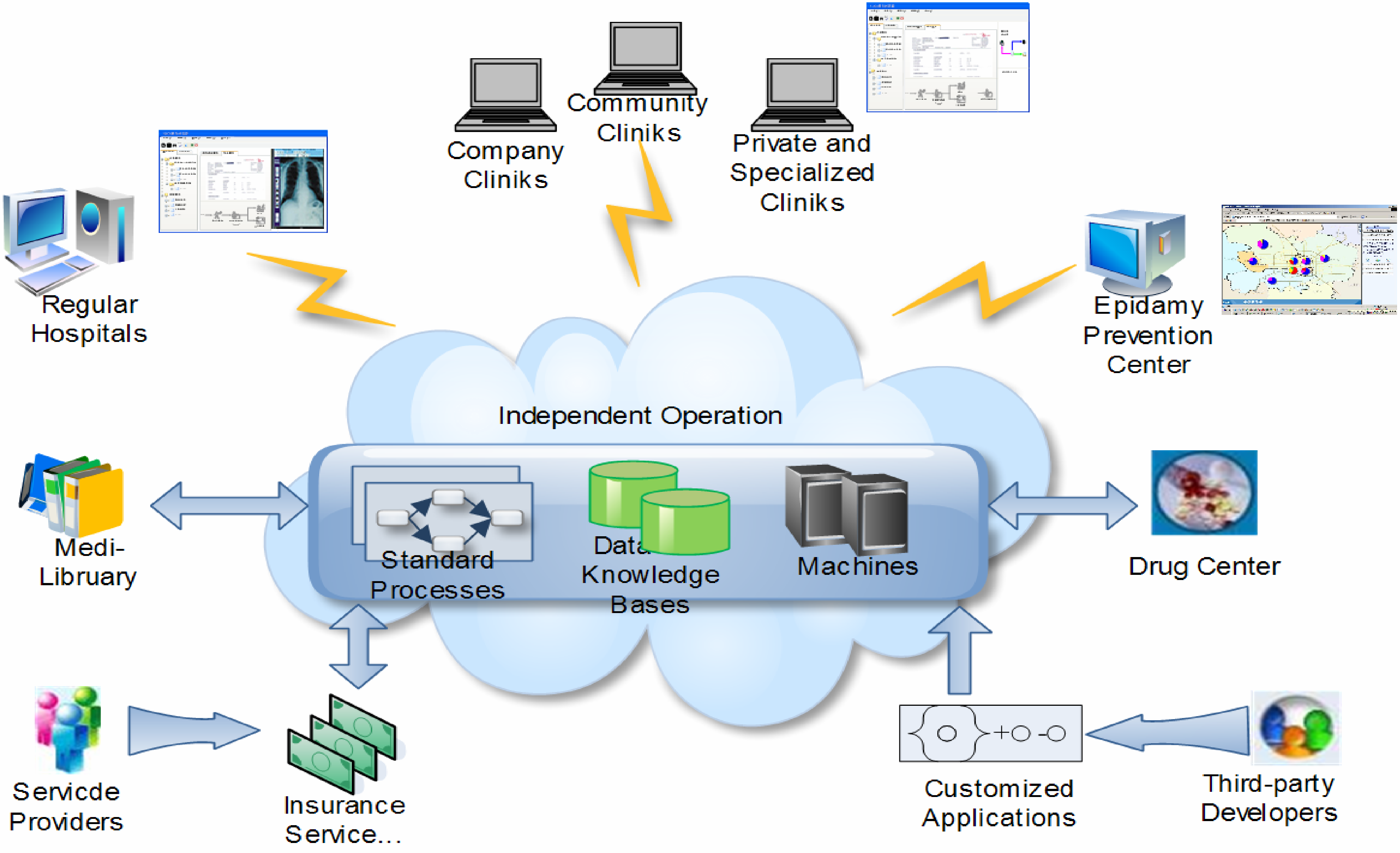
Service

Water Information Service

BJ Haidian Water Authority

Haidian District

VINCA-based Healthcare IS: supporting the new model of "Centralized Management and Operation, Ubiquitous Uses over the Internet"



Company Cliniks

Community Cliniks

Private and Specialized Cliniks

Regular Hospitals

Epidamy Prevention Center

Independent Operation

Standard Processes

Data Knowledge Bases

Machines

Medi-Library

Drug Center

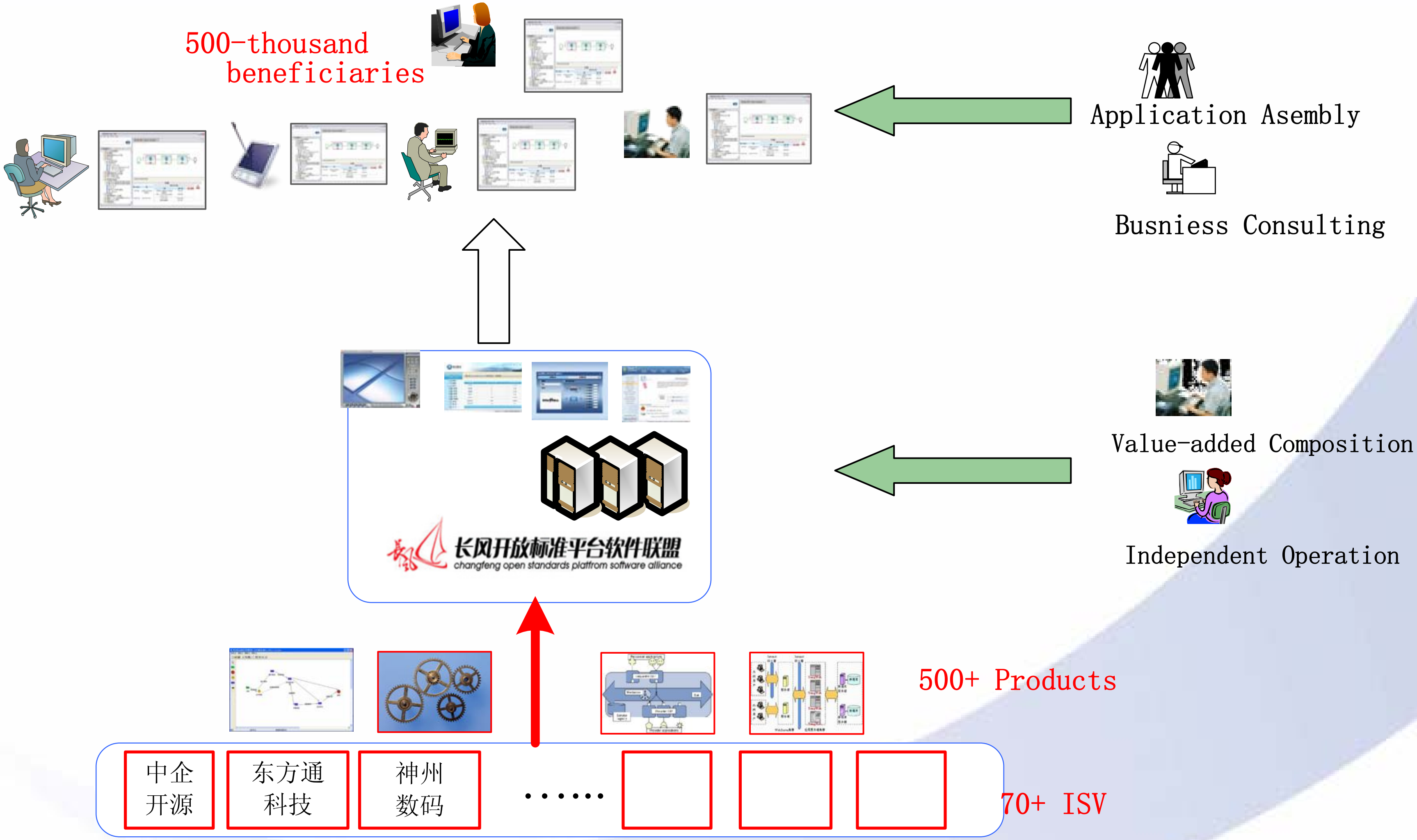
Servicde Providers

Insurance Service...

Customized Applications

Third-party Developers

“Virtual Products” of the Changfeng Alliance



New Roles

500-thousand
beneficiaries

Application Asembly

Busniess Consulting

Value-added Composition

Independent Operation

长风开放标准平台软件联盟
changfeng open standards platfrom software alliance

500+ Products

中企
开源

东方通
科技

神州
数码

……

70+ ISV

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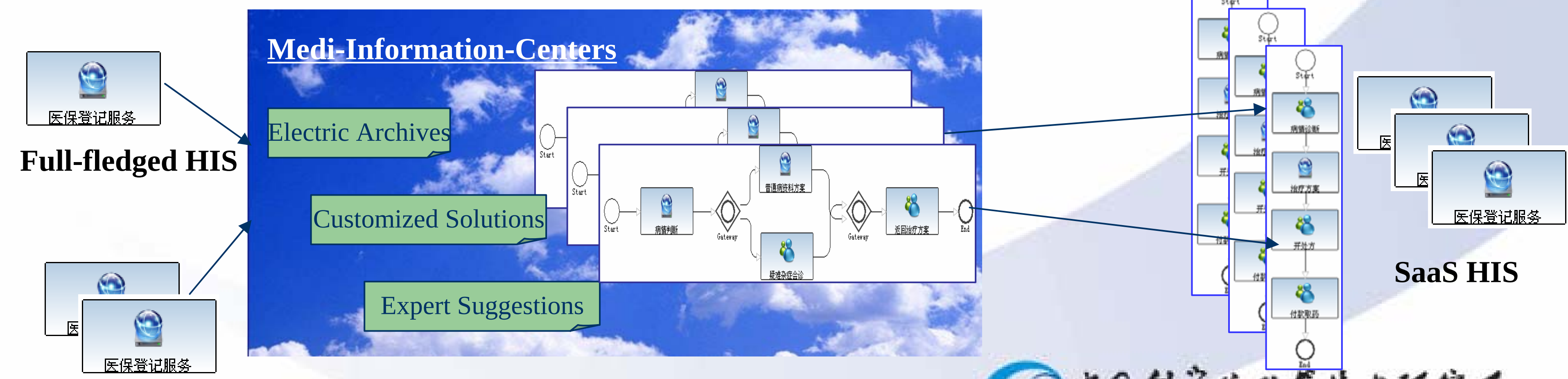
An Application Scenario

Healthcare in China: a Motivating Scenario

Several-thousand all-around hospitals, but handle 1782 million cases per year, more than half-a-day per visit in average

243-thousand clinics and hospitals in rural areas handle 424 million cases per year, with apparently higher rate of false diagnosis and medicament misuses

HOSPITAL
BUS
三甲医院


医保登记服务
Start
病情判断
Gateway
普通病诊疗方案
疑难杂症会诊
返回治疗方案
End
病情诊断
治疗方案
开处方
付款取药

Clinic Processes

Medi-Information-Centers

Electric Archives

Customized Solutions

Expert Suggestions

Full-fledged HIS

SaaS HIS

Other Systems, such as Insurance

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Challenges

- Providing integrated view and management of information and application resources for district health bureau
- Supporting timely creation of cooperative healthcare applications for emergency by local medical institutions
- Building common infrastructure for operation of applications in a cost-effective way

VINCA Solution for District Health

- Services are treated as the basic elements for sharing information and integrating systems – *VINCA Service Community Tool*
  - Services are identified and abstracted from business point of view
  - The whole lifecycle of services is managed in a centralized way
- End user oriented service composition are supported – *VINCA Service Browser*
- Platform services are provided to enable third-party operation of the composed services – *VINCA Operation Platform*
  - Run time environment are designed for multi-tenants
  - Service interaction is monitored in a global view

Service Management in District Health Community

Step 1: Community initialization

- Import domain concept, such as data standard, health taxonomy
- Define healthcare services model
- Configure community, including roles and permissions configuration

Step 2: Service registration

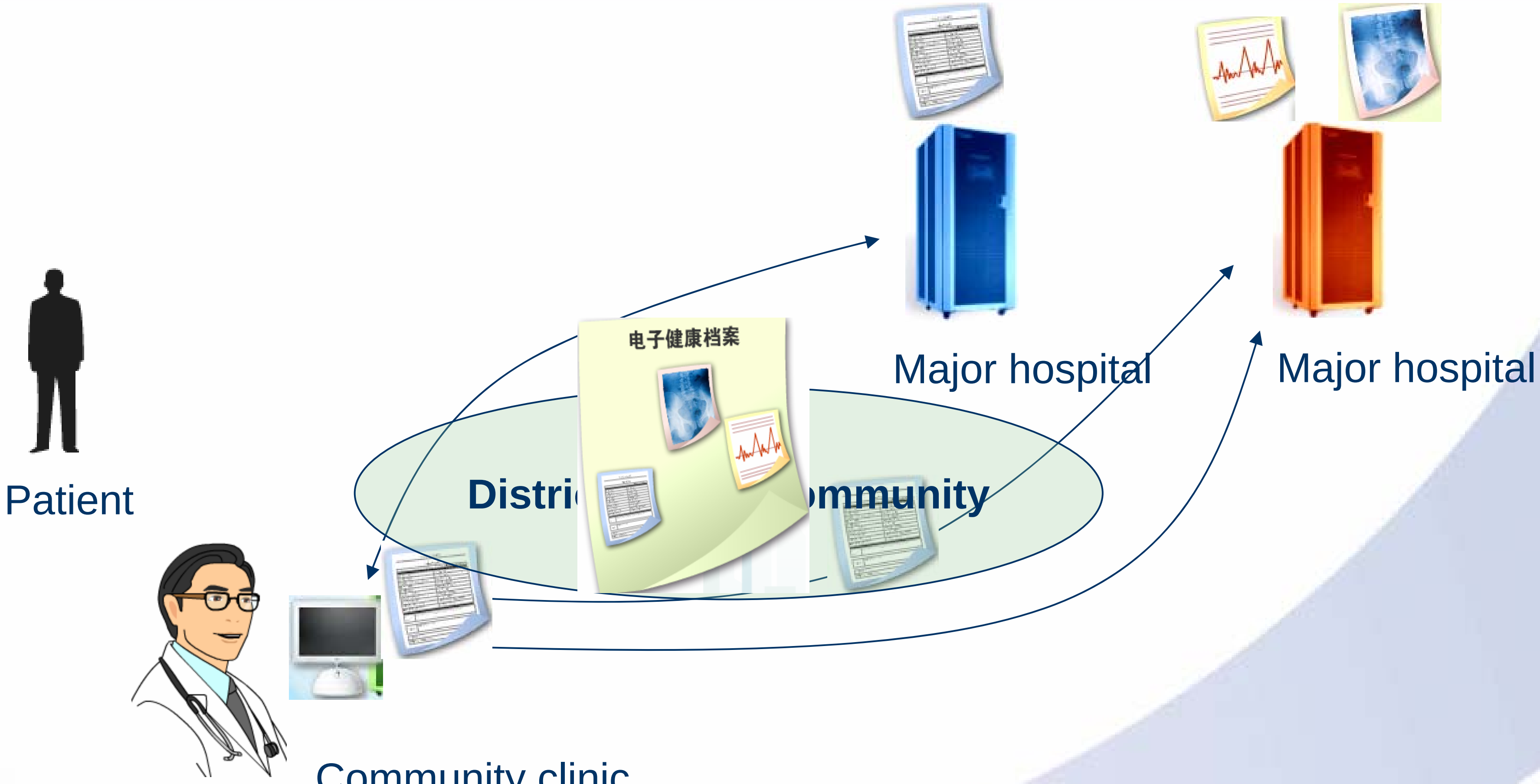
- Define business service
- Create personalized service directory

Step 3: Service monitoring

- Monitoring usage information of service, including QoS information, run-time information, and so on.

Service name	Provider	Service name	Provider
Referral appointment service of clinic	Erlizhuang clinic	Diagnostic imaging query service	301 hospital
Referral appointment service of clinic	Zhongguancun clinic	HIS query service	301 hospital
Referral appointment service of clinic	Beixiaguan clinic	……	……
Referral appointment service of clinic	Qinghuayuan clinic	Diagnostic imaging query service	Beiyisanyuan hospital
Referral appointment service of hospital	301 hospital	HIS query service	Beiyisanyuan hospital
Referral appointment service of hospital	Beiyisanyuan hospital	……	……
Referral appointment service of hospital	Haidian hospital	Payment service	Medical insurance bureau
……	……	999 service	Emergency center
EHR reading service	Health community bureau	Map service	Public provider
Patient ID service	Health community bureau	……	……

Scenario 1: referral appointments



Major hospital

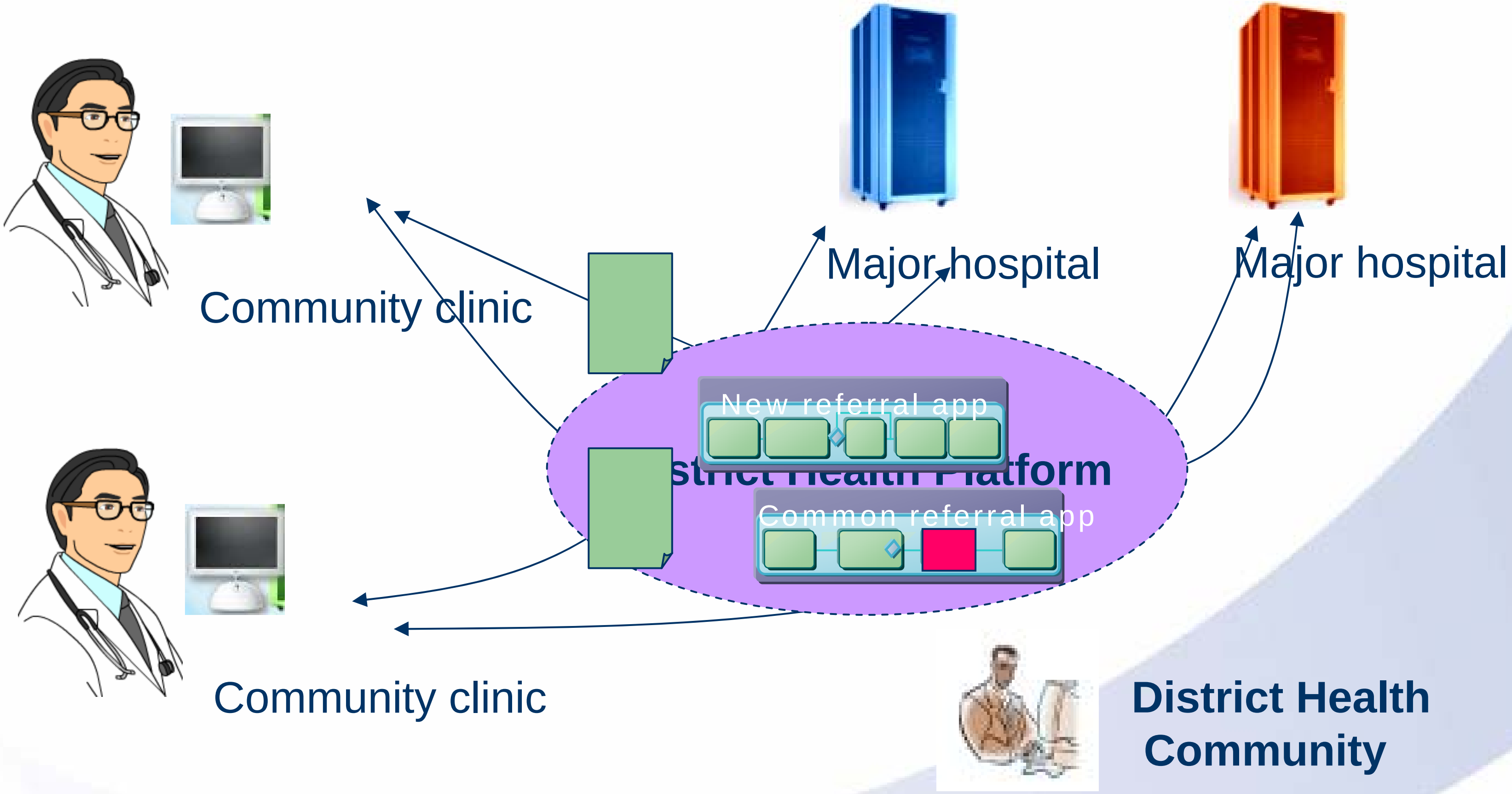
Major hospital

Patient

Distri mmunity

Community clinic

Scenario 2: healthcare contingency planning



Community clinic

Major hospital

Major hospital

New referral app

strict Health Platform

Common referral app

Community clinic

District Health Community

Benefits of VINCA Approach

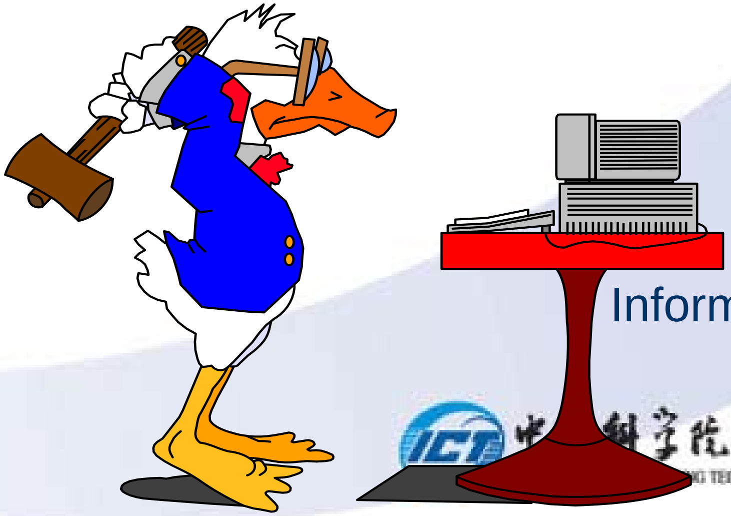
- Provide an integration view of all medical information and application resources among local medical organization
- Faster new healthcare application (service) programming and delivery
- Support early detection, identification and control of problems of health applications
- Provide an extensible environment for health application hosting and optimized execution

Summary

- **Cyberspace is getting closer. The above-stated approach and perspectives are proved to be in the right direction. The ways ahead are still horny.**

- **Our experiences indicates it is important to have close links to real value with model applications and close collaboration with the industry**

- **Innovation in business models would better not be understood as scientific advances. Many researches so far are rather ad-hoc. Heavier scientific explorations are need to deal with cyberspace challenges**

Thanks！