



Personal Content Management on PDA for Health Care Applications

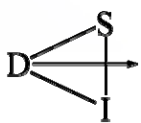
<http://mobmed.axmedis.org>

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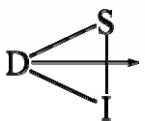
nesi@dsi.unifi.it,

<http://www.disit.dsi.unifi.it>



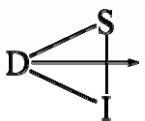
Outline

- Scenarios
- Mobile Medicine Content Examples
- Content Access and technical requirements
- Intelligent content
- AXMEDIS format and model
- The architecture of Mobile Medicine
- PDA Organizer for content
- Mobile Medicine: Content production
- Conclusions



Scenarios of Mobile Medicine

- **intelligent solution** in the hands of doctors and assistants for:
 - **Continuous Medical Educations**, CME, during the doctor life and continuous update;
 - **Calculation** of dosages, status/conditions, risks,..
 - **Education**: medical University/School level;
 - **Emergency help** medical personnel to take decisions and remind procedures/protocols, etc.;
 - **Collect data** from patients that cannot be easily collected or that are too expensive to be collected with mobile instruments;
 - **EPR**: *Electronic Patient Record report, excerpts*
- **Simple, usable and accessible OFF-LINE**



Mobile Medicine: Content examples

■ Content Examples:

■ Educational:

- Sliding Shows, video, document, audio, images...

■ Procedures/protocols: (mini applications)

- Emergency, routines, ...

■ Dosages for intensive therapy: (mini applications)

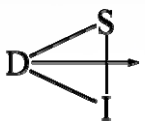
- Formulas, ranges, different application cases

■ Calculators for several aspects: (mini applications)

- Risk analysis, ...e.g.: pulmonary emboli....
- Classification of conditions/damages, ...

■ Needs of customizing:

- user interface, behavior, accessibility rights, etc.



Mobile Medicine Content

AXPDAPlayer (versione mobile draft non validata numero 0.1)
18/3/2009, Rev. 0

Dipartimento del Cuore e dei Vasi
Dir. Prof. G.F. Gensini
Terapia Intensiva Cardiologica
Medico-Chirurgo
Dott. ssa S. Valente, Lazzeri, Dott. A.

Farmaco: Abciximab
Nome commerciale: ReoPro

Calcolo dosaggio del ReoPro in bolo (in ml)
Dose 0,25 mg / kg
Fiale non diluite (fiale da 10 mg in 5 ml)

Kg

Calcola

1 2 3 4 5 6 7 8 9 0

! @ # \$ % & * ? /

File

AXPDAPlayer

Farmaco: Abciximab
Nome commerciale: ReoPro

Calcolo dosaggio del ReoPro in bolo (in ml)
Dose 0,25 mg / kg
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Kg

Calcola

1 2 3 4 5 6 7 8 9 0

! @ # \$ % & * ? /

File

procedure



Adobe Reader LE

CONTROPULSAZIONE INTRA-AORTICA

IN TERAPIA INTENSIVA

Modalità di gestione dello IABP in UTIC

Strumenti Menu

DOC

AXPDAPlayer

"Contropulsazione intra-aortica in US: risultati del Registro B..."

Mortalità intra-ospedaliera di cause

- 10,8% US
- 18% non-US

Complicanze correlate ad IABP

Mortalità legata ad IABP

- 0,05% US
- 0,07% non-US

Ischemia maggiore dell'arto

- 0,9% US
- 0,8% non-US

Sanguinamenti severi

- 0,9% US
- 0,8% non-US

La frequenza di complicanze correlate ad IABP è bassa nei centri US che nei non-US

View File

video



AXPDAPlayer

Classificazione Neurologica Standard dei Traumi Midollari

MOTORIO: MUSCOLI CHIAVE

Inserire un valore da 0 a 5 oppure lasciare la cella vuota se non valutabile.

0 = paralisi totale

1 = contrazione palpabile o visibile

2 = movimento in assenza di resistenza

3 = movimento con gravità

4 = movimento contro parzial resistenza

5 = movimento con forza normale

Cella vuota = Not Testable (N.T.)

	D	S	Fless. gomiti	Est. gomiti
C5				
C6				

File

Dosages

AXPDAPlayer

Calcolo GFR (Cockcroft-Gault)

età

peso (Kg)

creatinina serica

donna?

Calcola

GFR = ?

1 2 3 4 5 6 7 8 9 0

! @ # \$ % & * ? /

1/2 , ; : . ABC

File View

Assessment

AXPDAPlayer

SENSITIVO: PUNTI SENSITIVI CHIAVE (3/3)

	Sensibilità Tattile Superficiale		Sensibilità Dolorifica	
	D	S	D	S
L1				
L2				

File View

AXPDAPlayer

(versione draft, non approvata/validata) DAI DEA e Medicina e Chirurgia Generale e di Urgenza SOD Osservazione Breve Intensiva

Scegli un farmaco!

ADRENALINA

AMIODARONE

DILTIAZEM (DILZENE)

DOBUTAMINA (DOBUT)

DOPAMINA (DOPAMIN)

EPARINA

ISOSORBIDE DINITRATO (ISOSORBIDE)

File

AXPDAPlayer

Adrenalina: fiale 1mg/1ml

Diluizione: 10 fiale in 47 ml di SF o G5 (1ml=60mcg)

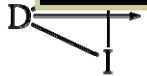
Dosaggio iniziale: 1-2 mcg/min=1-2 ml/h

P. volumetrica

Diluizione: 1f in 250 ml di SF o G5 (1ml=4mcg)

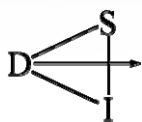
Dosaggio iniziale: 1-2 mcg/min=15/30 ml/h

File View



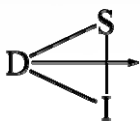
Mobile Medicine Content Access

- Collect content on their mobile device, PDA
- Access to personal collection in any conditions
- Navigate into the collection via several views:
 - medical, taxonomy, classif., description, etc.
 - Use data based: less used, most, recent, etc.
- Querying into the collection
- Keep updated the content collection automatically
- Keep the same content accessible on PC/PDA
- Licensing and rights controls to access and use (patience info and/or record)



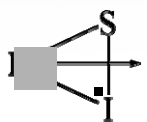
Technical Content Requirements

- **have to be indexed** with all its metadata and semantic information into the local database
 - **may arrive into the device** via any channel and solution
 - **has to be automatically updated** into the device without the user intervention
 - **may present links with other content** elements
- **may change behavior** on the basis of
 - user preferences/profile, device capabilities, network capabilities, general context description, device status
- **may request to user to provide info;**
 - **e.g.:** collection of patient data, perform actions on a checklists, do annotations, to create a multimedia scrapbooks, to provide user generated content, etc
- **may communicate with some central server** some messages;
 - for example: to mark that a content segment has been completed, report obtained data, decision taken, or possibilities browsed, ..



Intelligent Content

- A number of **cross media content** formats: SCORM, MXF, NewsML, MPEG-21, Flash, HTML, etc.
- **Major Issues** for cross media content (DMS 2008):
 - Packaging: Metadata and descriptors + essences
 - Distribution: download, streaming, progressive, P2P, ..
 - Hierarchical nesting levels: IPR, Metadata, etc.
 - Intelligence: profiling, decision, scripting
 - Tools: Players and Authoring tools
 - Automated production, repurposing, delivering
 - Protection: CAS vs DRM
 - ...



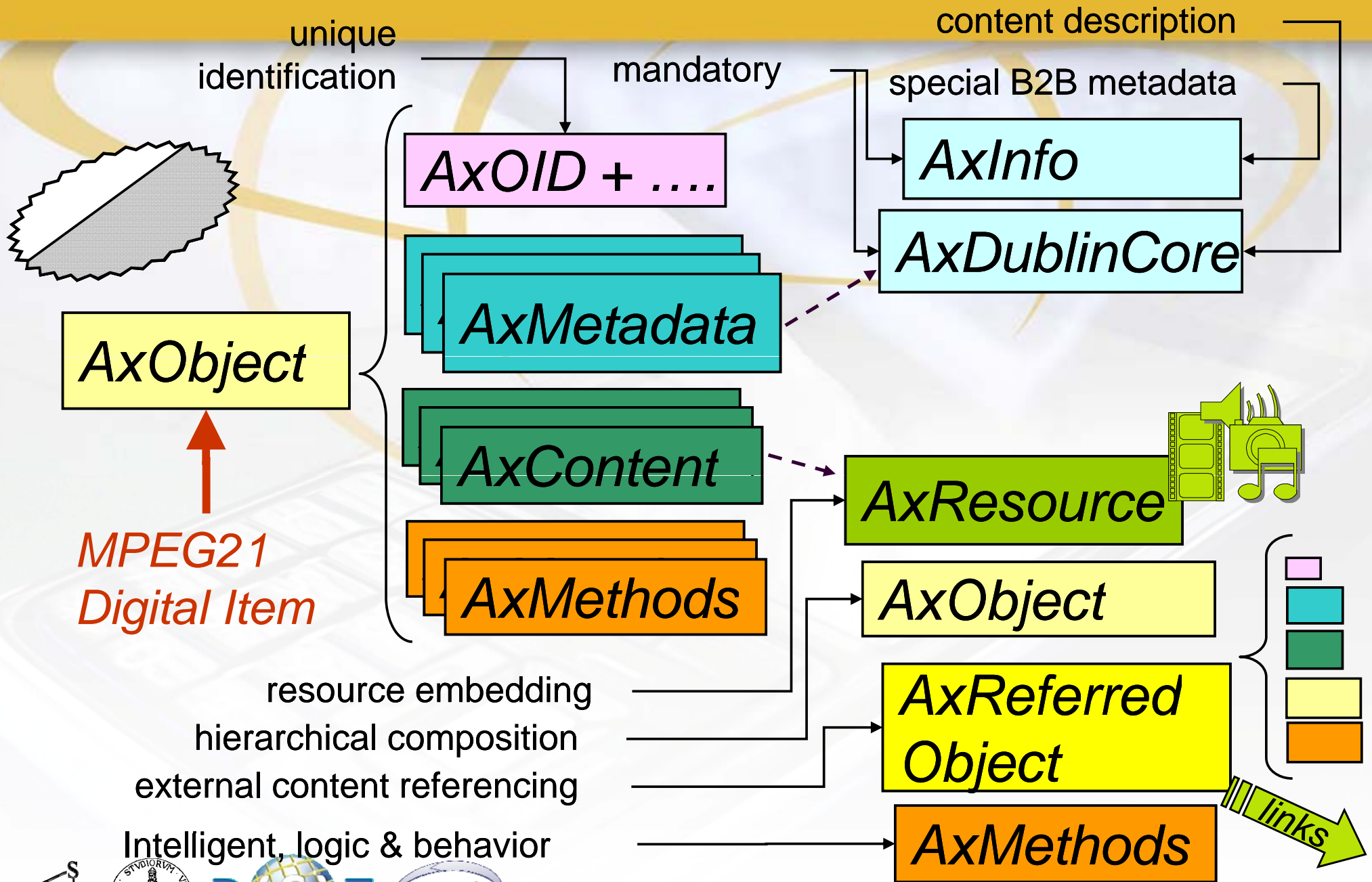
Interactive and intelligent content



- integrated media info
- proactive with the users
- attractive experience
- personalized
- multichannel interoperable
- device interoperable



AXMEDIS Object/Package Model



Examples: Intelligent Content

■ Single Files:

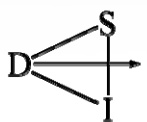
- audio, video, documenti, immagini, etc..

■ Interactive Content:

- HTML or SMIL as technology of User interaction
- Guides, games, etc.
- Valoriz. of Cultural Heritage content
- Educational Content

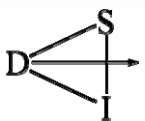
■ Proactive Wizard:

- Video messg. Recording, UGC
- Assisted upload
- Production of licenses
- User profile processing
- Taking decision
- Local indexing/searching
- Local assistant
-



AXMEDIS/MPEG-21

- **Structure:** hierarchical, links, etc.
- **Distribution:** download, p2p, progressive, stream
- **Classification:** DC, taxonomy, any MD, descriptors
- **Identification:** any IDs, for DRM AXOID
- **Behavior:** change on the basis of context, descriptors, axmethod code
- **Processing:** axmethod as in the AXCP, plugins,..
- **Presentational/interaction:** SMIL, MPEG-4, HTML, ...
 - Activation of methods, forms,
- **File format:** direct play without unpack of video,
- **DRM/prot** via MPEG-21 models and AXMEDIS implementation
- **Annotations:** possible



Mobile Medicine

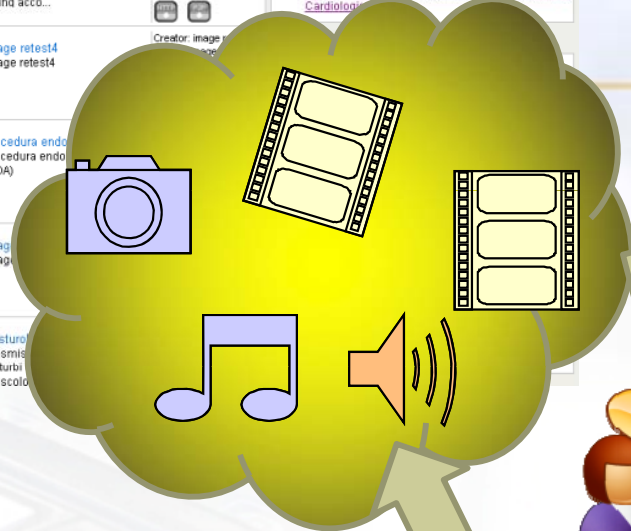
Automated
Back office



Complex content



UGC, web page
comments

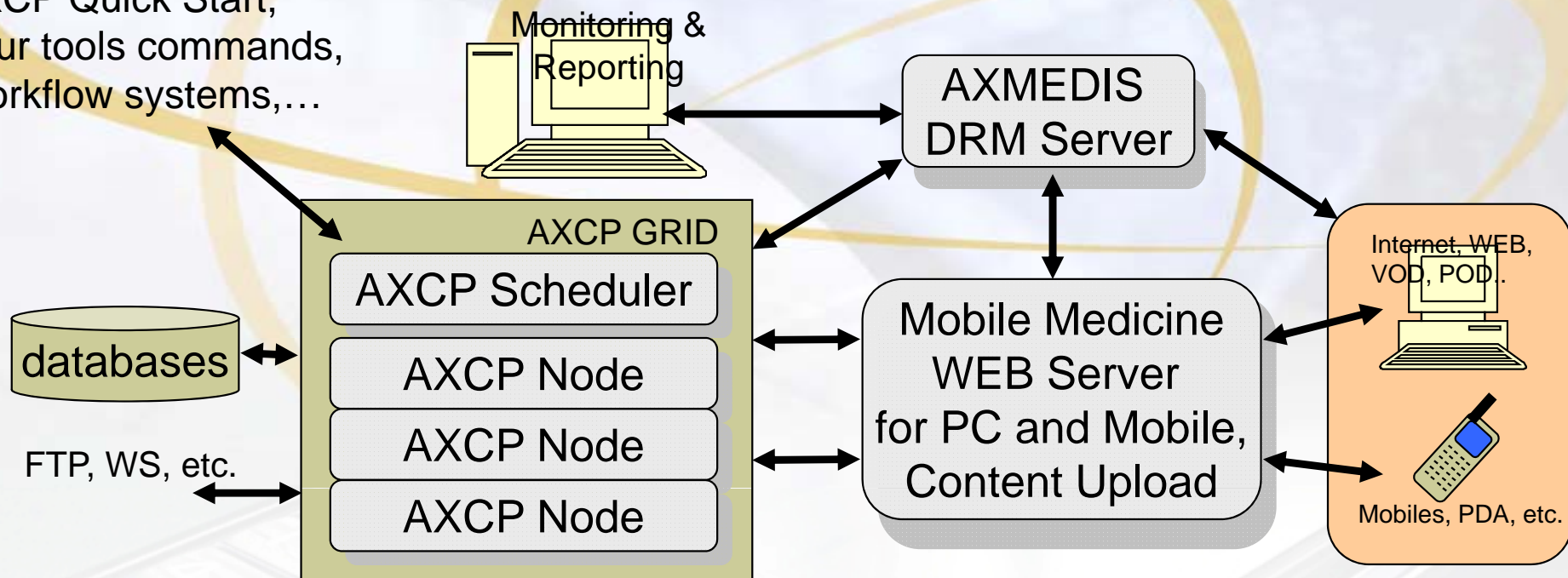


- PC, MACos, linux, ...
- iPhone, iPod, Windows Mobile, Android(*),

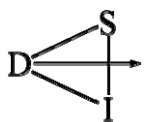


Mobile Medicine

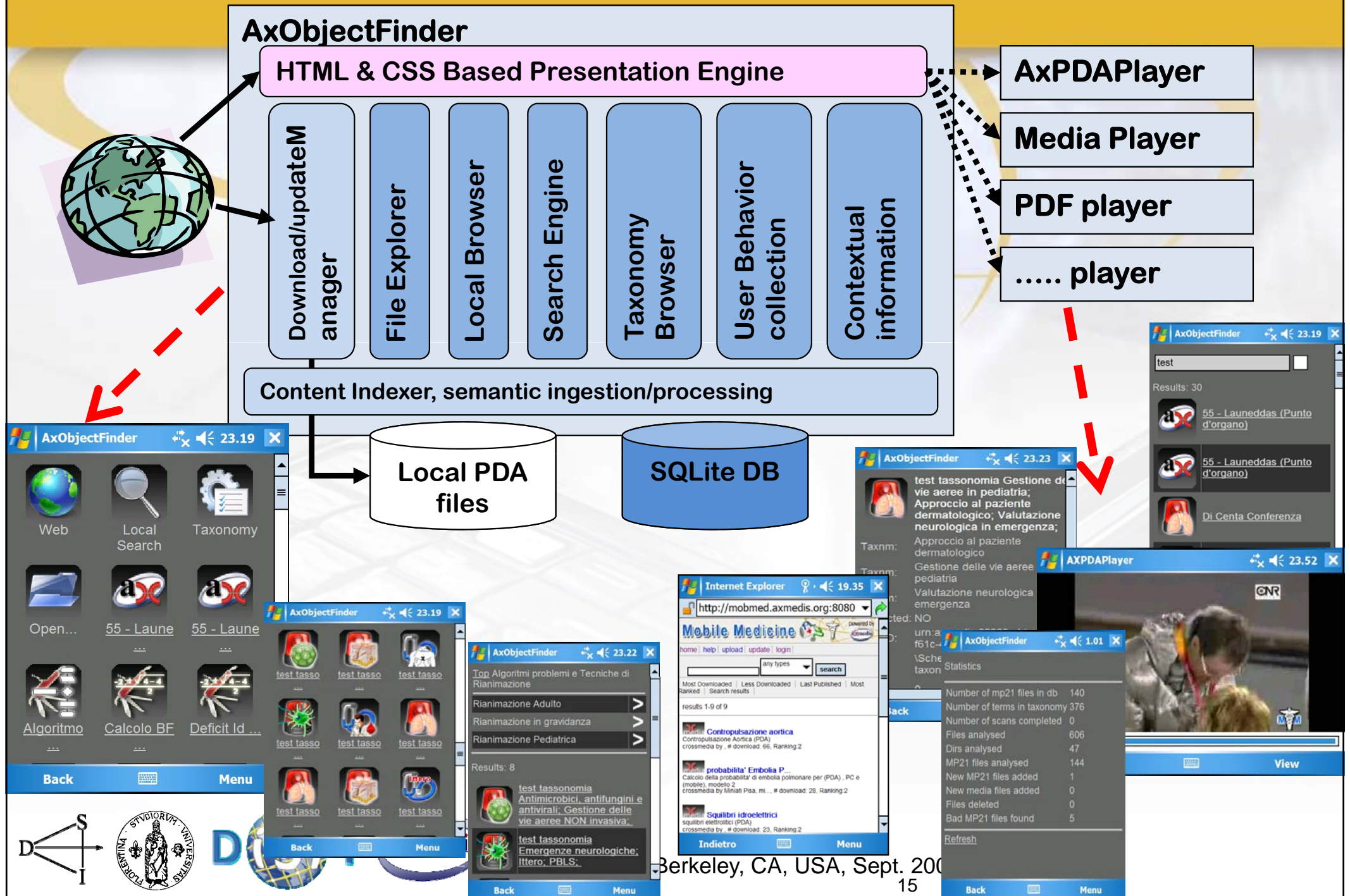
AXCP Quick Start,
Your tools commands,
Workflow systems,...



- AXMEDIS AXCP GRID backoffice server: semantic computing
- AXMEDIS DRM: for Rights control and security
- Mobile Medicine portal for the multichannel distribution:
 - PC, PDA, iPhone, iPod, mobile, etc.
- Production tools and players, for PC and PDA



Personal Mobile Social Intelligence



Semantic flows



•User Profile

•Local User Profile

•User behavior

•Local User behavior

•Use data

•Local Use data

•Content

•Content

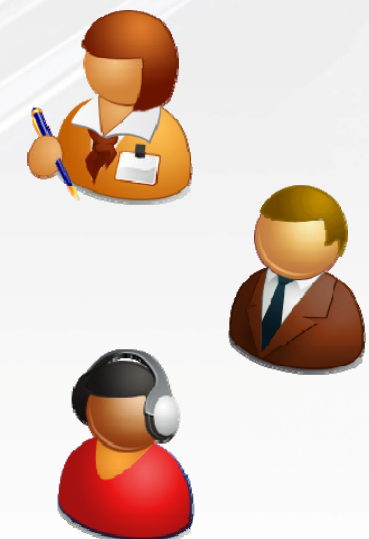
+ Content action data

- DC+IDs
- AXInfo: ver, prod., rights,...
- Descriptors
- Taxonomy
- Groups

- DC+IDs
- AXInfo: ver, prod, rights,
- Descriptors
- Taxonomy
- Groups

•Recommendation
•Suggestions on the basis of user behavior

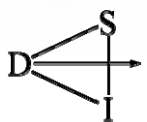
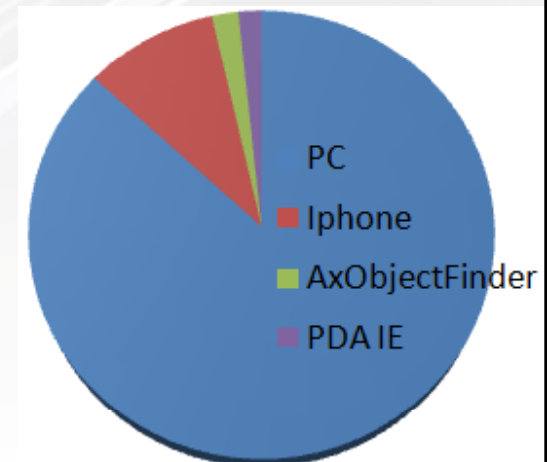
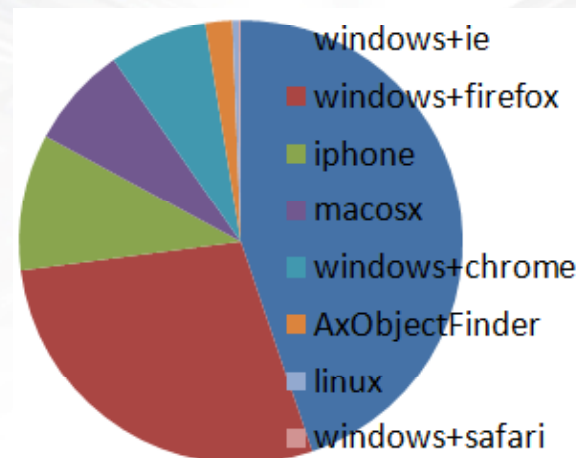
•Local Recommendation
•Local Suggestions on the basis of user behavior and local content



Conclusions

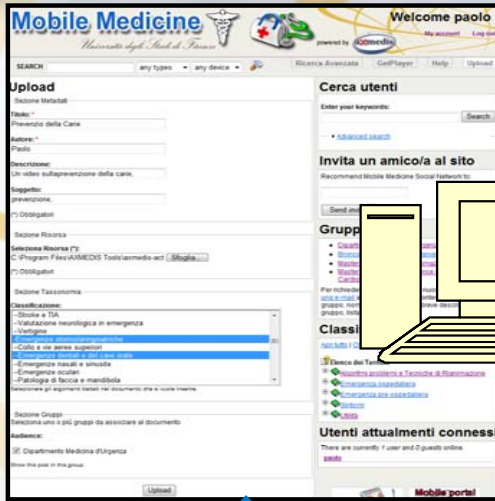


- Accessible since June 2009
- Several objects and mini-applications,
 - calculators for dosages, verification, etc.
- Intelligent Content Organizer for PDA WM5/6
 - Medical taxonomy allows to make navigation into content
 - local recommendations
 - Offline/online
- iPhone supported via regular portal, only for online



Content Production

User:
upload/propose
Single file content
directly



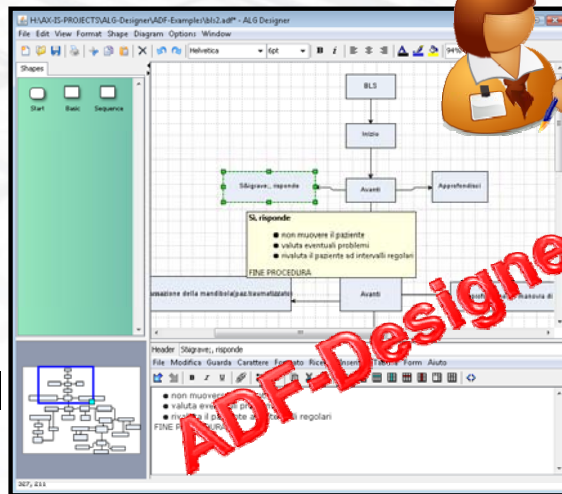
Automated
backoffice:
Transcode, adapt,
..



ADMIN, validate
send in
publication

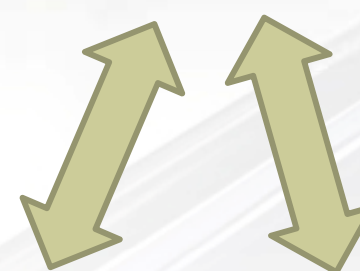


User: study and
design complex
content, then
upload

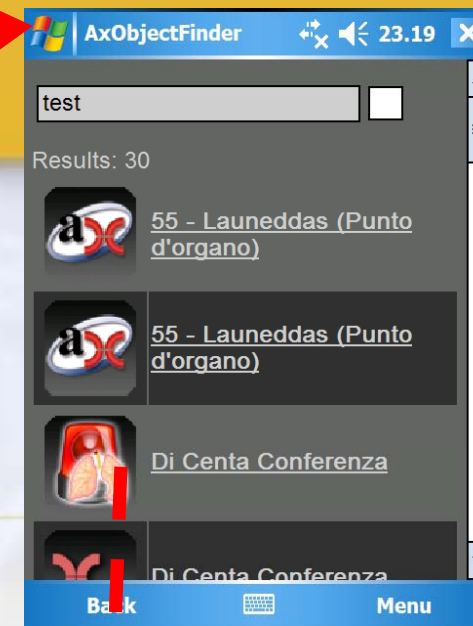
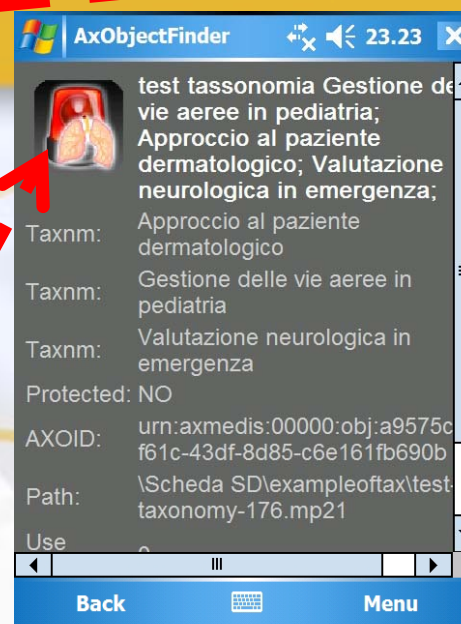
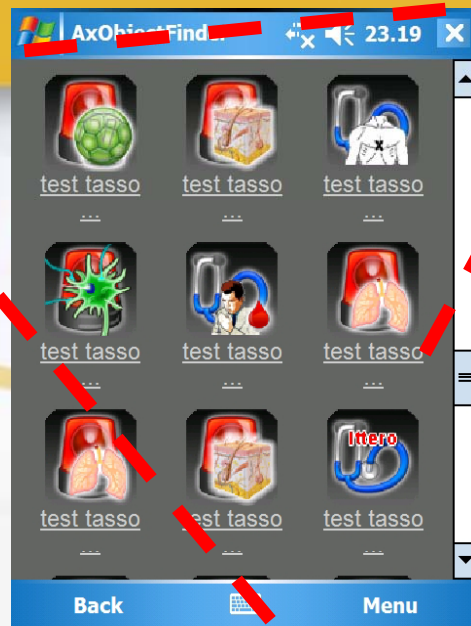
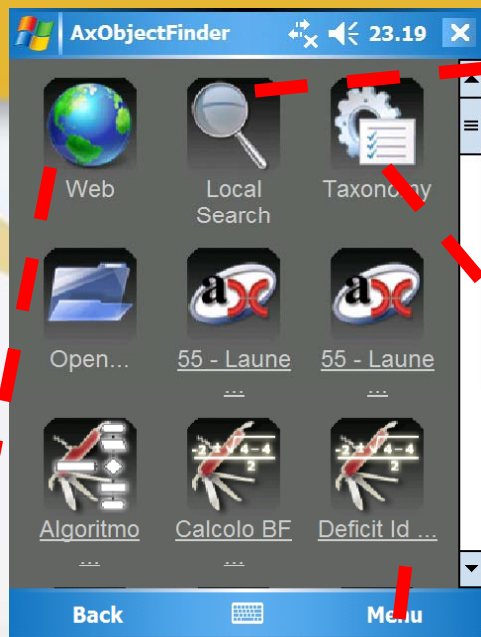


ADF-Designer

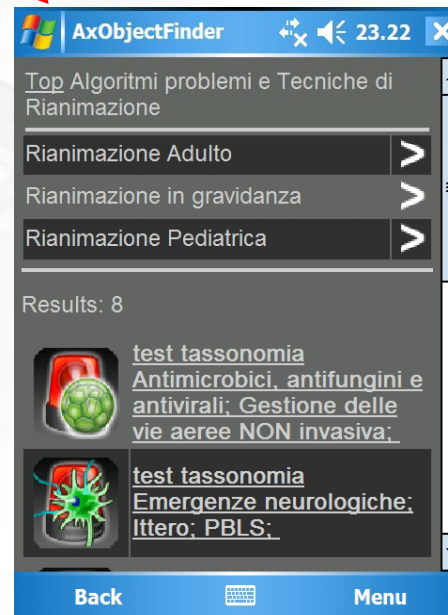
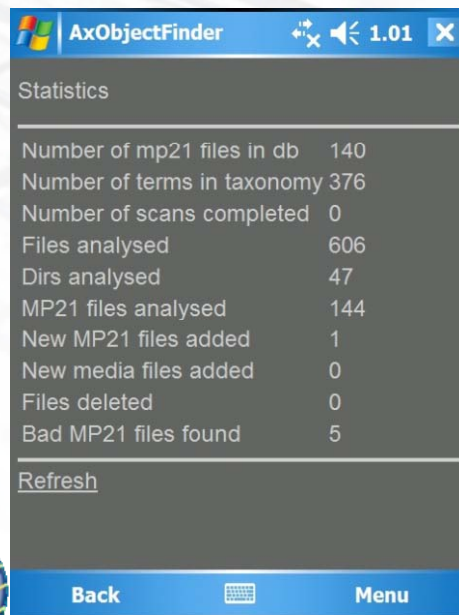
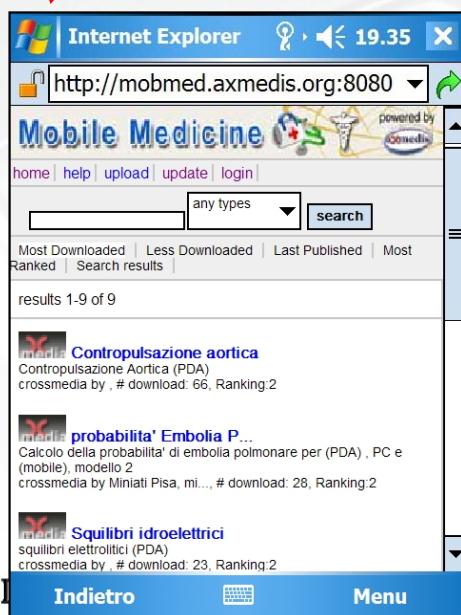
Produce the
complex content
with authoring tool



Mobile Medicine AxObjectFinder

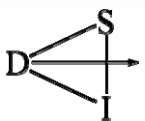


Suggestions on the basis of user behavior



Some references

- **Mobile Medicine:** <http://mobmed.axmedis.org>
 - [Manuale: http://mobmed.axmedis.org/Mobile-Medicine-Manual.pdf](http://mobmed.axmedis.org/Mobile-Medicine-Manual.pdf)
 - Development and production tools
- **AXMEDIS:** <http://www.axmedis.org>
 - Report and documentation, development tools and demos
- **DISIT Lab**, Univ. Firenze, DSI: <http://www.disit.dsi.unifi.it/>
- P. Bellini, I. Bruno, A. Fuzier, P. Nesi, M. Paolucci, “*Semantic Processing and Management for MultiChannel Cross Media Social Networking*”, NEM conference, Saint Malo, France, September 2009.
- **----this paper----**: P. Bellini, I. Bruno, D. Cenni, P. Nesi, M. Paolucci, “*Personal Content Management on PDA for Health Care Applications*”, 2009 IEEE International Workshop on Semantic Computing and Multimedia Systems ([IEEE-SCMS 2009](#)), Berkeley, CA, USA - September 14-16, 2009





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