

ICT Center of Excellence For Research, Innovation, Education, and industrial Labs partnership
Politecnico di Milano

An approach to multimodal and ergonomic nomadic services
A research experience and a vision for the future




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Summary



- Cefriel's past activity
- **Interaction: Multimodal** delivery
 - ▶ The user's point of view
 - ▶ The developer's point of view
 - ▶ The approach
 - ▶ The M³L platform
 - ▶ The M³L language
 - ▶ Ongoing activities
- **Fruition: ergonomic** delivery
- Conclusions and future work

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Cefriel's past activity



Multichannel/multimodal


- 1999-2001 **Multichannel** platform (CDI-ML)
 - ▶ One channel **at a time**
- 2002-2003 Mobile **Multimodal** platform M³L
 - ▶ Different interaction modes **at the same time**
- 2004 Multimodal platform
 - ▶ Devices with different capabilities

Ergonomic services

- 2001 **personalization** of multichannel services
- 2003 **ergonomic** platform
 - ▶ React to changes in the context
- 2004 **ergonomic** platform based on **WebML**

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Why multimodal?



Increased connectivity capabilities of devices	➔	Users can be always connected
The Web has become movable	➔	Users cannot use every mode in every situation
Miniaturization of devices	➔	Difficult interaction modes
Devices can cooperate	➔	Different interaction modes available

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Multimodal interaction: Reference definitions



- Vision: “*extending the **Web** to allow multiple modes of interaction*” (W3C)
 - ▶ Multimodality for **hypertexts**

- “*Multimodal interaction will enable the user to **speak, write and type**, as well as **hear and see** using a more natural user interface than today's single mode browsers*” (W3C)
 - ▶ Support for **voice, written text** (input and output) and **visual** representation of contents (output)

Motivation - the user point of view



- No special requirements on client devices
 - ▶ The user can access the same service using **different devices**
 - ▶ Only technologies **available** on the market
 - ◆ A PDA with and HTML 4.01 and JavaScript 1.2 browser
 - ◆ A common GSM Phone
- A service can be used in nearly **every situation**
- To select the best interaction mode for every kind of data
 - ▶ Use of different interaction modes **at the same time**
 - ▶ Simplify the use of small devices

The developer point of view

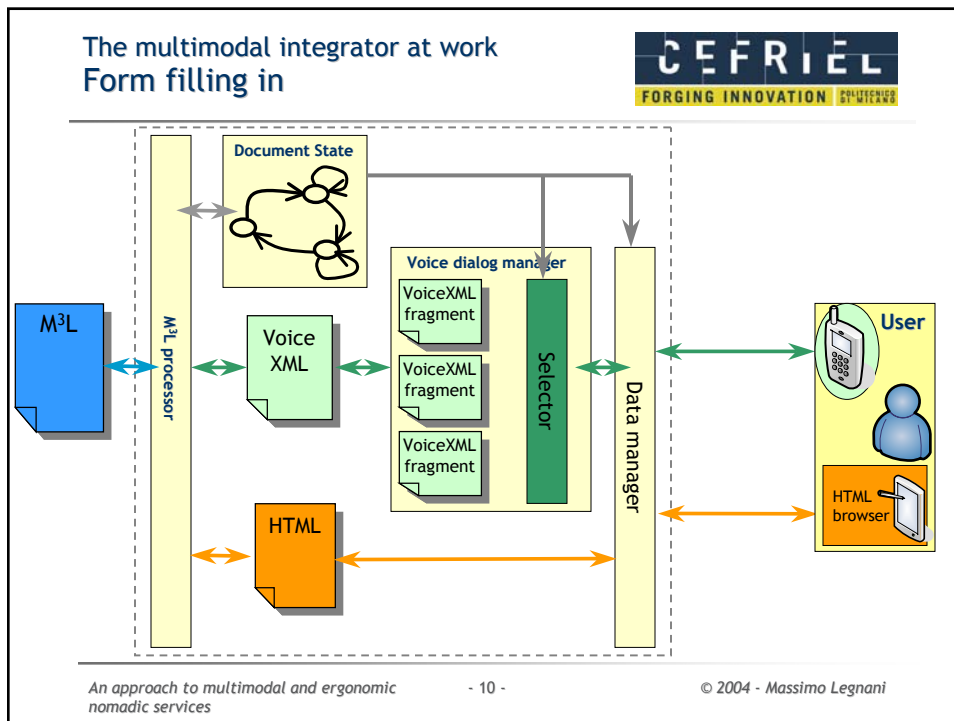
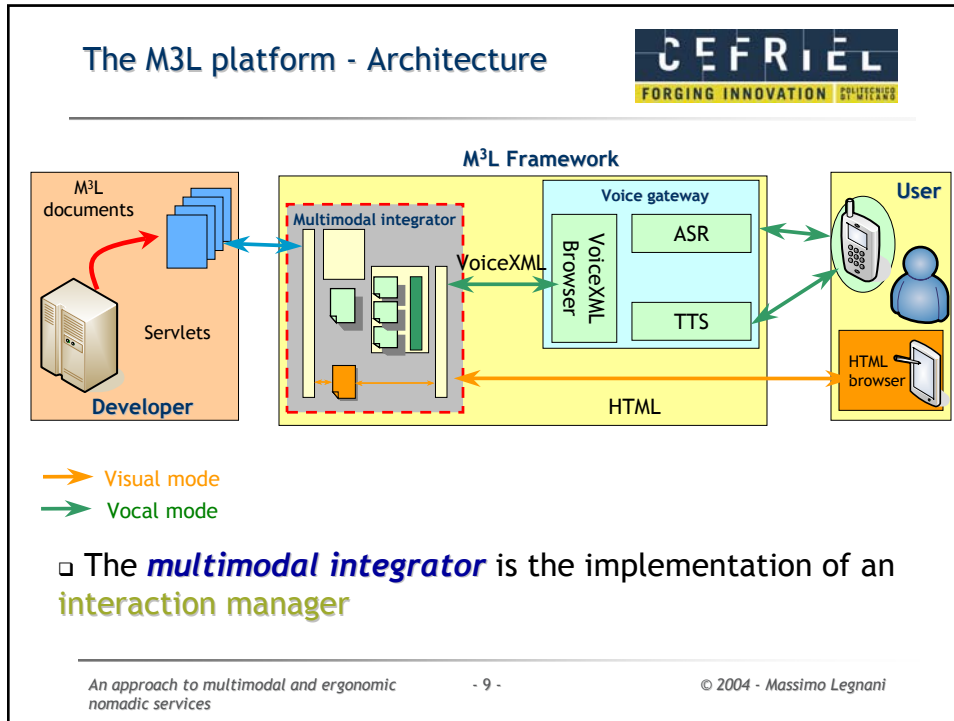


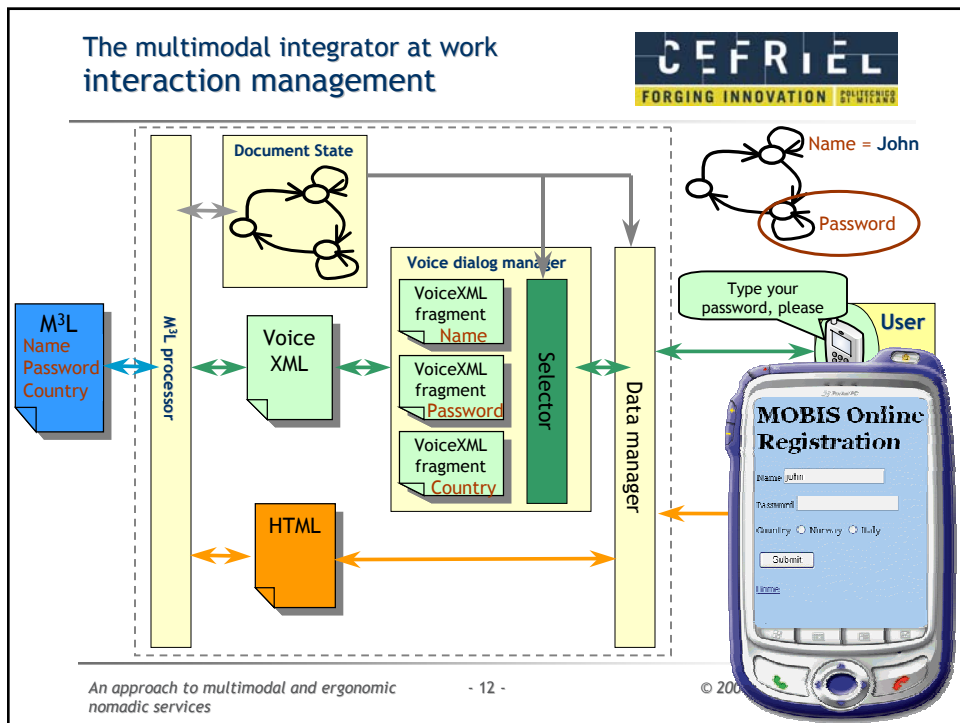
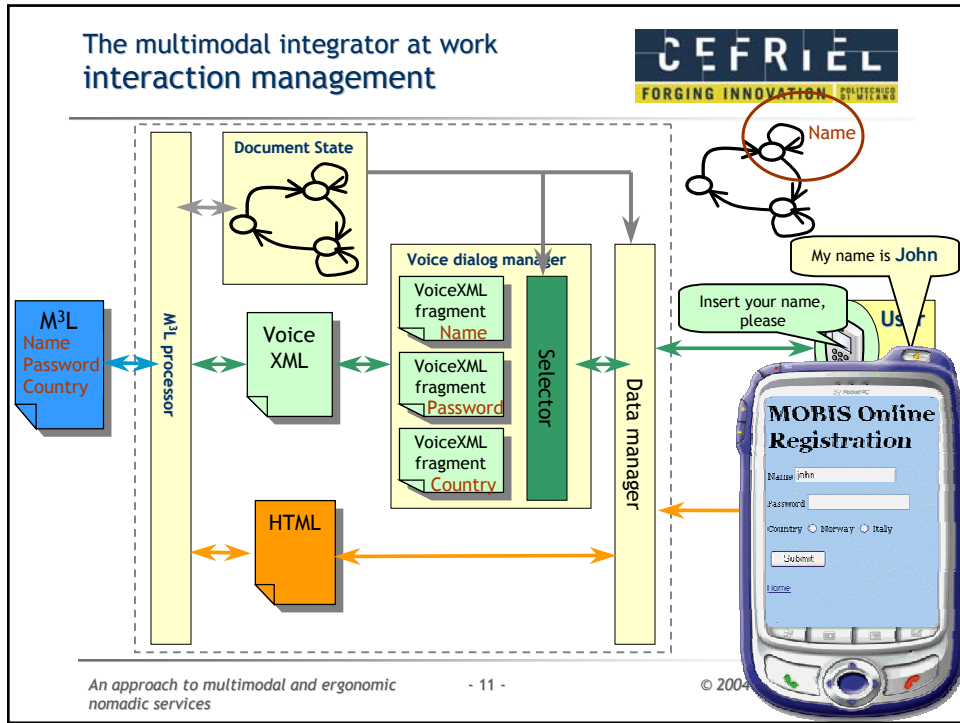
- The platform allows to write the service once
 - ▶ A new **multimodal specific markup language** was defined: **M³L (Multi Modal Markup Language)**
 - ▶ **M³L** is similar to HTML
 - ▶ **M³L** is extremely **simple**
- The platform manages the delivery of contents to the different devices and modes supported
 - ▶ **Synchronization** of inputs
 - ▶ **Synchronization** of outputs
 - ▶ Updates the **state** of the application after a user action
- Simplified deployment on the platform

Our approach - summary



- Aimed at **multimodal hypertexts** creation and delivery
 - ▶ Different **simultaneous** and **synchronized** modes
- **Server-side** approach
 - ▶ Not enough resources available on the devices
 - ▶ No constraints on the client devices
- Define a **new markup language**, similar to HTML
- Modes: **voice and visual**
- Using **different devices**
- Simple development of **new applications**
- **Mobile** and **nomadic** environments





Code examples

```

<?xml version="1.0" encoding="iso-8859-1"?>
<M3L language="english">
  <HEAD>
    <TITLE>Registration form</TITLE>
  </HEAD>
  <BODY>
    <SECTION id="main">
      <PARAGRAPH out="vocal">Fill in the form, please </PARAGRAPH>
      <FORM name="miaform" method="get" action="/register">
        <BR/>
        <LABEL out="all" mode="text" name="surname"> Surname </LABEL>
        <INPUT type="text" size="20"/>
        </LABEL>
        <BR/>
        <LABEL out="all" mode="both" name="country"> Country </LABEL>
        <SINGLECHOICE kind="radio">
          <OPTION value="norway" vocalshortcut="norway"> Norway </OPTION>
          <OPTION value="italy" vocalshortcut="italy"> Italy </OPTION>
        </SINGLECHOICE>
        </LABEL>
      </FORM>
    </SECTION>
    <MENU>
      <ITEM out="vocal" name="home"> Home </ITEM>
    </MENU>
  </BODY>
</M3L>

```

A picture of the vigeland park
 MOBIS Online Registration
 Type Name

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Multimodal ongoing activities

- The ML framework
 - ▶ Both server and client side approaches
 - ▶ M³L as a virtual terminal
 - ▶ Both client-side and server side approaches
 - ▶ ML Framework can generate SALT, X+V (*), or M³L documents

* The activity is currently in progress

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Summary



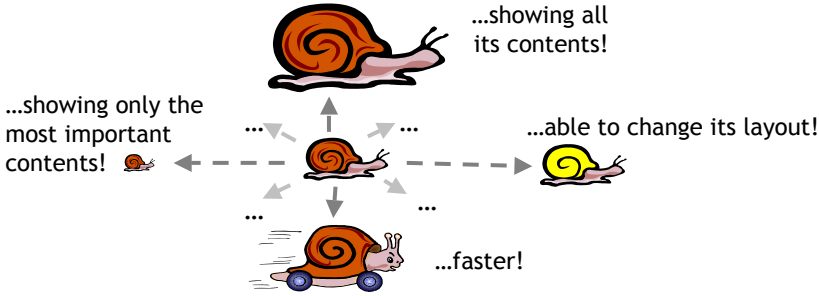

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Ergonomic services



- What have we achieved with multimodality?
 - ▶ Improvement in the **interaction** between the user and the service
 - ▶ More **flexibility** in the interaction mode
 - ▶ Better **utilization** of the resources available to the user
 - ▶ Is this enough?
- Nomadic services: "the Web has become movable"
 - ▶ **Different situations**
 - ▶ The **context** changes

Ergonomic services



...showing all its contents!

...showing only the most important contents!

...able to change its layout!


...faster!

Ergonomics is the science concerned with designing safe and **comfortable** machines for humans

Ergonomic ⇒ a service able to **adapt** itself to the **context**

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Ergonomic delivery



- A service must be able to **perceive** the environment
 - ▶ **React** to changes
- Adaptivity for:
 - ▶ Contents, Navigation, Style, Layout
 - ▶ But even for the **interaction mode**
- The interaction mode is a **lever** that a service can use **to adapt itself to the environment**
- Multimodal:
 - ▶ the association between contents and mode is made at "**design time**"
 - ▶ Forecasts may be wrong
 - ▶ The association must be done at "**run-time**"

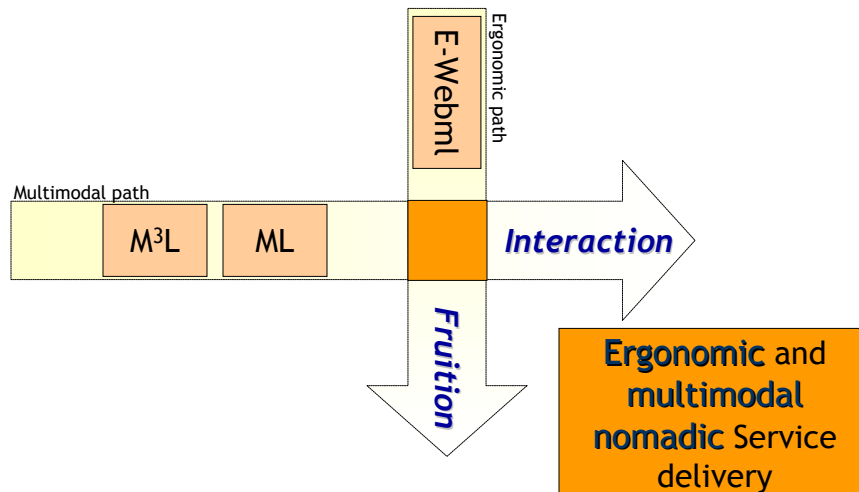
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Ergonomic services ongoing activities



- Extension of the WebML model to support context information: e-WebML
 - ▶ Contents **classification** properties
 - ◆ labels to evaluate the adaptation of the contents to the status of the delivery environment
 - ▶ Contents **presentation** properties
 - ◆ Used to change the presentation of the page
- The association between the property and the value is performed at **run-time**
 - ▶ Depends on the context status

Cefriel's future activity





This activity is being conducted within the MAIS project



Thanks For your attention