

Software Development for u-Healthcare services and Its Applications

24 October, 2012

Dr. Haeng Kon Kim

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Definition of U-Healthcare

❑ Concept in Narrow Sense

Medical staff utilizing IT to communicate with other medical staffs in remote area regards to medical knowledge or technology

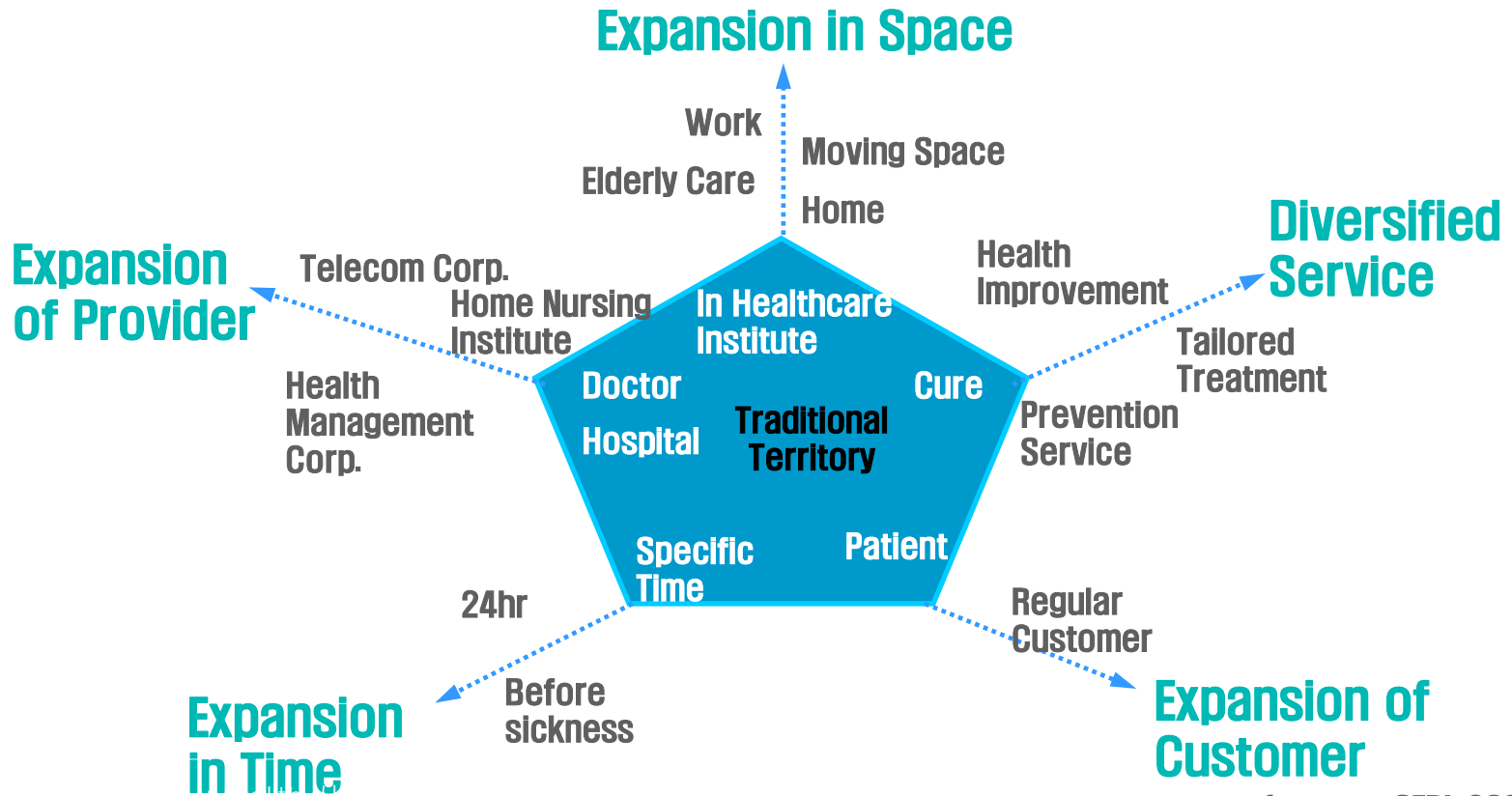
❑ Concept in Broad Sense

Providing medical service to the public anywhere, anytime in regards to prevention, diagnostic, cure, aftercare, etc.

● **u-Health : Ubiquitous + Healthcare + Health**

- Broaden concept of traditional remote healthcare, Healthcare, e-Health

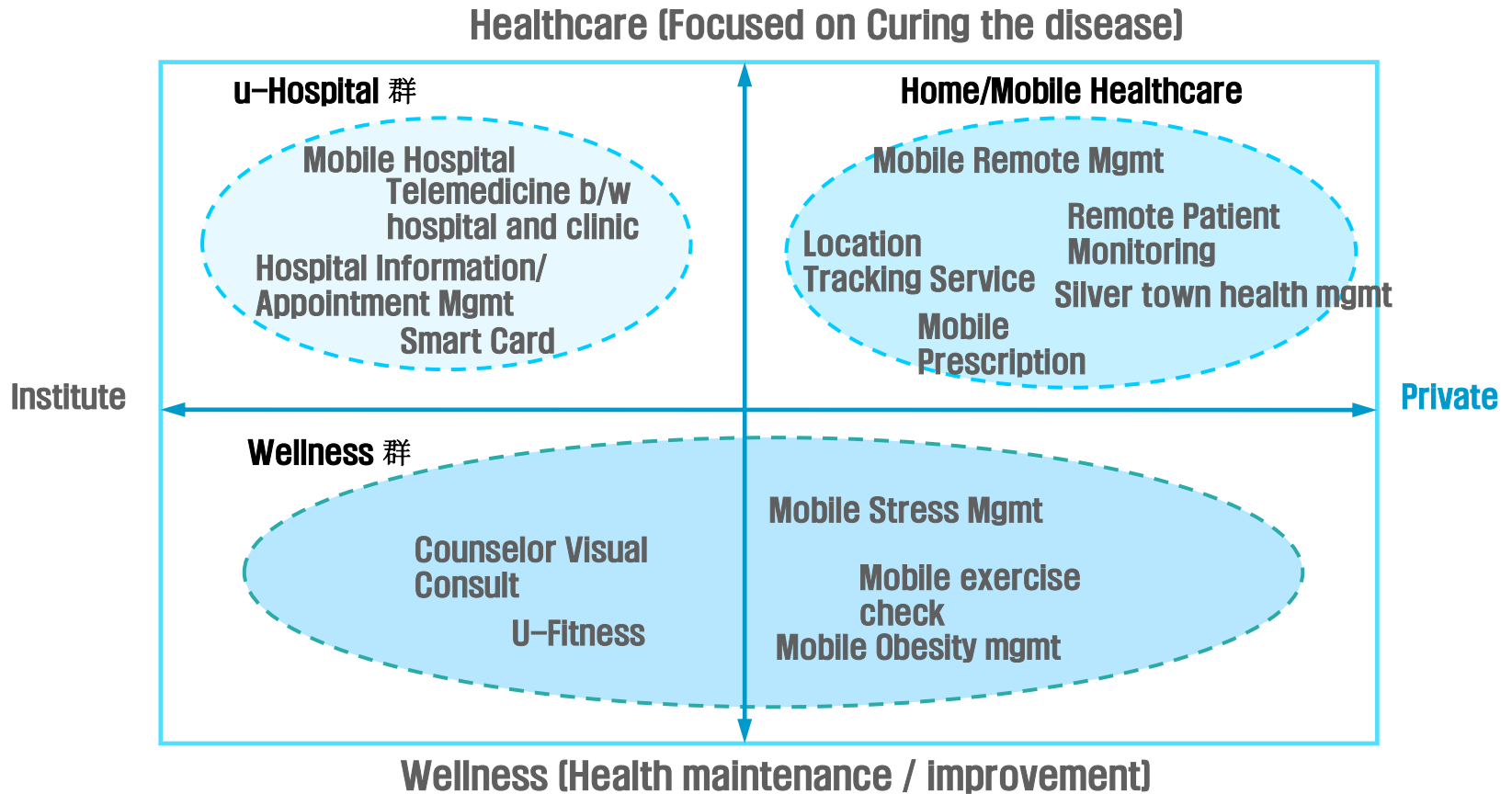
Scope of u-Health



(source: SERI, 2007.5)

u-Healthcare overview

Classification of u-Health



Healthcare paradigm is evolving ...

Today

Tomorrow

Treatment of patients

Paradigm

Health of citizens

Provider centric

Focus

Patient centric

**Episodic approach,
curative**

Time Space

**Lifetime care,
preventive**

Hospital based

Space scope

**Decentralized,
Community based**

invasive, uncomfortable

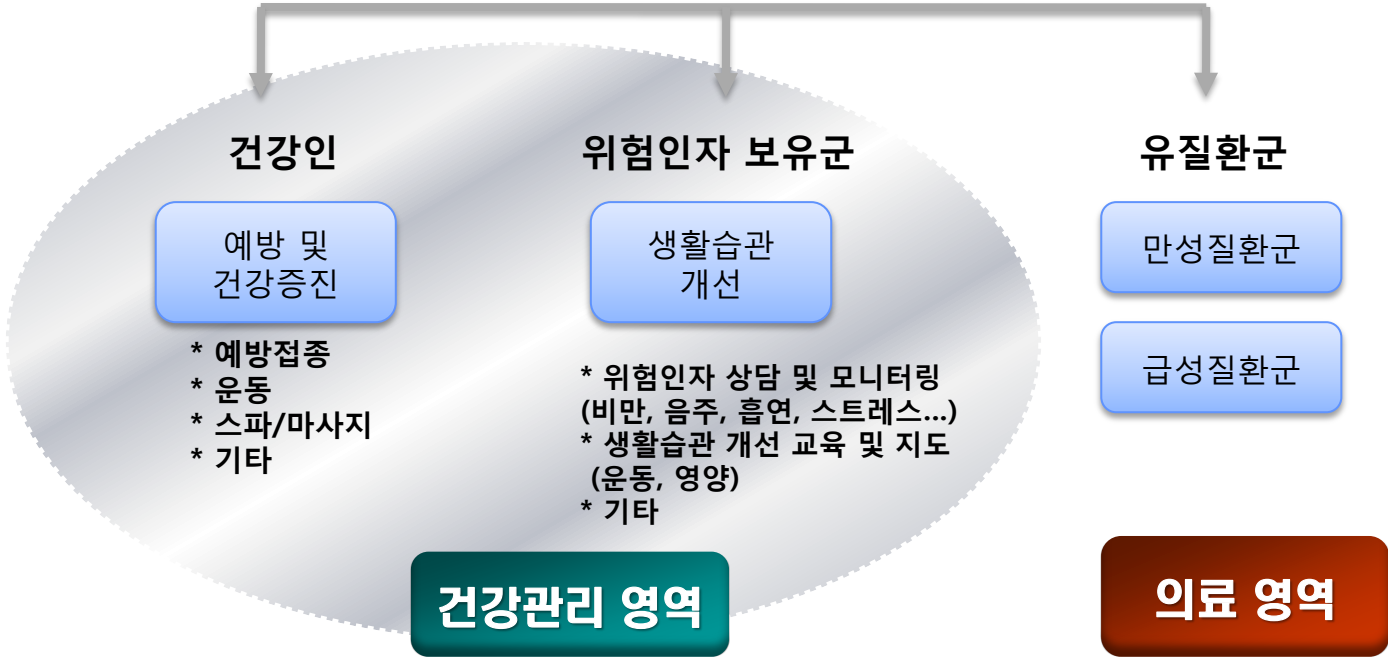
Treatment

**Less invasive visualization &
treatment**

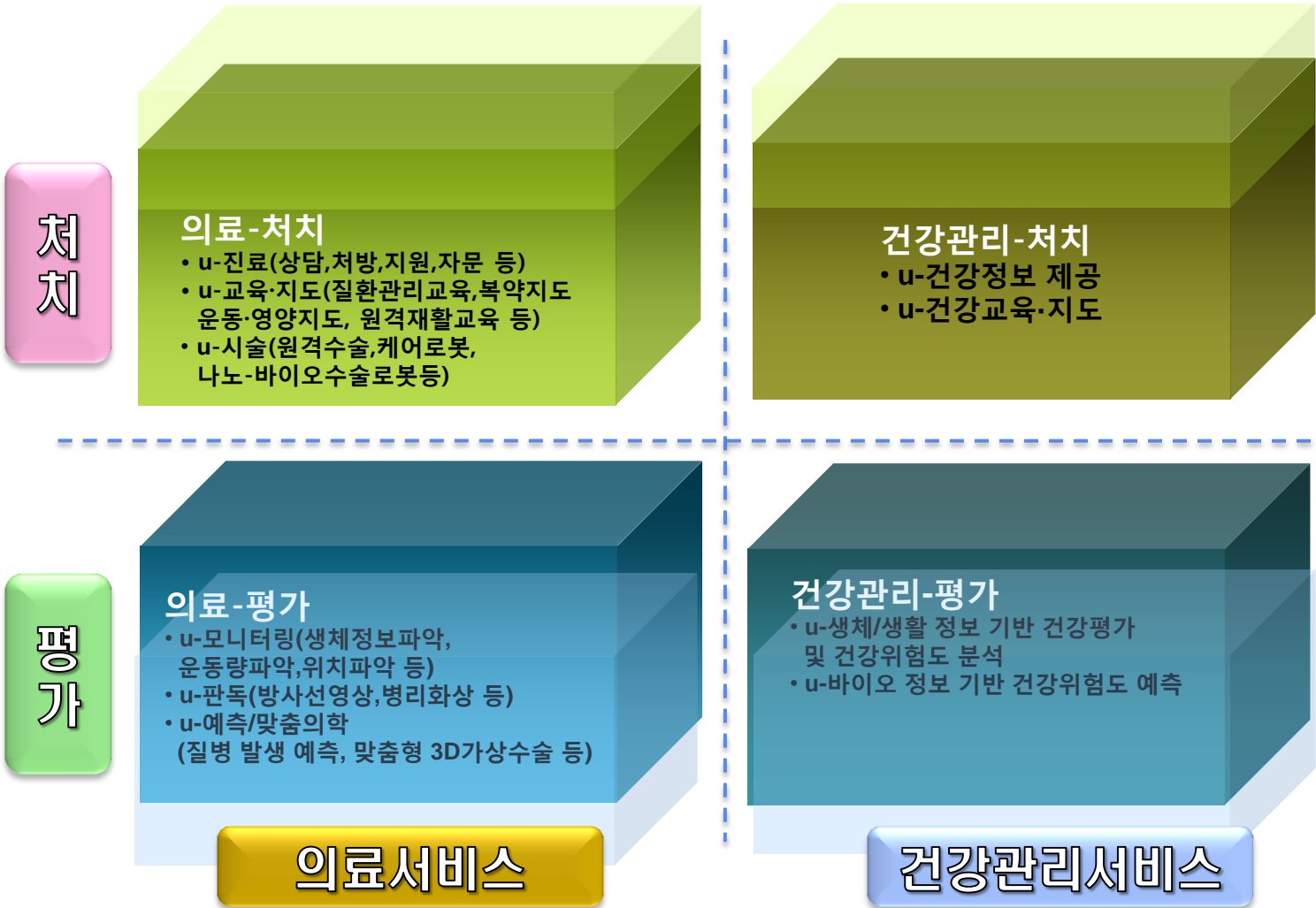
U-Health care 서비스 분류체계(1)-대분류

건강상태평가

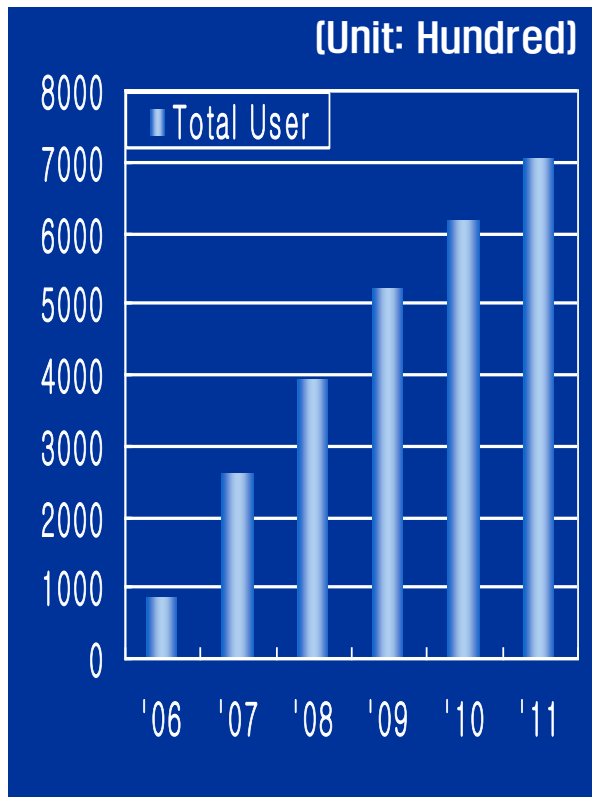
- * 건강검진
- * 건강위험도 평가(HAA)
- * 정신기능 평가 등



U-Health care 서비스 분류체계(2)-중분류



Healthcare market forecast – 1

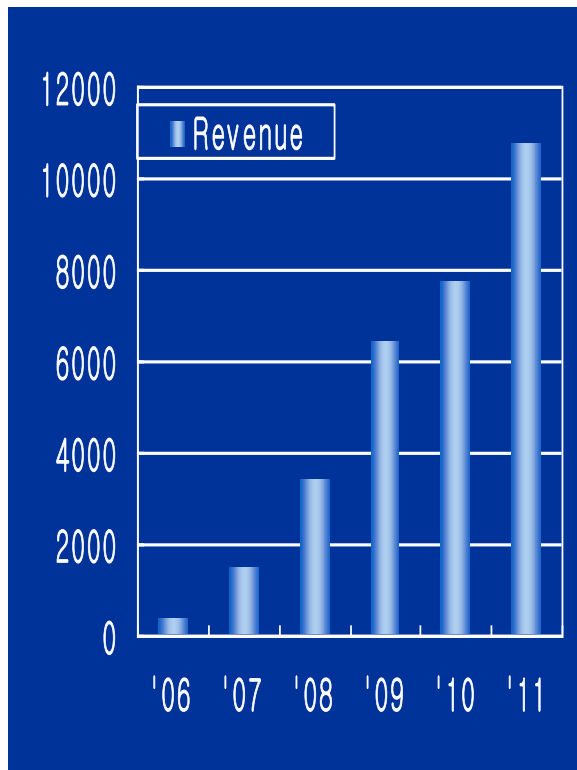


**u-Health Market Size:
Anticipated to be 7.026 Million
Population by 2011**

**☐ Serviced by Medical Institution: 6.128
Million Persons**

**☐ Personally Subscribing User: 1.362
Million Persons**

Healthcare market forecast – 2



U-Health Revenue

- ❑ Anticipated to be 1.075 Billion USD by 2011
- ❑ Serviced by Medical Institution Revenue : 562.4 Million USD
- ❑ Personally Servicing Revenue: 513.2 Million USD

New Market Creation

- ❑ Knocking Chronic Disease Management & Well-Being service market (Diabetic, Obesity, Hypertention)
- ❑ Support Multi-Media (PC, IPTV, mobile) in real time and service with profession and realistic methods

(Source: Institution for Information Technology Advancement, U-Health Demand forecast and Market Development, Feb,2006)

Related Law & Policy

Article 21-2 (Electronic Medical Record)

① Doctors or healthcare institutes can create and save medical record data in forms of Electronic Medical Record with approved electronic signature.

Article 30-2 (Telemedicine)

① Doctors or medical staffs can provide medical knowledge and techniques to patient in remote place using computer or IT technology.

Amended medical law (2002. 3. 30 announced / 2003. 3. executed)
Newly added articles




u-Healthcare case

Chungnam(Boryung city)

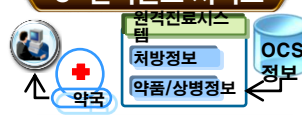


기구축 시스템



신규 구축 시스템

2007년도 u-Health 시범사업

<h4>이동형 u-진료</h4> <p>해상이동 u-진료 병원선 및 도서지역 보건진료소</p>  <p>건강진단서비스 원격 영상 서비스</p> <p>육상이동 u-진료 진료차량 및 사회복지시설</p>  <p>진료방문차량 서비스 원격영상 서비스 만성질환 모니터링 서비스</p>	<h4>u-생활습관관리</h4> <p>메디컬 피트니스 아산시 및 논산시 보건소 내</p>  <p>순환운동 프로그램 활동습관/운동 관리 원격영상 서비스</p> <p>헬스케어 지원 시스템</p> <ul style="list-style-type: none"> · 상황실 및 지원센터 구축 · 통합서비스 사이트 구축 · 의료 콘텐츠 확보 및 활용 · 홍보사이트 운영 및 동영상제작
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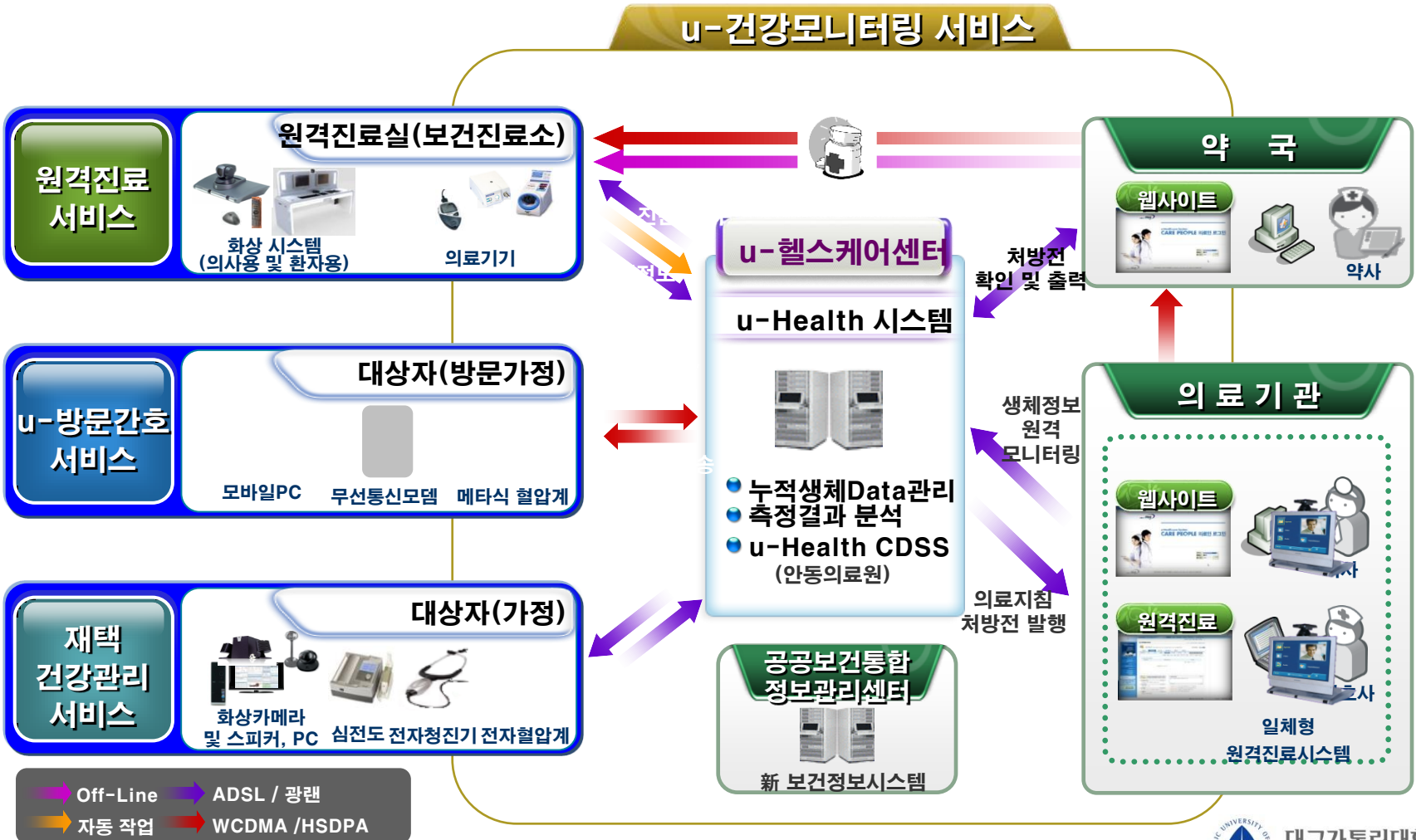
2008년도 u-IT 확산사업

<h4>U-원격진료 서비스</h4>  <p>원격진료시스템 처방정보 OCS 정보 약국 약물/상병정보</p> <p>전자처방전 및 약국택배 OCS 연동 RFID 인증</p>	<h4>U-방문건강관리</h4>  <p>디지털화 된 생체정보 생활습관 정보 지속적 생체정보 측정</p>
<h4>재택 건강관리</h4>  <p>u-Health 통합사이트 만성질환 및 심장질환자 관리 질환자의 상태 모니터링 CDSS 분석정보 제공</p>	<h4>지원시스템 및 연계 서비스 강화</h4> <p>통합사이트 기능 강화 홍보사이트 개편 관리기능/통계 강화 신 보건정보시스템 연계</p>

<h4>공인인증 및 보안모듈</h4> <ul style="list-style-type: none"> · 인증서/개인키 관리 · 상호 인증 · 전송 데이터 암호/복호화 	<h3>u-Health 통합사이트</h3>	<h4>통합연동시스템</h4> <ul style="list-style-type: none"> · 서비스간 데이터 연동 · 의료측정장비 데이터연동 · 사용자 별 통합 관리 UI 제공 	<h4>콜센터</h4> 	<h4>상황실</h4>  <p>상황정보 통계정보</p>	
<h3>u-Health Framework</h3>					
원격건강 측정 시스템	자가문진 시스템	측정기기 연동시스템	건강위험요인 판독 시스템	u-Health CDSS	생활습관 개선 시스템

u-Healthcare case

Kyungbuk(Youngyang gun)



u-Healthcare case

Kangwon(Kangreung city)



의료지도의 구현



치매조기진단
허약노인 외병예방
만성질환관리
보건교육



치매환자의 전문의 직접 진료
만성질환자 관리
방문간호 지원
의료지도
최신의약품 복용가능

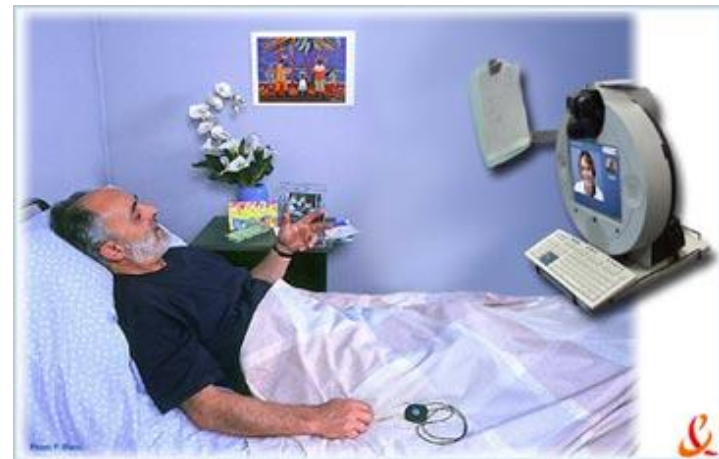
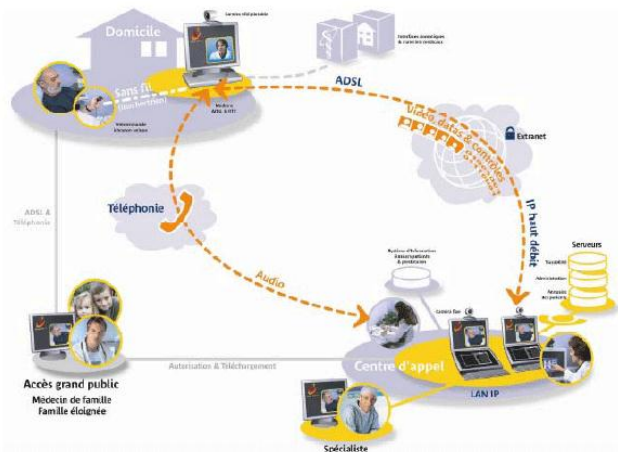


방문간호

u-Healthcare case

Medical Care Continuity (MCC)

- Serviced to patients who need consistent care
 - Italy(4 companies), France(6 companies), Belgium(3 companies), Poland(2 companies) initiated operation as Consortium ('05.2 ~ '06.7)
- Recovering patients at home after treatment of Cancer or New disease
- Diagnose exact status of the patient thru telemedicine system.
 - Telemedicine staff monitoring and checking on the patient 24/7
 - Patient information shared b/w hospital and related personnel



u-Healthcare case

Remote Presence 6

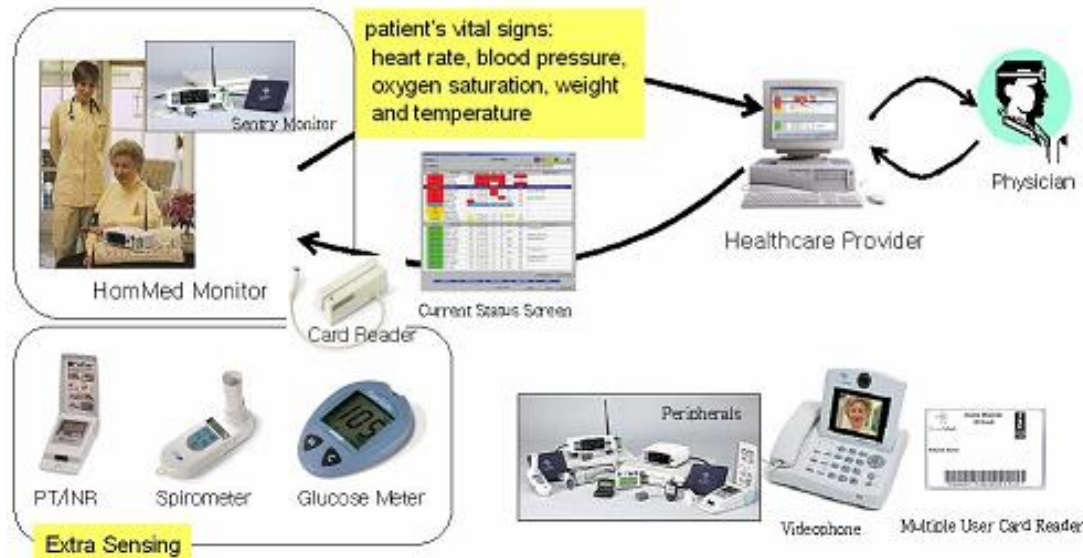
- RP6(Remote Presence 6) Robot: Medical professional using wireless technology to communicate with patient in remote place.
 - Imperial Univ. and Intouch Health Corp. of the U.S. has developed in 2005 and implemented in St.Mary's Hospital as pilote project
 - Robot's role is to connect b/w patient and doctor, not to physically diagnose the patient directly.
 - Doctor can see the status of the patient, communicate, and view the medical record or X-ray results in remote place thru controlling the robot with joystick



u-Healthcare case

Honeywell

- HomeMed LLC: Automation & Solutions
- Expanded operation to diseases such as Hemorrhagic Cardiac Failure, hypertension, coronary, diabetic, chronic lung disease...

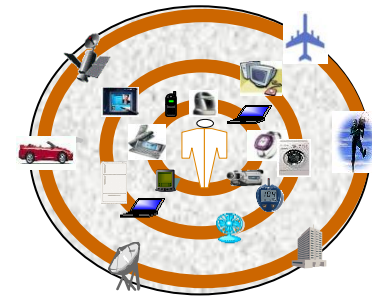
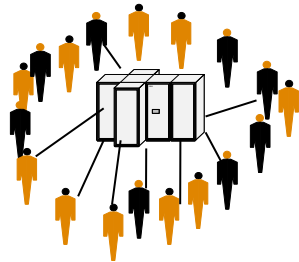


Technology trend & Future Scenario

**First Wave : Main frame
1980's**

**Second Wave : PC
1990's**

**Third Wave : Ubiquitous
Computing Concept
21st Century**



Wide spread use of Internet

Network

Wireless

Scientific/Engineering
Calculation

Word
Processing

Intelligent Services
& entertainment

**Ubiquitous
Computing**

Building-size
Mainframe

Box-size
Personal
Computer

Portable
Devices

Disappearing
Devices





Home Healthcare Scenario

Analysis and store acquired vital sign data
Check health status by analyzing accumulated acquired vital sign data through sensor

Health info Analysis

Health Care Server

Vital sign analysis (weight, body fat, urine)

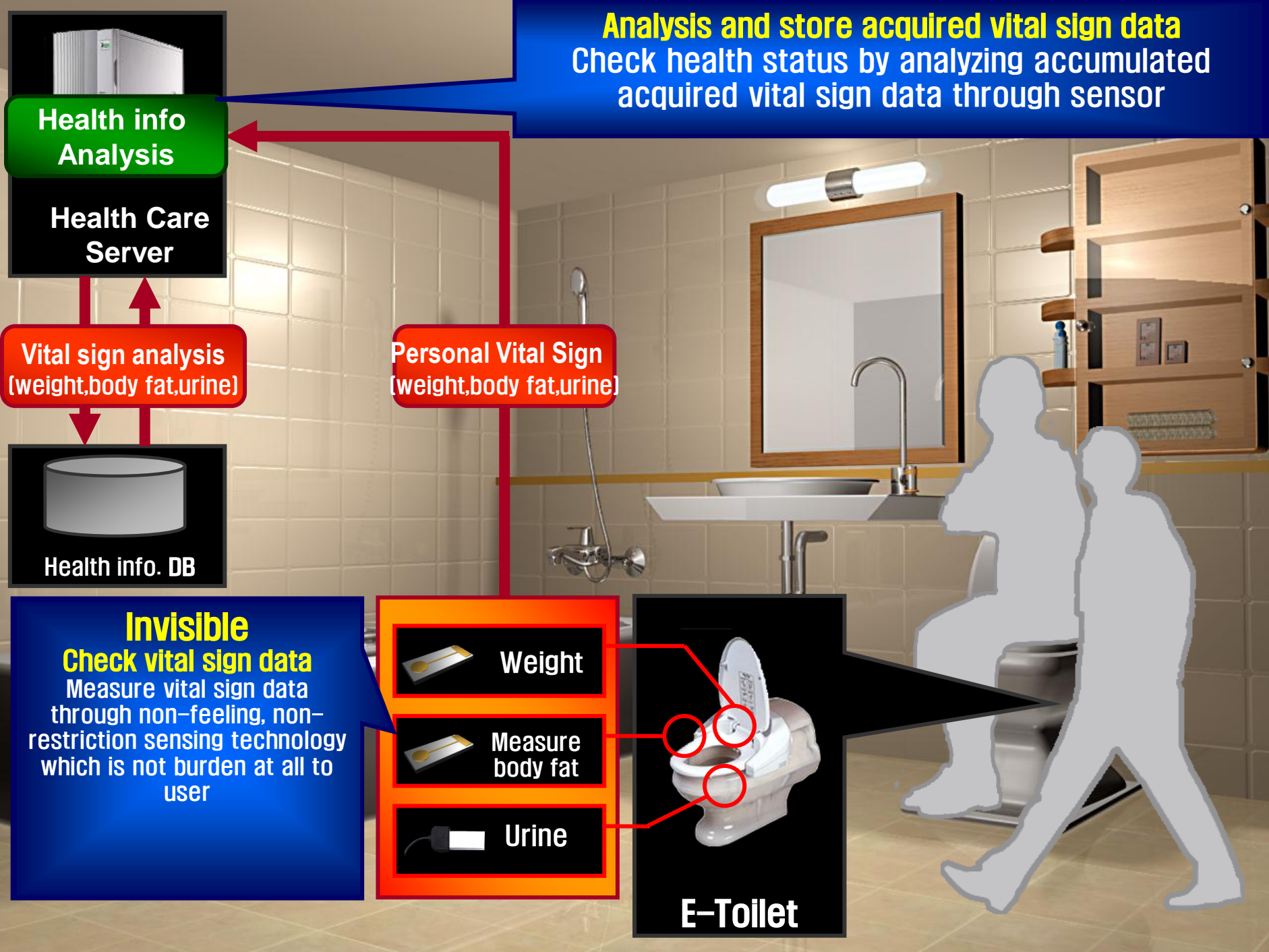
Personal Vital Sign (weight, body fat, urine)

Health info. DB

Invisible
Check vital sign data
Measure vital sign data through non-feeling, non-restriction sensing technology which is not burden at all to user

-  **Weight**
-  **Measure body fat**
-  **Urine**

E-Toilet





Cope with emergency

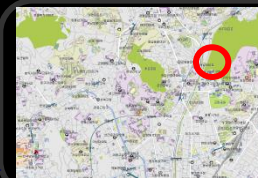
Pinpoint the location of patient

Search near hospital, transfer medical data

Reserve bedroom, doctor, nurse



Transport patients



Search near hospital



Patient data transfer



reserve bedroom, doctor, nurse

Analyze vital sign

Emergency

Emergency Processing

Quick processing for patients in case of emergency situations

Vital sign
(breath, ECG, pulse)

Vital Sign
(blood-sugar, heart rate)

Emergency



Smart Shirts



Smart Watch

Technology trend & Future Scenario

Digital Hospital



- Hospital to Data Warehouse
- Doctors' role to Data Mining
- Diagnose converts to AI based system
- Convergence Tech. Contest
- Information System based value creation



Technology trend & Future Scenario



침단실버 서비스

- 소변분석 사용자 등록
- 소변분석 데이터 열람



연동

재택 모니터링

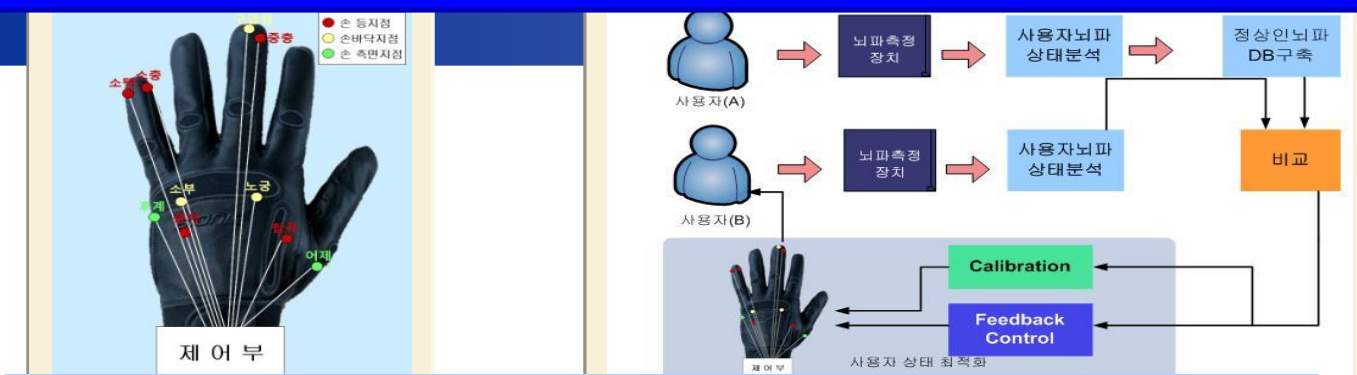
- 소변검사 및 분석
- 검사결과보기
- 사용자선택
- 검사결과 데이터 전송



소변검사를 통해 조기 발견 가능한 질환들

비뇨기질환	신장질환,신장염,방광염,신장종양,신증후군,신우신염,요로감염, 요로결석,방광결석, 요붕증,요로출혈,신결핵,신장암,알카로시스
성인병	황달,간질환,담도질환,담석증,간경변,췌장염,고혈압
만성질환	당뇨병,신성당뇨, 만성신장염
기타질환	갑상선기능항진증, 발열성질환

오감정보처리기술 및 뇌파를 활용한 사용자 적응형 임상진단/치료시스템 출원번호 : 10-2007-0091771

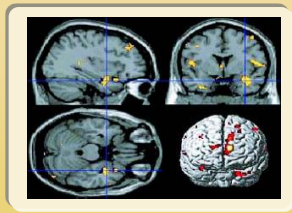
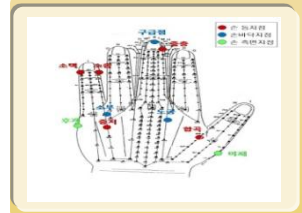


전체 시스템구성도

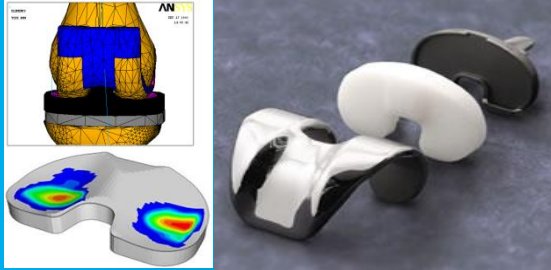
양/한방의학

한의학

양의학



뇌질환 진단 및 치료



한국 노령환자 맞춤형
인공 슬관절 개발

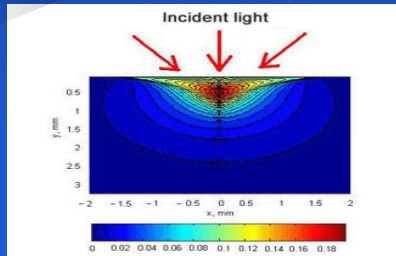
양방치료

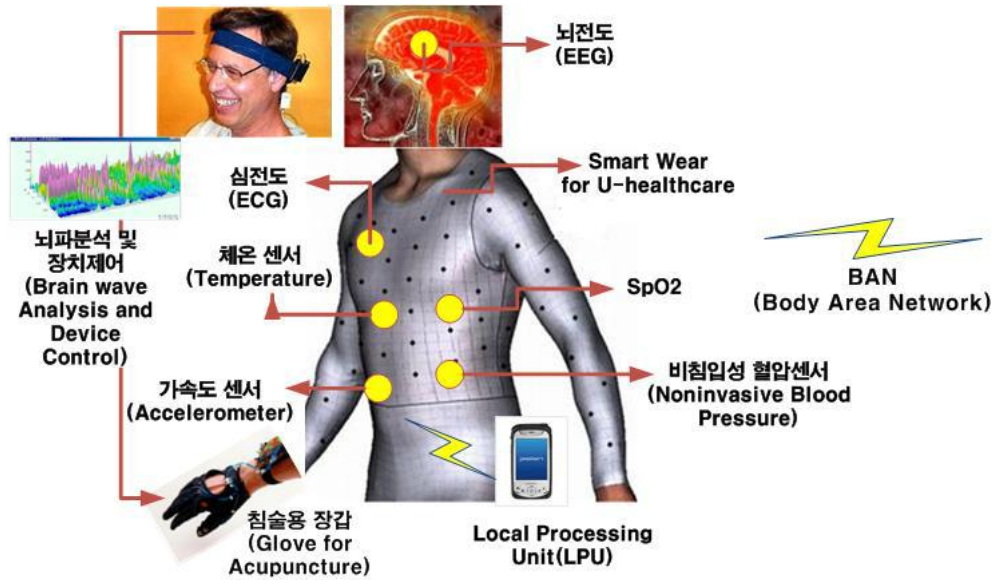


노령환자
슬관절 질환

한방치료

저출력 레이저를 이용한
침·뜸 융합기기 개발





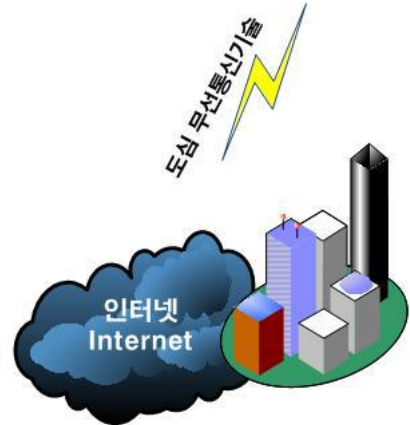
차량용 AP (Access Point)



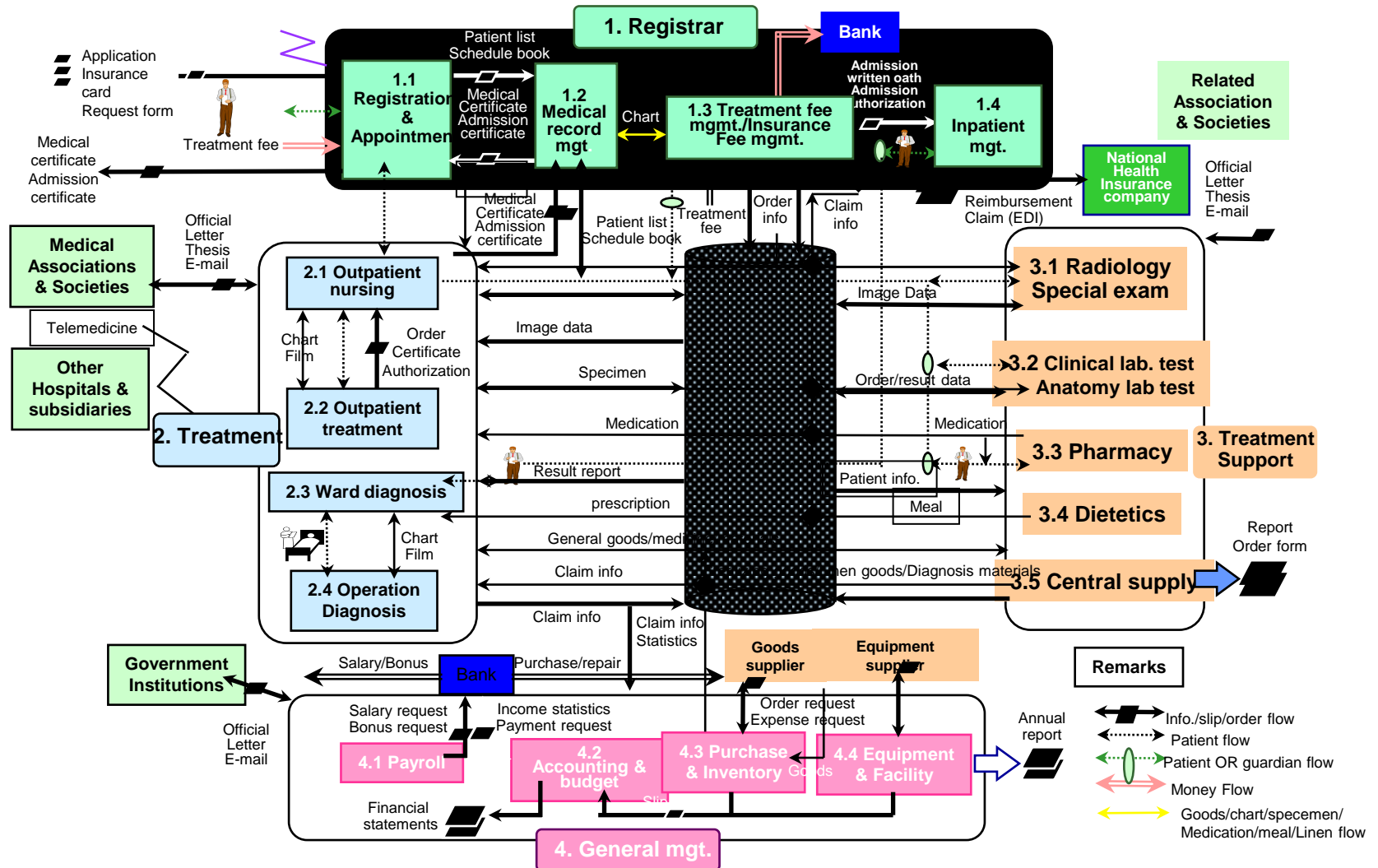
U-healthcare Monitoring Center in Hospital



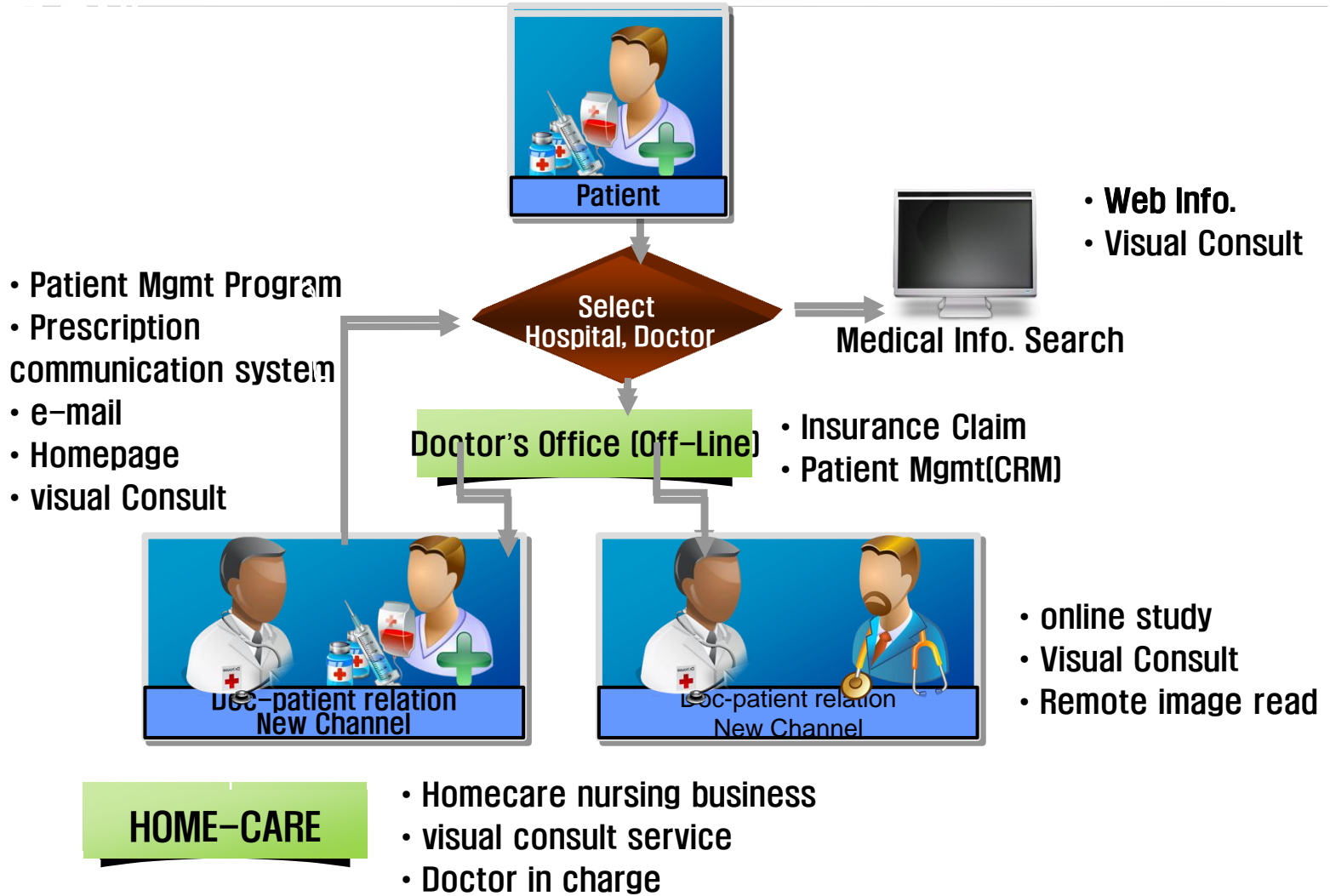
도심 무선통신기술



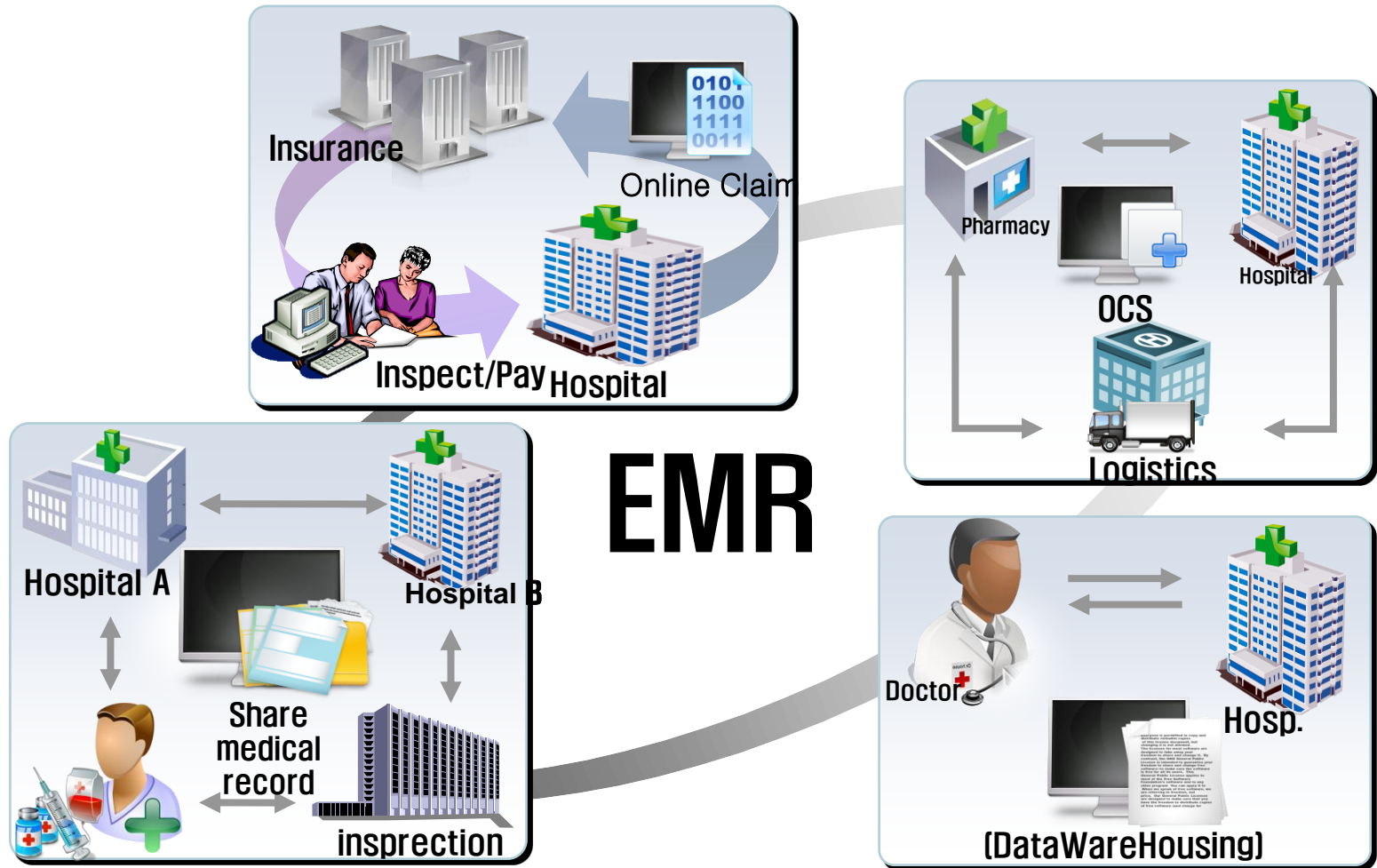
Software development in u-Healthcare



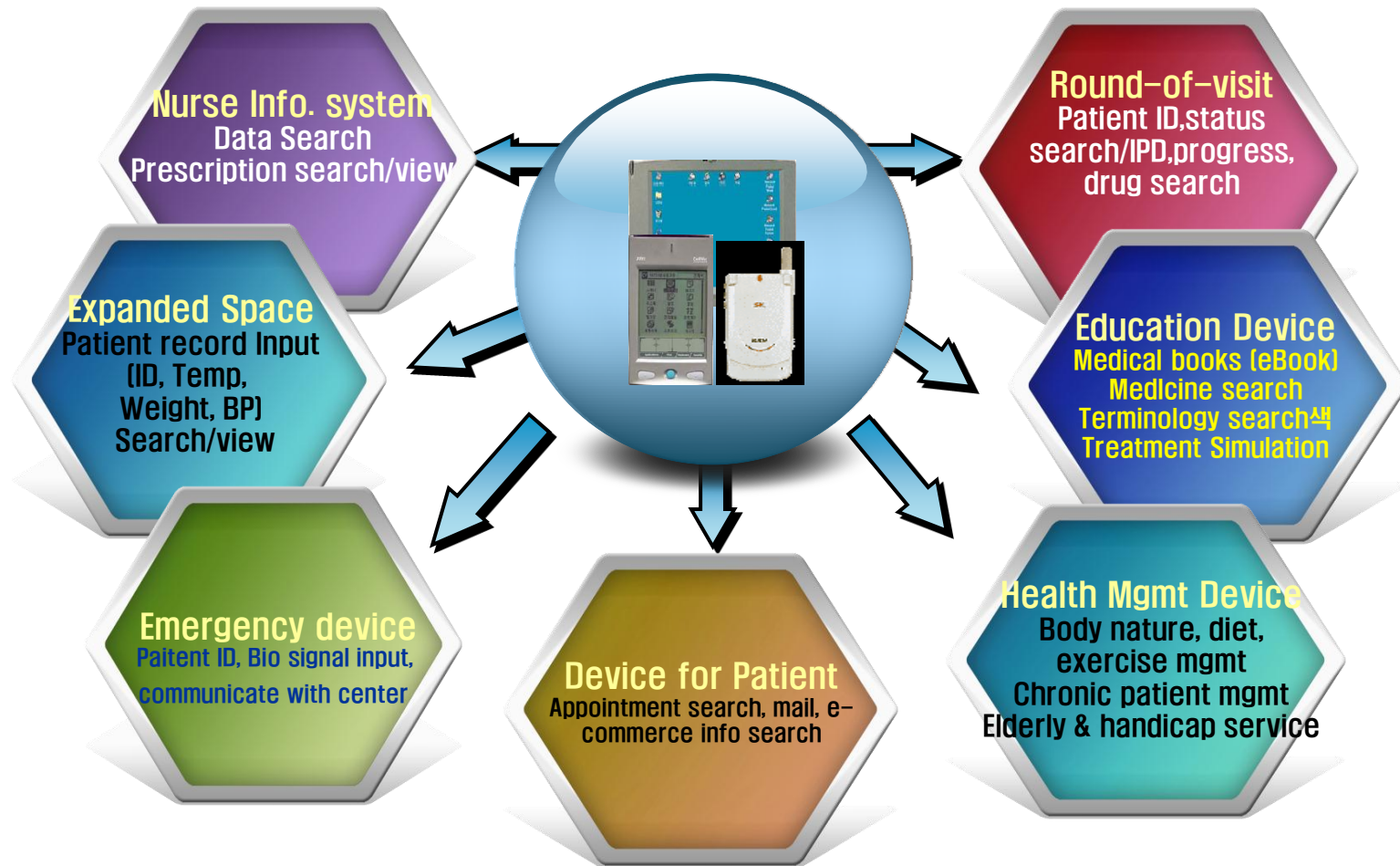
Software development in u-Healthcare



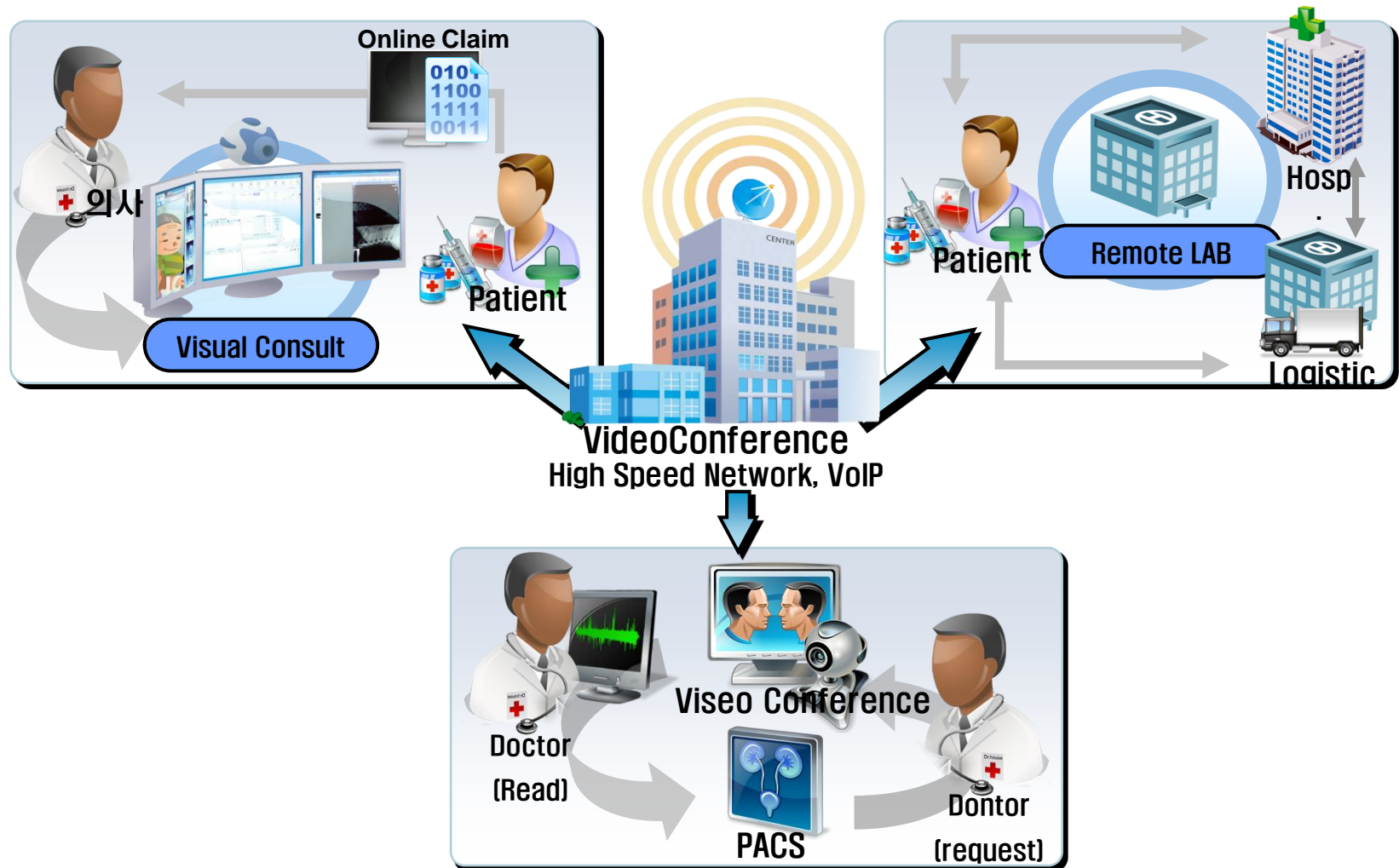
Software development in u-Healthcare



Software development in u-Healthcare

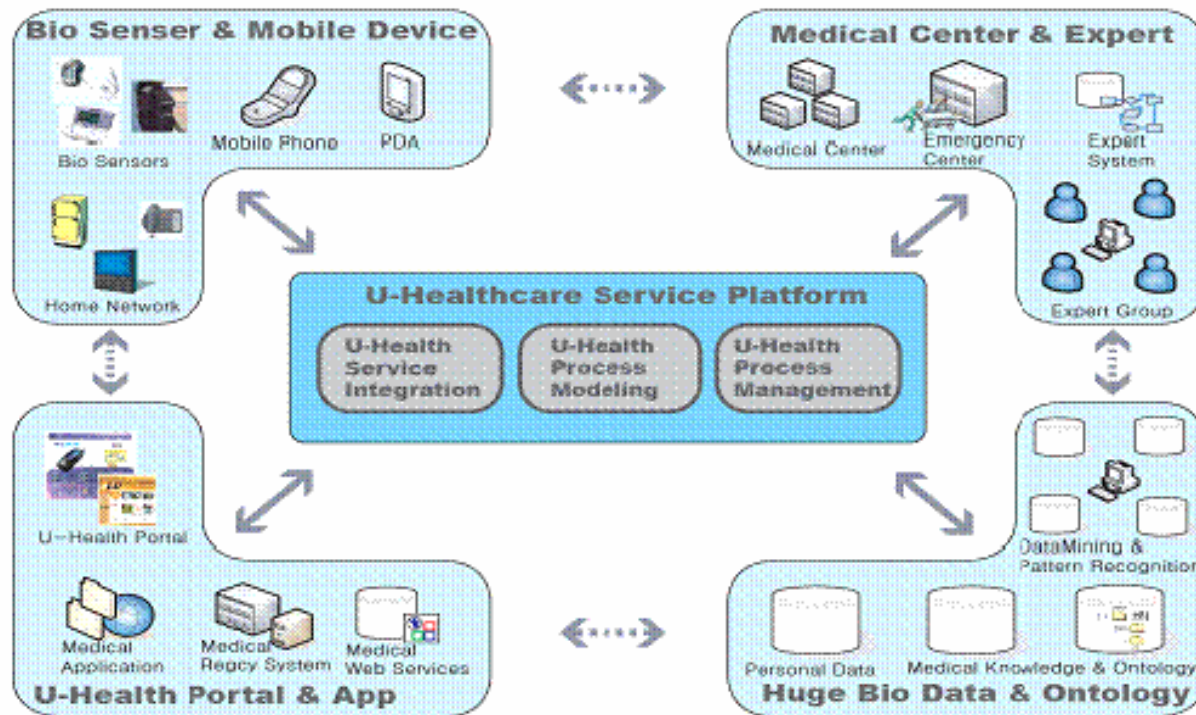


Software development in u-Healthcare



Software development in u-Healthcare

u-Health service platform

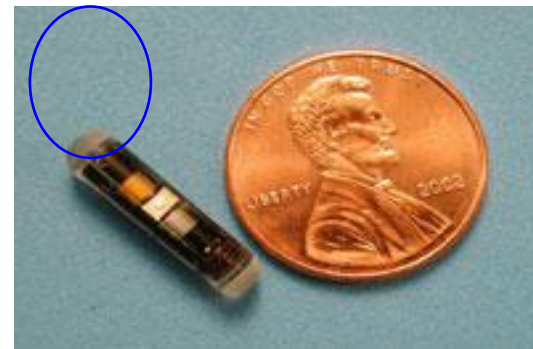


Sensing Technology

- ❑ Non-restrictive, non-conscious Bio signal extracting technology
- ❑ Bio signal analysis and verification technology
- ❑ Bio signal handling technology
- ❑ Bio signal system miniaturization technology (BioMEMS)
- ❑ Multidimensional sensor integration technology
- ❑ Sensor System integration technology



Campus Micro Technologies, Germany

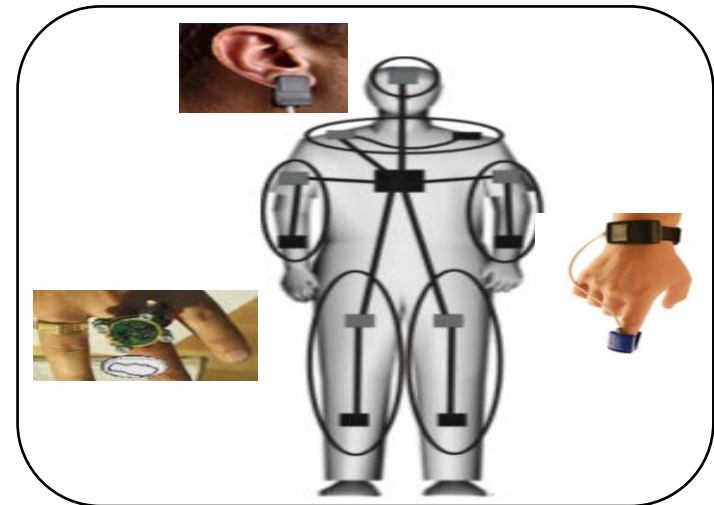
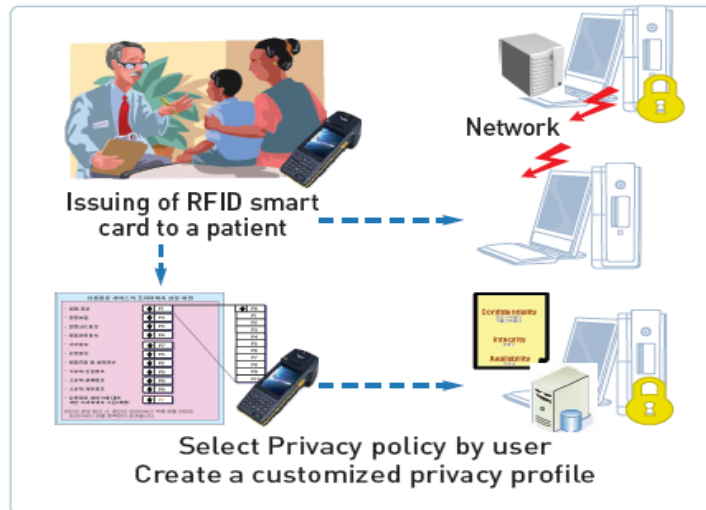


인체삽입혈당센서, 메디트로닉사

Software development in u-Healthcare

Wireless Communication Technology

- ❑ Sensor network that allows to gather real-time info.
- ❑ wireless gateway technology
- ❑ home network
- ❑ Body Area Network(BAN) for personal healthcare

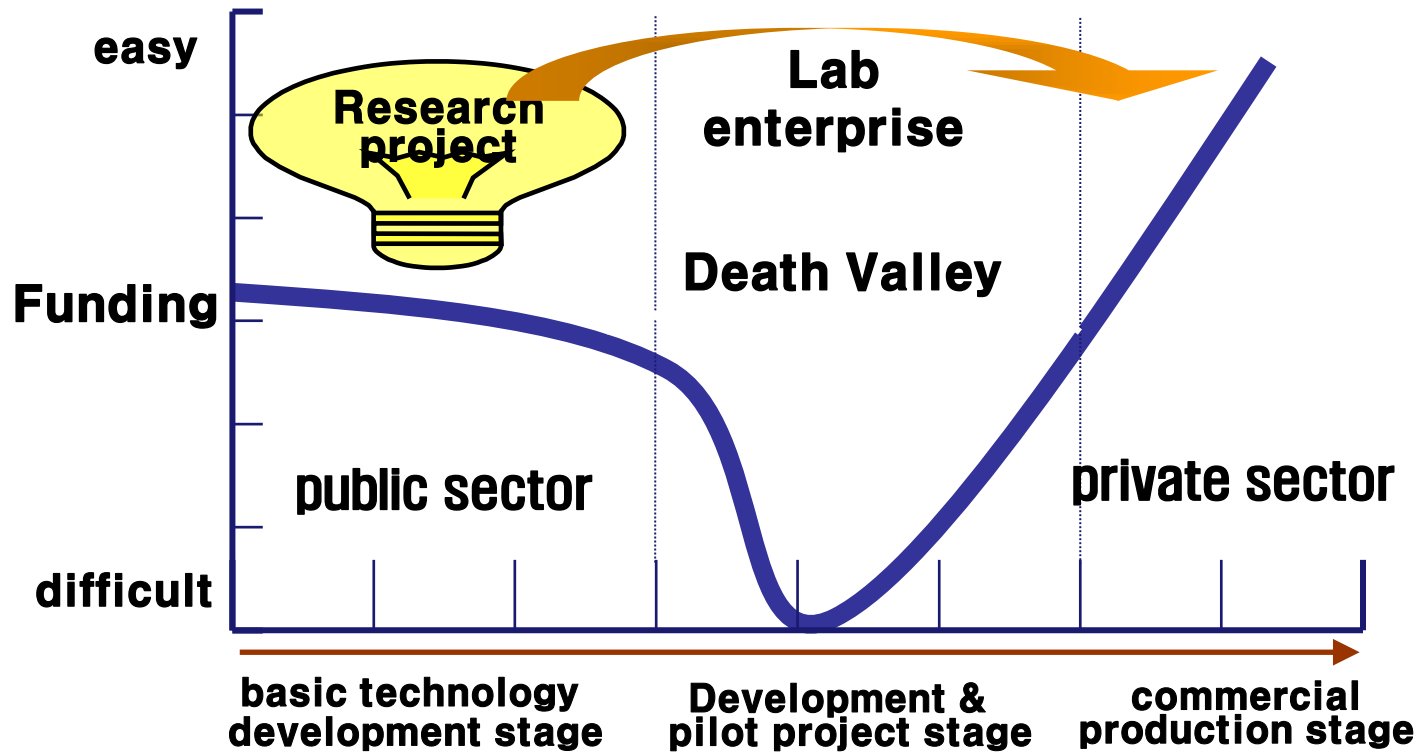


AI & DB Technology

- ❑ Context Awareness Technology
- ❑ Disease pattern analysis and forecasting
- ❑ Decision supporting system
- ❑ Ontology-based data representation
- ❑ Datawarehousing for Healthcare



Software development in u-Healthcare



(source : US ministry of commerce, OECD Work-Shop Dec. 2001]

Thank You

