SUPPORTING E-PLACEMENT: ACHIEVEMENTS IN THE ITALIAN WORKFARE PROJECT

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Abstract: This paper presents the basic developments and architectural issues of the Italian "*Borsa Continua Nazionale del Lavoro*" (BCNL), an eGovernment project aimed at developing a Portal for Services to Employment. It consists in a network of nodes structured at three main levels: the National level, managed by the Ministry of Welfare; the Regional level, in which Regions are grouped in local federations in order to interoperate, and the Provincial level, in turn structured as a federation of local domains. The federation is the structural tool supporting *proactive* and *reactive* policies aimed at enhancing job-placement. The paper describes each level, and the cooperation occurring in the domains and across levels. Advantages and drawbacks of this architecture are discussed. Finally, the paper illustrates the basic issues related to security and privacy in the networked environment, in particular presenting cooperative federated authentication.

1 INTRODUCTION

During the last few years, Government and Public Administrations (PAs) felt the necessity to renovate their relationship with the administered territory, in terms of increased efficiency and efficacy both in services and communication exchange towards the users' communities, such as individuals, companies, Administrations (Chambers of Commerce, Public Pension Offices, Local Governments, and so on). For these reasons, eGovernment was conceived as a tool to define and manage the relationships between citizens and PA, and among PAs, through a capillary and digitalized modernization of services.

EGovernment in Italy has been mainly delegated to Regions, which are autonomously proceeding in the implementation of public on-line *advanced services* through the activation of Regional Competence Centres. The achievement of eGovernment processes requires much time and various efforts to reach a standardization of the electronic procedures, because eGovernment comprises not only the digitalization of bureaucratic procedures, but also many regulations on privacy and user authentication; identification of minimal levels of provisioning regarding social rights; coordination and integration of ICT in local and central administrations; protection of concurrency and provisioning of institutional information.

One of the fields where eGovernment in Italy is more fertile is related to *Services to Employment*. At the beginning of the 1990's, the ineffective status of the National Public Employment System brought the necessity for a radical change in services to employment, where efforts were to be concentrated not only in finding a job, but also in education, professional training and job qualification. Moreover, during the years 1996-97, some Local PAs signed a partnership with the Ministry of Welfare for engineering of new on-line service network devoted to citizens, enterprises, and PAs themselves. The first design of this network of services led to the creation of the Networked Employment Centres distributed over the regional territories and Provinces to support the whole employment, educational and training process towards citizens. This way, the Regional autonomies began to design their own Workfare Portals providing the opportunity to automatically match job Offers and Requests (O/R) over a *territory of competence*. At the same time, the need arose to integrate the local Workfare Portals within a unique distributed and cooperative Information System (IS).

This paper gives an overview of the Italian Project aimed at developing the distributed and

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cooperative Web based IS supporting the employment workfare. This project called *"Borsa Continua Nazionale del Lavoro" (BCNL)* standing for *National Workfare Information System* is framed in the Italian National Plan of eGovernment started in 2002. The goal of BCNL is to support real-time electronic transactions through a network of Portals, regarding job O/R in a virtual *e-marketplace*.

The project is not unique in its area of interest: in Europe, many projects directed to Services to Employment are active, one for all, the EURES project (EURES, 2005). Recently, the Single European Employment Marketplace (SEEMP) launched by the EU (EEO, 2005; EIF, 2005) has the purpose to create a network of Services to Employment distributed all over Europe to increase workers' mobility in the EU and to stimulate the renewal of competences, and knowledge within European Member States and within the single Countries.

This paper is organized as follows. Section 2 describes the BCNL project dedicated to e-employment. Section 3 illustrates the problems related to security and privacy in this project; some solutions aimed at protecting personal data from unauthorized manipulation are explained. Section 4 describes a proposal of integration of the BCNL into the SEEMP project.

2 AN ITALIAN E-GOVERNMENT PROJECT: THE "BCNL"

The *BCNL* is conceived as a National Network providing advanced services to employment such as the O/R matching in the job environment (BLL, 2004; Fugini et al., 2004). This distributed and cooperative IS (Coulouris et al., 1994) is composed of a *cluster of logically and independent applications and databases* which collaborate to pursue common objectives through a hardware and software communication and interoperability infrastructure (Hendrikse, 2003). Being cooperative, the *BCNL* correlates pre-existing and autonomous informative and application resources regarding many subjects, both public (Pas) and private (e.g., work agencies). Advantages of this approach are the autonomy of sites in local policies and in technological choices. Drawbacks arise in the management of the overall system, e.g., when tackling problems of access to distributed applications and databases, of ensuring that individual data are unique, or when dealing with data privacy and distributed user authentication (CoopIS, 2005).

The main target of the *BCNL* is summarized in Figure 1: it provides matching procedures among job O/R loaded on the Workfare Portal. On one side, the citizen who joins the marketplace publishes his Offer in terms of Curriculum Vitae (CV) in a standard format on the Web: personal data are protected by Privacy Laws and can circulate in the *BCNL* only upon the citizen's (who is the owner by default) explicit consensus. On the other side, enterprises, or job intermediaries, publish their job Requests, while preserving the privacy of their data. The *BCNL* system, through a Search Engine, searches the "best" match, and provides the results back to the users. As an additional function, when an individual is hired, the system communicates the individual's and enterprise's data to the National Pension Registry and to the Social Security Registry, thus tracking the users' social positions and updating the National statistics about employment, using a Data Mining engine. Besides citizens and enterprises, other actors are involved in the system: 1) the Provincial Employment Centres (EC) distributed on the territory, which are usually the physical mediators between citizens and enterprises; 2) schools, institutions or universities, that can promote re-qualification courses for workers, stages and training programmes; 3) Regional and National offices, which inspect data on market trends in order to update statistics and to tune the system. To these users, the Portal offers many advanced job search functions or consultation of the most up-to-date professions, or access to a Statistical Information System (SIS) and a Data Warehouse.

The *BCNL* architecture is organized at three levels:

1) the National level;
2) the Regional level of cooperative nodes of Regions that have negotiated a cooperation contract (Ciborra et al., 1987);
3) the Provincial level of cooperative nodes; all the Provinces in a Region adhering to the Regional domain must adhere to a Provincial cooperation contract.

These levels interoperate through a dedicated proprietary network built over the Internet for the Web portion. Cooperative nodes are grouped in *domains*, linked in a multilayer infrastructure. Figure 2 reports a simplified scheme of the interconnection among the domains. At the Provincial level, each Province in a Region is connected to all the Provinces of that region via the *Regional Node* which coordinates data exchange.

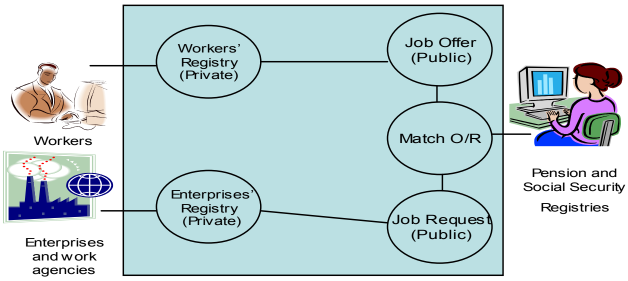
Workers' Registry (Private)
Job Offer (Public)
Match O/R
Enterprises' Registry (Private)
Job Request (Public)
Workers
Enterprises and work agencies
Pension and Social Security Registries

Figure 1: Scheme of the *BCNL (Borsa Continua Nazionale del Lavoro).*

The second level links the Regions which coordinate their Provinces, while referring to the National Node, managed by the Ministry of Welfare. An end-user (citizen, company, work agency, EC) can register at one node of the network, and select the access domain where the inserted data are made visible. Such entry point node is considered the subject's *competence* (master) *domain*: each time the subject accesses the *BCNL* from a different node, the National level (which is in charge of subjects' authentication), requires the subject's credentials to the master domain of that subject.

2.1 Cooperative Issues of the *BCNL*

Cooperativeness is one of the basic features of the *BCNL*; therefore, distributed data are reachable from any site, due to the adopted Web Service technologies for interoperability based on Web Services. Cooperativeness has various advantages (Fugini et al., 2003). First of all, data stored in the databases (available 24/7) can be accessed in an interoperable way, via user Web Sessions through Web Service technologies and interoperability formats (i.e.: XML and JDBC for data).

Distributed transactions are granted to be correctly executed and traced by the technical components belonging to the *Envelope of eGovernment* standard. Users are authenticated through security mechanisms preserving the autonomy of sites in defining their own security policies. Such policies are defined within users' profiles, according to which users can read and write the authorized data only.

Applicative cooperation (Fugini et al., 2002) is granted by the adoption of a pair of <Applicative Gateway, Delegated Gateway>, together with a Manager of Events, a Workflow Engine, a Web Service Gateway, a UDDI Registry and a Service Broker, as shown in Figure 3. All these components are used in the same Web session. Each domain communicates with other domains through the *Domain Gateway* whose role is a proxy for access to the applicative resources of the *BCNL*.

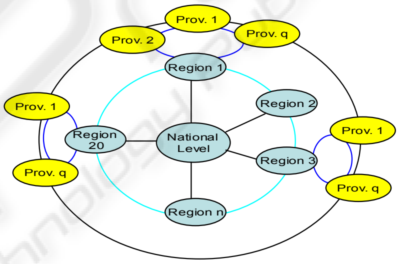

Figure 2: The three levels of the *BCNL*.

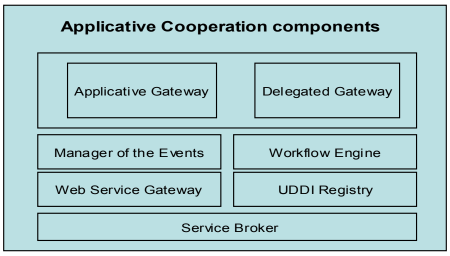

Figure 3: Applicative Cooperation Components.

The Gateway function is twofold: it acts as an Application Gateway whenever it provides data and services, and as a Delegated Gateway, when it invokes services or requires data.

The *BCNL* comprises front-end and back-end functions (Figures 4 and 5). The Web based front-end implements the end-user interface; it includes multi-channel gateways (web, phone, and wireless access). It manages both contents and layout of the Website, and tracks the correct sequence of events and queries sent to the Portal and forwarded to the back-end portion.

The back-end manages the communications among the network nodes, for example, for remote access to databases, or for distributed application execution, granting the correct execution and sequence of operations, and managing error messages if some operations could not be properly concluded. It manages external communications to provide cooperation among nodes and with other analogous systems (e.g., Social Security, National Healthcare IS, European Job Marketplace systems, such as EURES).

Considering the issue of minimal *requirements* for Private Job Placement Agencies and Organizations (e.g., temporary work companies or head hunters) to join the Portal, the interoperability architecture includes a *Passive back-end* component, located at each organization, sharing data with the Portal. Such organizations are required to install in their IS only a Web Service module, in order to share data in the environment, according to a standard format. This component is *passive* in that, according to the Web Service paradigm, it reacts to events forwarded by the Portal Web Services and cannot start any conversation.

A further core component of the *BCNL* is the *distributed Search Engine*. It executes the O/R match spreading over the user-specified domains in the e-marketplace. It retrieves the best matching results as well as a set of results that partially fulfil the requests, ranked according to a similarity rank. Thus, subjects are enabled to explore a large set of opportunities; meanwhile, the Portal is aware of the most requested jobs and can update its internal Statistical Information System and the research criteria.

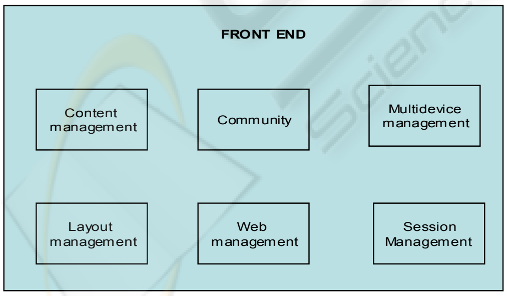

Figure 4: Front-end components.

3 SECURITY AND PRIVACY

As mentioned in the previous sections, the constitution of a federation at a National, Regional and Provincial level, led to focus on the mechanisms of users' authentication to protect subjects' privacy (Chopra et al., 2003), according to the Italian law 196/2003. For this reason, our purpose is to provide the description of a distributed end-user authentication process in the *BCNL*. The case regards, as an example, a worker, first registered in a competence domain A, invoking a service offered by domain B of the federation (Fig. 6). In the same Web session, after the first authenticated access operation, the worker requires access to a second service offered by a different domain C in the net. When the user, registered in domain A, connects to domain B to invoke the service, domain B redirects the user to the National domain which has been designed as the node responsible for coordination of the authentication process in the *BCNL*. The National node presents a log-in mask where the user fills in the credentials, currently a user-id and a PIN code, which are checked by the competence domain. A challenge-based mechanism is used by the nodes for mutual authentication, in order to prevent shadow server or repudiation issues. Once verified the security credentials, the National Authentication Server releases a SAML token (Bellettini et al., 2004), that uniquely identifies the user. By using this token, the user can access the desired service. If in the same session, the user requires the service on domain C, he is not required to re-insert the credentials due to the Single Sign On (SSO) technology adopted to implement the distributed authentication and access control mechanism. Through SSO, the user is authenticated only once over the whole network: the SAML (Secure Assertion Mark-up Language) Token, contains all the information necessary to correctly authenticate the user (Fugini et al., 2001).

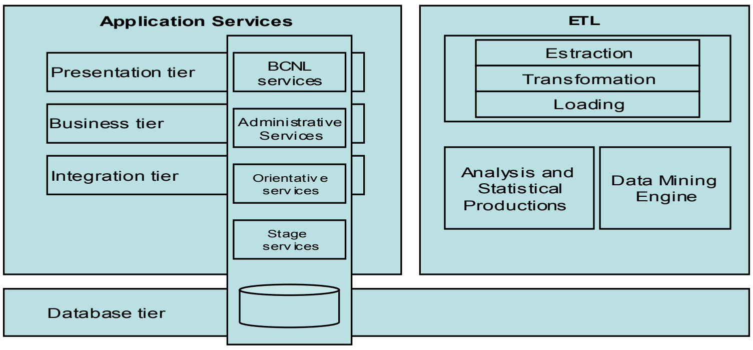

Figure 5: Back-end Components.

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A second case of federated authentication is shown in Fig. 7. An Enterprise requires access to a service offered by the National node. The hypothesis is that the user is registered in the National Pension registry (INPS). The user gets connected to the National node where it is specified that the user's data are collected in the INPS Registry. The National node delegates the authentication procedure to the INPS node; the user inserts his credentials. After the check and the positive result, the INPS, which is the other node in the *BCNL* network enabled to release authentication tokens, generates an *INPS token* and sends it to the National domain. This last one authenticates the user and provides the user with the SAML token. Once in possess of the SAML, the enterprise is now authorized to use the requested service. The federation of domains constituting the *BCNL* must guarantee the minimal requirements of authentication in the interactions using encrypted channels (e.g., using the SSL-3 protocol), or digital certificates applied on the Domain Gateways to control the correct provenience of the messages. These mechanisms are implemented to protect truthfulness of the connections and the data stored in the Data Warehouses linked through the Database tier. The technical issues of the Portal *BCNL* adhere to the indications of the *Envelope of eGovernment*, promoted by CNIPA (CNIPA, 2002), the National Centre for ICT in PAs.

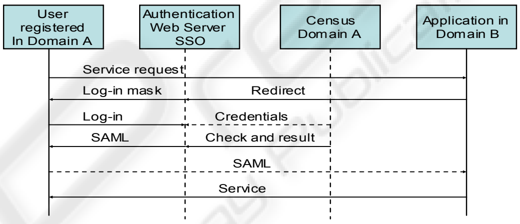

Figure 6: Sequence diagram describing cooperative user's authentication.

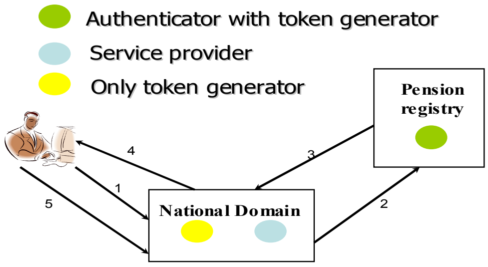

Figure 7: Cooperative authentication of an Enterprise accessing a service of the National node.

4 TOWARDS INTEGRATION OF THE *BCNL* IN A EUROPEAN FRAMEWORK

In Europe, the situation of eGovernment varies from Country to Country; however, each Member State started specified programmes dedicated to eGovernment (Kubicek et al., 2000; Lenihan, 2002).

Differences are not only about territorial policies but also even in the level and model of services provided to citizens (Liikanen, 2003). Services towards companies are more developed than those directed to private citizens. This is partly due to the limited access to large band Internet by citizens and also to low Internet security. Also in Europe, one of the most developed services concern *employment services to citizens and companies*. A proposal exists to connect the *BCNL* into a *European Workfare IS*. In such streamline, the EU recently launched a new project on e-employment called SEEMP (Single European Employment Market Place). It is a definition of a further level of the *BCNL*: people can become more visible on the market through the publication of their O/R all over Europe. SEEMP adheres to the new EU policies of federalism and power decentralization. It is aimed at designing and implementing an interoperability architecture for public e-Employment services which encompasses cross-governmental business and decisional processes, interoperability and reconciliation of local professional profiles and taxonomies, semantically enabled web services for distributed knowledge access and sharing. Moreover, the efforts to be made in SEEMP imply the integration and the unification of the data format and of the services semantics, by means of ontologies. Security is treated considering the privacy laws in the EU, and is based on token passing mechanisms and SSO. SSL will be the basis for encryption, but smart card authentication will be experimented. Database security in a shared environment is also a basic issue that is going to be treated via distributed views and protected JDBC connections. Physical security will be provided through ad hoc firewall based architecture. A challenging issue is the harmonization of security policies, and their expression (e.g., through WSDL, WSMO, or WS policy). The first outcomes of SEEMP will be available by June 2006.

REFERENCES

Bellettini, C. and Fugini, M., (eds) 2004. *Security in Distributed Information Systems: Trends in Methods, Tools and Social Engineering*, IDEA Book Publishing

BLL: Borsa Lavoro Lombardia, 2004 www.borsalavorolombardia.net

Chopra, K. and Wallace, W.A., 2003. Trust in Electronic Environment, *in Proceedings of the 36th Hawaii International Conference in System Science*, Hawaii

Ciborra, C. and Gasbarri, G. and Maggiolini, P., 1987. System Design for Local Authorities: Participation Based on 'Information Contracts', *in System Design for Human Development and Productivity: Participation and Beyond,* P. Dockerty, and Fuchs-Kittowsky, and Kolm P. and Mathiassen L. (Eds), North-Holland, Amsterdam

CNIPA, 2002. Handbooks, *Network Services offered on websites by Italian Regions and Autonomous Provinces*, July

CoopIS, 2005. *Proceedings of Cooperative Information Systems Conference*, Cyprus, November, Springer Verlag

Coulouris, G. and Dollimore, J. and Kindberg, T., 1994. *Distributed Systems, Concepts and Design*, Addison-Wesley

EURES, European Employment Service, 2005. www.europa.eu.int/eures

EEO, European Employment Observatory, 2005. www.eu-employment-observatory.net

EIF, European Interoperability Framework, 2005. www.europa.eu.int/idabc

Fugini, M., and Maio, F., and Plebani, P., 2001. *Sicurezza dei sistemi informatici*, Apogeo

Fugini, M. and Mezzanzanica, M., 2003. Development of a Security Methodology for Cooperative Information Systems, *11th European Conference on Information Systems*, Naples, June

Fugini, M. and Mezzanzanica, M., 2004. An Application within the Plan for E-Government: the Workfare Portal, in *Annals of Cases on Information Technology, volume 6*, IDEA Group Publishing, pp. 59-89

Fugini, M. and Plebani, P., 2002 A Methodology for Development of Trusted Cooperative Information Systems. In *Conference on Information Resource Management*, Seattle, May

Hendrikse, G.W.J., 2003. *Governance of Chains and Network: a Research Agenda*, Journal of Chains and Network Science, 3 (1), 1-7

Kubicek, H. and Haegen, M., 2000. One stop-Government in Europe: an Overview, in *COST Action A 14 Government and Democracy in the Information Age*, Working Group "ICT in Public Administration", Bremen

Lenihan, D.G., 2002. Realigning Governance: from e-Government to e-Governance, *Centre for Collaborative Government*, Ottawa, April

Liikanen, E., 2003. *E-Government and the European Union*, Upgrade, Volume IV, N° 2, April