HOPS
Project presentation

Enabling an Intelligent Natural Language Based Hub for the Deployment of Advanced Semantically Enriched Multi-channel Mass-scale Online Public Services
HOPS is a three-year project focused on the deployment of advanced ICT enabled “voice-enabled front-end public platforms” in Europe permitting access for European citizens to their nearest Public Administration.
Project Objectives

To address the mass-scale deployment of new online public services supported and accessible by voice channels (basically phone, both fixed and mobile), the most accessible and easiest communication means used by all European Citizens.

This will only be possible by the addition of new fully functional advanced technologies enabling to deliver automated services without losing quality and further enhancing the current functionalities.
• **2.3.1.9 Networked businesses and governments,**

“Open, secure, interoperable and re-configurable e-government platforms, applications and multi-modal services. They should be based on European standards, support national, regional and local initiatives and deploy as much as possible open source software solutions for all aspects of inter- and intra-government operations including electronic democracy systems, interaction with citizens and businesses, governmental process re-engineering and knowledge management”.

• **2.3.1.7 Semantic-enabled systems and services,**

“Facilitating multimedia content mining on the Web and across distributed computing platforms. They should be self-organising, robust and scaleable and enable better mastery of complex information spaces through improved analysis, interpretation and visualisation of high-dimensional objects and content”.

• Voice XML
• Voice Portals
• Natural Language Processing
• Semantic Web Technologies
Voice XML portals

1. Voice Provider
2. Internet/intranet
3. Contents (VoiceXML, XML, html, …)
4. Service Logic, Content Adaptation, ...
5. Voice Platform (VoxNauta)
6. Fixed or Mobile Network

Voice Provider
Application Provider
Content Provider
Natural Language Processing

- Recognition
- Parsing
- Semantic Interpretation
- Text-To-Speech

Word String → Syntactic Structure → Partial Semantic Representation → Domain Ontology (OWL)

- Wordnet
- Dialog Manager

Answers and Clarification Questions → Query Answer

SEMANTIC WEB TECHNOLOGIES

- IT
- SP
- EN

- Semantic query representation

NLP

SEMANTIC WEB TECHNOLOGIES

IST-2002-507967 (HOPS)
Semantic Web Technologies

Semantic query answering

Automatic upgrade to Semantic Web

Domain ontologies

Service ontologies

Manual annotation of Semantic Services

Voice Access

Semantic query representation

(semi) automatic service composition

OWL

OWL-S

NLP
IE
IPO
Multilinguality

Public Administration information

Public Administration services
Technologies implied in HOPS project are different one from each other and our challenge is to make them work together.

The integration tasks are aimed to guarantee digital communication between systems designed independently, in order to provide an end-to-end perspective of the whole chain.

In order to achieve an integration standard implementation that enables communication between HOPS components, is necessary:

- To analyze different data models
- To identify platform dependencies
- To identify access mechanisms to retrieve data from back-end systems
The main three layers in an integration system are:
- **Service Broker**: This layer is intended to manage external services of each component
- **Data Transformation**: The aim of this layer is to adapt different data formats to a common data model that enables component understanding.
- **Communication Management**: This layer guarantees data exchange between components.

SUN Microsystems Spain has a wide experience and knowledge in system integration and has carried out several integration projects not only in government sector but also in telcos, consumer package goods and financial sectors.
Modular approach

**VOICE PORTAL**

- **ASR**
  - Automatic Speech Recognition
- **TTS**
  - Text-to-Speech
- **NLP**
  - Natural Language Process
- **Semantic Extraction**
- **Service Qualify**
- **Result Qualify**
- **Semantic Web Query**
- **Semantic Enriched Data Access Layer**

**BACK END**

**DATA**
Project structure
Description
The objective of this work package is to ensure the overall management of the project and to efficiently coordinate the technical and financial project’s dimensions. This workpackage will also aim to co-ordinate the evaluation and quality assessment of the project, the preparation of the exploitation plan and the dissemination of the results.

Tasks
WP1 will be responsible for the coordination of the production of all the periodic reports expected by the Commission, as defined in the Contract information.

Deliverables
D10 Consortium Agreement
D11 First Annual Report
D12 Second Annual Report
D13 Third Annual Report

Partners: BCN plus all partners
**Description**

The objective of this work package is to generate a solid and stable set of user requirements suitable to guide and set the basis for the further development and integration of operational prototypes. This workpackage will have a very close collaborative work with WP3, as the technological options to be considered will have to be aligned with the overall dimension of user requirements, and also the functionalities to be required should be ambitious in nature by realistic in practice.

**Tasks**

Task 2.1  User Requirements definition  
Task 2.2  User Requirements refinement

**Deliverables**

D21 User Requirements  
D22 Refined User Requirements  
D23 Final User Requirements

**Partners:** BCN, COT, LBC, LOQ, ISOC, CSP, TALP,CSI, RUC, SUN, ITD, UOT
WP3 Enabling Technologies

Description
Definition of an information retrieval system combining NLP modules with Semantic Web technologies. Interaction with the final user will be provided using a voice system via automatic speech recognition and text to speech conversions. The main challenge is the definition of the integration of multi-lingual NLP modules with emerging Semantic Web technologies able of providing informational services to final users using voice portals and speech recognition.

Tasks
Task 3.1 Voice Portal
Task 3.2 Natural Language Processing
Task 3.3 Semantic Web Technologies
Task 3.4 Interoperability

Deliverables
D31 VUI design Guidelines for the European Public Administration Services
D32 Natural Language Processing Technologies
D33 Semantic Web Technologies
D34 Interoperability Analysis and Definition

Partners: ISOC, TALP, LOQ, SUN, UOA, UOT, BCN, COT, LBC, RUC, ITD, CSI, CSP
Description
The Development and Integration WP intends to develop a complete solution according to what has been defined in WP2 and WP3. This development is planned as a three-prototype-refinement approach in order to obtain results quickly and improve system efficiency with feedback received from every local city implementation (WP5).

Tasks
Task 4.1 Architecture Specification
Task 4.2 Voice Portal Development
Task 4.3 Natural Language Processing Development
Task 4.4 Semantic Web Development
Task 4.5 Integration

Deliverables
D41 HOPS Architecture Specification
D42 Voice Portal Application Specification
D43 Natural Language Processing Development
D44 Semantic Web Development
D45 Integration Model Development

Partners: SUN, TALP, ISOC, LOQ, CSI, RUC, ITD, BCN, CSP, LBC, UOT, UOA, COT
Description
This workpackage deals with the on-site development and implementation of the prototypes as produced by WP4. As the objective of the project is to provide Local Administrations with a platform that allows them to deploy mass-scale transactional and informational services, the platform will be integrated with the legacy systems in each of the cities. The fact that this on-site integration is carried up in three cities owning absolutely different systems assures that the HOPS platform is not linked with a special environment, but can be integrated into a wide variety of system architectures.

Tasks
Task 5.1 On-site Local Development
Task 5.2 Trials

Deliverables
D51 On-site Local Development
D52 Trials Description

Partners: CSI, RUC, ITD, BCN, LBC, COT, TALP, ISOC, CSP, LOQ, SUN, UOT
**Description**

The overall objective of WP6 is twofold: a) to determine and execute a methodology and a benchmarked method of evaluating the adequacy of the proposed solutions, and b) to enable the project to have an internal evaluation instrument in order to balance the contributions of the Public Administrations, Industrial and Academic dimensions with the technical and operational issues.

**Tasks**

Task 6.1  Evaluation Model Build-up
Task 6.2  Pilot Measurements
Task 6.3  Project Evaluation

**Deliverables**

D61  Evaluation Methodology
D62  Pilot Evaluation Results
D63  Final Project Evaluation

**Partners:** LBC, BCN, COT, TALP, ISOC, CSI, CSP, LOQ, RUC, SUN, ITD
WP7 Dissemination and Exploitation

Description
The overall objective of this workpackage is to act as a tool that will enable the project to reach new prospectors, by setting-up a network of research issues also involving public administration bodies. By publishing the HOPS findings in a research arena the project will further ensure that the main outcome and the overall work done can be transferred to the broadest audience, mainly through the European local Government instances.

Tasks
Task 7.1  Dissemination
Task 7.2  Exploitation

Deliverables
D71  Project web site (first release): continuously uptaded
D72  Dissemination and Exploitation Plan
D73  Final Guidelines
D74  Final Dissemination and Exploitation Report

Partners: COT, LOQ, BCN, LBC, UOT, UOA, TALP, ISOC, CSP, CSI, RUC, SUN, ITD