

CATALOG

NAOS  LAB

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NAOS LAB S.R.L.

NAOS Lab is not just a company, but a project made up of people.

Founded in January 2001 as a consultancy and software development company under the name of NAOS Consulting, over time the company has evolved into an operational and creative laboratory of ideas that offers 360° solutions to its customers, hence the decision to change from Consulting to NAOS Lab.

The company is able to provide its customers with cutting-edge services in the fields of Consulting & Systems Integration and Research & Development, thanks to the skills acquired in the provision of the main services, such as IT and technological consultancy, conception, design and creation of innovative software applications, Mobile apps, 3D modeling and graphics. It works for important companies in the Italian and external production fabric, offering specialist consultancy in various sectors ranging from telephony to banking and the Culture sector.

Over the years NAOS becomes part of various realities. Since December 2006 she has been a member of the Consortium Society ICT-SUD Competence Center based in Rende (CS), a mixed public-private company representing all the regions and the main universities of the South in the field of scientific research and technological innovation with which she maintains active collaborative relationships.

Since 2012 she has been a member of the DATABENC district (High Technology District for the Cultural Heritage of the Campania Region), and since 2018 she has been a member of the Innovation Center of the Cultural Heritage of the Calabria Region (Culture and Innovation) with which she collaborates on research and development projects within the Cultural Heritage sector, in particular she works for strategic planning on cultural heritage, environmental heritage and tourism, making the sites archaeological and artistic driving forces for a cultural and economic relaunch.

NAOS Lab has been registered in the National Research Registry since 2003 with the code 54984UZF.

The company holds UNI ISO 9001:2015 certification for the activities of: Design, implementation and testing of software projects and products and provision of IT consultancy services starting from 2006; it also holds the UNI ISO 14001:2015 certification for the design, implementation and testing of software projects and products and the provision of IT consultancy services starting from the year 2023.

The company staff is made up of young and dynamic people capable of designing and implementing innovative ideas, capable of keeping up with the times and technological changes. Thanks to the synergy between the various figures present in the company, NAOS is able to follow a project in all its phases, proposing and adopting the best solution for each individual phase.

The world of Information Technology is constantly evolving and NAOS evolves with it.



Digital Library

“2D” Category

In 2023, Naos Lab, in partnership with the company 3D Research, was awarded three lots of the Digital Library project, promoted by the Ministry of Culture (MiC) for the digitization of Italian cultural heritage as part of Mission 1 – Digitization, Innovation, Competitiveness, Culture and Tourism, Component 3 – Tourism and Culture 4.0 of the PNRR Culture (devdigitallibrary.cultura.gov.it).

Specifically, the lots assigned to the companies were:

- **North-West Italy**, with the two locations of the Prehistoric Museum of «Balzi Rossi» and archaeological area of Ventimiglia (IM) and the National Archaeological Museum and archaeological area of Luni (SP), belonging to the DRM Liguria;
- **Central-Southern Italy**, with the three locations of the National Archaeological Museum of Campli (TE), the National Archaeological Museum "La Civitella" and the MANdA - National Archaeological Museum of Abruzzo (Villa Frigerj) in Chieti (CH), belonging to the DRM Abruzzo; the Archaeological Museum of Abruzzo – an autonomous museum – in its three locations at the Piccolomini Castle - Torlonia Collection and the Museum of Sacred Art of the Marsica in Celano (AQ); the Spanish Fort and the Former Slaughterhouse in L'Aquila (AQ);
- **South 2**, with the headquarters of the Museum and Archaeological Park of Sibari – an independent museum – Cassano allo Ionio (CS)

The activities carried out employed a multidisciplinary team of professional photographers with experience in cultural heritage, restorers, archaeologists, and IT technicians. Within each museum, the company set up digitization workshops for the ultra-high-resolution photographic acquisition of artifacts and art objects identified by each individual institution. These acquisitions were made using company-owned professional equipment (FUJIFILM cameras and 45 mm and 120 mm bright lenses). Following the on-site operations, Naos Lab's specialized staff then oversaw the expeditious cataloging of the same objects using the DPaC digital management and cataloging platform made available by the Ministry for this project. The metadata campaign was conducted in parallel using a proprietary software application specifically designed for the semi-automatic compilation of metadata.

For the Digital Library project, Naos Lab has therefore created a total of approximately 50.000 digital archives.



Digital Library

“3D e high quality” category

Thanks to funds from the NATIONAL RECOVERY AND RESILIENCE PLAN Mission 1 - Component 3 - Tourism and Culture 4.0 Investment 1.1 'Digital Strategy and Platforms for Cultural Heritage' Sub-Investment 1.1.5 'Digitization of Cultural Heritage', the company Naos was awarded the contract for the digitization of Italian cultural heritage - Category '3D and high quality'.

Specifically, the company was awarded Lot 3 SOUTH, which includes the following museums:

- National Archaeological Museum and Castle of Gioia del Colle
- National Archaeological Museum of Taranto MarTA
- National Archaeological Museum of Venafro



I-MUSE

I-MUSE project related to the programme 'TECH4YOU- TECHNOLOGIES FOR CLIMATE CHANGE ADAPTATION AND QUALITY OF LIFE IMPROVEMENT', Spoke 4, Line A, Project 4.5.1-3.

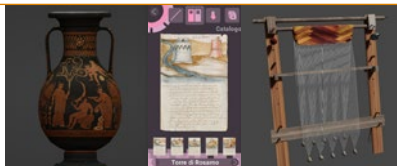
As part of the I-MUSE project, Naos Lab has completed the analysis and design for the creation of an innovative solution based on XR technologies and the creation of an AI virtual assistant for the enhancement of minor cultural sites in the South Italy, conceiving the design of multimedia content to make them accessible, focusing in the first phase on evaluating existing solutions, studying the most suitable technologies and defining the design approaches to be adopted, and for the second phase, the implementation, development and dissemination of the innovative solutions designed.

Thanks to this project, the company has been able to implement new ways to promote, make more accessible and also preserve cultural heritage, increasing digitization practices and artificial intelligence integration systems, improving forms of cooperation and interoperability between data, and creating new experiences for visitors and new opportunities for operators in the sector.

In particular, in this scenario, Extended Reality and AI technologies represent a natural evolution of digital enhancement processes, enabling an immersive, accessible and narrative experience of cultural heritage. These tools allow users to explore works, sites and historical contexts through three-dimensional reconstructions and dynamic interactions, improving accessibility, inclusion and public engagement.

The latest research and the Tech4You PP 4.5.1 project have highlighted, alongside the potential, critical issues related to the complexity of authoring tools, poor accessibility for non-technical operators and the limitations of web-based architectures. This evidence points to the need for more modular, interoperable and user-centered XR systems.

In this context, I-MUSE represents a critical evolution, aimed at re-engineering standalone XR toolkits that combine high performance, ease of use and co-creation, contributing to the democratization of immersive content production for cultural heritage.





Rimuseum

New displays for UNICAL's SIMU

The work carried out at UNICAL's SIMU involved the refurbishment of several rooms in the RiMuseum and the Paleontology section.

For the RiMuseum, Museum of the Environment, Naos collaborated with the Academy of Fine Arts in Reggio Calabria to create two different displays: one dedicated to the problem of waste production and the second focusing on the issue of waste pollution in the air, water and soil.

The two displays are supported by two multimedia applications that use descriptive cards and interactive games to illustrate to users the issue of waste on a global level, the amount of waste produced in the European Union, Italy and Calabria, as well as the consequences for global pollution and their link to phenomena such as stray animals.

Regarding stray animals, Naos has also produced the third volume of the comic book *Le Eco Avventure di Ecori* (The "Eco Adventures of Ecori"), entitled *Ecori e gli Amici per la Natura* ("Ecori and Friends for Nature"), together with a cartoon based on the comic book story.

For the Paleontology section, a new exhibition dedicated to "Life on Earth" has been created, with in-depth information on the different geological eras, from the Precambrian to the Quaternary, accompanied by descriptive information sheets and paleoartistics reconstructions. To complete the exhibition, twelve 3D prints of the most representative fossils in the museum have been created and displayed, accompanied by text cards in Braille to ensure accessibility.





Museum Accessibility Projects

In 2023, Naos Lab was awarded the software, graphics, and content development services for the following projects:

- *Parva Turris: the museum of inclusiveness* – CUP B57B22001630006, for the refurbishment of the Civic Museum of Torella dei Lombardi;
- *Ad antiqua sine limitibus* – CUP I44H22000800005, for the refurbishment of the Paolino Macchia Civic Museum in Villamaina;
- *Interventions for the accessibility and use of the Luigi Bernabò Brea Museum in Lipari* – CUP G67B22001250006, for the creation of a multisensory laboratory at the museum of the same name.

These projects were submitted respectively by the Municipalities of Torella dei Lombardi and Villamaina (AV) and by the Luigi Bernabò Brea Aeolian Regional Archaeological Museum of Lipari (ME) and financed under the Notice for the submission of project proposals for interventions for the removal of physical, cognitive and sensorial barriers in museums and public cultural sites not belonging to the Ministry of Culture, to be financed under the PNRR, Mission 1 - Digitalisation, innovation, competitiveness and culture Measure 1 "Cultural heritage for the next generation" Component 3 - Culture 4.0 (M1C3-3) Investment 1.2 "Removal of physical and cognitive barriers in museums, libraries and archives to allow wider access and participation in culture" funded by the European Union - NextGenerationEU.

For each site, the company has developed specific products, modeled and designed to meet the unique needs of each location, always with the primary objective of ensuring sensorial and cognitive accessibility to the historical and cultural heritage of each of the three distinct areas.

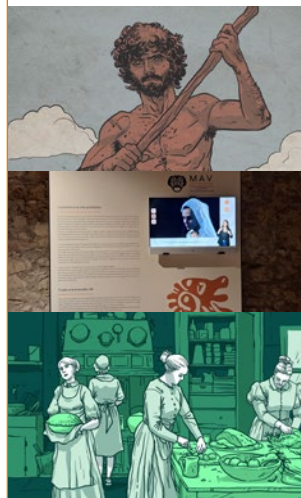




The technological solutions proposed included the creation of **mobile applications**—free to download from major online stores—designed to support on-site visits, featuring bilingual text and audio, a photo gallery, and digital models of some of the exhibits. These applications also integrate videos in LIS for the deaf and hearing impaired and descriptive playlists that accompany tours dedicated to blind users. In agreement with the clients, the company surveyed, modeled, and 3D printed some of the most representative objects from individual museums, obtaining **1:1 scale haptic reproductions**.

Naos also conceived, designed, and created **animated storytelling videos** for each site, with the aim of conveying specialized content in formats suitable for children and raising public awareness of accessibility issues at cultural sites. Specifically, the company entirely conceived, designed, and created the storytelling and animations for the Parva Turris project. For the MAV, it created the storytelling and designed the 3D animations based on the client's specifications. For the Aeolian Archaeological Museum, Naos conceived the storytelling under the close supervision of the Museum's archaeologists and based on the topics indicated by them.

The company also designed the **graphic design** for the **new educational materials** that complement the redesign of each exhibition site, and designed and created the **websites** for the three museums. The websites created for the Torella dei Lombardi and Villamaia projects are available at the following links: museoparvaturris.it and museovillamaia.it. For the website of the Aeolian Archaeological Museum of Lipari, Naos Lab created updated text content, which the Museum entrusted to the organization managing the existing web space.





Montagna Easy

The Montagna Easy Project is a project created thanks to the Development and Cohesion Plan (PSC) – Ministry of Tourism, CIPESS Resolution No. 58/2021 CUP J18J22000710008 Thematic Area – Business Competitiveness Sector of intervention 'Tourism and Hospitality'.

In some areas of our country, where depopulation is one of the main problems to be addressed, tourism and certain initiatives to safeguard cultural and food and wine heritage, such as festivals, fairs and theme days, are the ideal tools for involving the population in the relaunch of small villages.

All this can certainly be seen as a first sign of awareness of the need to take care of one's own territory and make it a protagonist, but it is not enough to create the conditions for the local population to tackle issues such as unemployment and lack of services, which are prerequisites for what is defined as the right to remain.

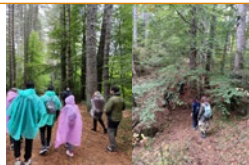
Building a new sense of place does not mean eliminating traditions or reinventing cultural heritage. Far from it, it means finding tools to give a new life to the people who choose to live there.

The Montagna Easy project has precisely this objective. It aims to restore the centrality of the Santo Stefano in Aspromonte area, together with its cultural, natural and food and wine heritage, while integrating digital tools and experiential activities. The goal is to create synergies between institutions, local operators and communities, promoting an innovative, eco-sustainable tourist and cultural offering with a strong social and economic impact.

To do this, it is necessary to integrate the various components, aiming to make the mountains attractive during the low season and periods of low tourist traffic by implementing the following initiatives:

- Montagna Easy Space: restoration of a building located in Pidima/Telese, near the main ski slopes of Gamberie, to create a multimedia, multisensory and dynamic space. The structure will be restored in accordance with energy efficiency standards, with green and smart solutions to ensure the production of renewable energy and to encourage visitors to learn about the mountains and think about climate change. In addition, it will be possible to take part in various activities, hire equipment, and participate in workshops and events to raise awareness and provide training on sustainability, ecosystem services, and good business practices.
- Forest Therapy: activation of eco-sustainable "wellness tourism" trails, based on an "Ecosystem Services" approach, with health benefits – promoting health and preventing and treating certain physical and mental illnesses as a complementary medicine to conventional treatment and rehabilitation methods.
- Experiential activities for the direct and active involvement of visitors to observe/take part in the production processes of typical local products (food and wine and crafts).
- 'Space Easy' management platform: to improve the quality and accessibility of tourist-cultural, ecosystemic and vademecum services offered to the public, with respect for the mountains.

The project is carried out in partnership with the CUEIM Research Institute and the company Auris SCARL.



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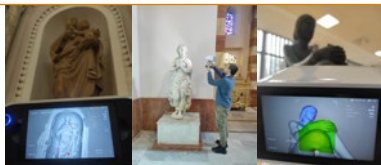
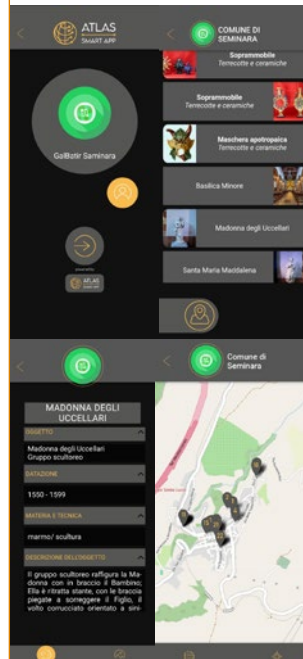
In 2021 the Naos Lab company developed an experimental project proposal to promote local contexts based on the use of a digital cataloging and archiving platform for tangible and intangible heritage, including visually impactful multimedia content, in response to the project "Sub-Measure 6.2 - Start-up Assistance for New Non-Agricultural Businesses in Rural Areas" – Intervento 6.2.1 "Innovative Start-ups" promoted by the GAL del Basso Tirreno (GAL.Ba.Tir). The digital platform can be used to generate a mobile app for tourism-related use of the platform's content. The platform used for this project is the company's proprietary *Atlas*, the *Atlas of Knowledge*.

Five pilot municipalities - Melicuccà, Palmi, San Procopio, Sant'Eufemia d'Aspromonte and Seminara - all located in the province of Reggio Calabria and within the GAL.Ba.Tir intervention area, were involved in the project.

To populate the multimedia section of the catalog entries, a thorough digital acquisition campaign was conducted in the field. Historical monuments, natural landscapes, accommodations, and architectural and cultural details of urban centers were carefully examined. The primary objective of this effort was to create a broad portfolio of photographic images, videos, and 3D models that effectively represent the cultural heritage and potential of the reference territories.

To achieve these results, a wide variety of equipment was used, including two types of laser scanners (Artec Leo and Artec Spider), a Canon EOS R camera (owned by the company).

Once cataloging was completed, the *Itineraries* function integrated into *Atlas* allowed the created cards to be aggregated into guided tours structured by geographic proximity. Each property can be identified on the map using the geographic coordinates associated with it during cataloging. Aggregating the cards on the platform is a prerequisite for visualizing the POI (Points of Interest) in the application. Such a solution allows for smart and innovative access to the cultural heritage of the individual pilot municipalities, through simple and intuitive channels.





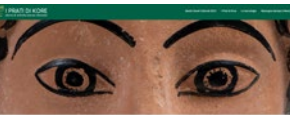
CULTURAL EVENTS 2021 *I PRATI DI KORE*

The Prati di Kore project. Stories of ancient women from Vibo, winner of the Public Notice for Cultural Events 2021 promoted by the Department of Education and Culture of the Calabria Region using PAC CALABRIA 2014-2020 resources - Axis VI, Action 6.8.3, was born from an idea developed by Naos Lab in collaboration with the Management of the National Archaeological Museum of Vibo Valentia and proposed by the Polo di Innovazione Cassiodoro (PIC).

For this occasion, the company has developed a series of technological tools aimed at improving the ways in which the exhibition of the same name can be enjoyed, set up in a wing of the Norman-Swabian castle of Vibo and inaugurated on February 28th and 29th, 2024. In fact, with this aim in mind, the following were created:

- The *I Prati di Kore* **application**, a visit support that integrates descriptive texts of the works on display in Italian and English, audio tracks (Italian and English), images and 3D models of the exhibits on display and LIS videos for deaf users;
- The animated video, obtained using the **motion tracking** technique starting from the 3D digital model, of the precious basanite female portrait from the 2nd century AD;
- **3D printing** of the same model for tactile use, accompanied by Braille caption;
- **Animation** dedicated to the Orphic laminetta with simultaneous translation in LIS;
- The project **website**.

Thanks to the support of the most modern technologies put at the service of the enjoyment and valorisation of cultural heritage, an event has been created which aims to be **accessible** and **inclusive** for the greatest possible number of visitors, with the hope of attracting even the most distant and distant users - not only physically - from this type of event.





NAPLES, CASTEL NUOVO

Digitization and cataloguing

The Naos Lab company carried out, on behalf of the Culture, Art and Cultural Heritage Area of the Municipality of Naples, a cataloging and digitization campaign of the cultural assets preserved in the Castel Nuovo deposits (mainly sacred art objects rescued from the rubble of the 1980 Irpinia earthquake). Acquisition sites have been set up inside the halls, with photographic sets, stations for the conservative control of movable objects and stations for the acquisition of preliminary data for cataloging in Sigec Web. The company was able to employ all the professional figures necessary for the correct carrying out of these activities.



iBEG Innovation BEG

The 'Innovation BEG' (iBEG) project, proposed by the Demoskopika Institute, the CUEIM University Consortium and the company Ti&SI, stems from the needs expressed by Catanzaro and Vibo Valentia and proposes to investigate the quality of life of young people aged between 18 and 35, observing and analyzing the risks, especially of social exclusion, and the employment and recreational opportunities available in the municipal area.

The NAOS company's contribution involved the creation of a decision support process with the aid of ICT tools.

The project aims to develop this process in order to: analyze and co-create an identity for the different urban areas (map of "neighborhoods") through an e-democracy approach with the support of GIS territorial information systems; assess risks and opportunities for the beneficiary municipalities through the construction of the BEG (Youth Well-being) by developing a set of ad hoc indicators; develop and apply youth wellbeing indices for territorial areas and define an overall BEG for the city; evaluate alternative policy scenarios for the formulation of a "decision-making dashboard" through which, under the supervision of experts in the field, good practices and tools can be provided with respect to those indicators that denote problems relating to youth wellbeing.

In addition, the platform has been equipped with a mobile application (iBEG App) to provide a useful and, above all, user-friendly tool for young people. The mobile application was used in various phases of the project: during the administration of the questionnaire, in the phase of using useful content, and for the final visualization of the BEGs.





CALL CaLabria Creative Living Lab

The Living Lab, created thanks to POR CALABRIA 2014/2020 FESR funding action 1.3.2 - Support for the generation of innovative solutions to specific problems of social relevance, was created with the aim of helping small Municipalities to promote, for tourism and cultural purposes, their territory and their identity through innovative tools and methodologies. The three pilot Municipalities involved in the project are Squillace, Staletti and Taverna, in the province of Catanzaro. The project was managed by a multidisciplinary working group made up of Auris, CNR IRISS and the suppliers LUPT, PIC, 012 Factory and Naos Lab.

The company has provided its expertise in the technological sector for the creation of a series of tools aimed at sharing knowledge. In particular, Naos has created a collaborative creative platform, which collects catalog cards regarding the most relevant tourist-cultural assets and activities for the communities present in the reference area.

This platform powers a mobile application that encourages the autonomous but assisted exploration of the territory by visitors, as it is able to suggest to the user the main points of interest based on the geospatial position detected with the aid of GPS localisation; a desktop application for touchscreen monitors to propose the exploration of cultural routes via a fixed infopoint station.

Finally, Naos has developed an augmented reality application for the use of animated storytelling starting from the scanning, to be started via the camera of the own mobile device, of tags placed on specific paper supports.

The CALL project aims to become a paradigm that can be exported to other realities that want to build their future in an innovative, conscious and responsible way, allowing for the creation of new shared value.





VIDE GOLD

The virtual journey continues



Naos Lab, as leader and in RTI with the company 3dresearch, won the tender for the project Vide Gold - The virtual journey continues, financed with the PON "Culture and development" FESR 2014-2020 funds.

The project, which involved nine attractors between Calabrian Museums and places of culture belonging to the Calabria Regional Museums Directorate (Museum and National Archaeological Park of Scolacium, Roccelletta di Borgia (CZ), Archaeological Park of Sibari in Cassano allo Ionio (CS), National Museum and Archaeological Area of Locri (RC), National Museum and Archaeological Park of Kaulon in Monasterace (RC), National Archaeological Museum of Crotona (KR), Museum and Archaeological Park of Capo Colonna (KR), La Cattolica di Stilo (RC), National Gallery of Cosenza (CS), Church of San Francesco d'Assisi in Gerace (RC)), has engaged the company in the macro activities of:

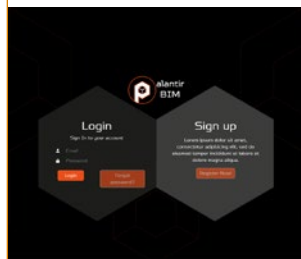
- Creation of an infrastructure for WiFi connectivity and electronic ticketing system;
- Cataloging and digitization of cultural heritage, consisting of the recognition of existing materials and the inventorying, cataloging and digitization;
- Communication and promotion, for which a photographic and video campaign was launched for the production of documentaries; the production of mini-documentaries for video walls and displays installed on site, with audio tracks and subtitles in English and videos with LIS translation; the development of documentaries for the promotion of attractors via the web.



Palantir BIM

Palantir-BIM is a project financed by POR CALABRIA FESR-FSE 2014-2020 AXIS I – PROMOTION OF RESEARCH AND INNOVATION, OS1.1 Increasing in innovation activity for companies, Action 1.1.5. Project partners NAOS LAB and Department of Civil Engineering – DICIV, Università degli Studi di Salerno

Palantir-BIM is a Cloud-based Software as-a-Servis (SaaS) that allows the exchange of data relating to BIM-oriented projects. Customers do not need to install any programs and can access to the platform directly from the browser. The mission of Palantir-BIM is to provide companies with an interesting solution for that branch of the BIM industry that deals with documenting heritage and for effectively and efficiently managing restoration, recovery and redevelopment projects of artistic and non-artistic heritage, making use of IT tools based on the latest web technologies. The objective was to develop a set of tools that could meet the needs of professionals, with updates and improvements that will be the result of continuous dialogue with the customer. This approach, in the future, could contribute substantially to the implementation of the BIM methodology in the workflows of those companies that, for various reasons, struggle to implement the change. This model is designed to strongly oppose companies that develop and market BIM software which, while on the one hand they offer platforms and tools that boast consolidated know-how, on the other they have not yet been able to offer a unified digital environment for data management, a true key principle of the BIM philosophy and a practicable solution to guarantee a reduction in costs and times.





patrimoni
APP

PatrimoniAPP

The PatrimoniAPP project was created to encourage the cataloging and use of the Cultural Heritage of a city, through the involvement of schools, which offer their students the opportunity to analyse, research and catalog the assets that make up their territory. The project includes two types of activities, the first is cataloging and consists of a PatrimoniApp web platform, where students, together with their tutors, after registration, have the opportunity to catalog every type of cultural asset. Once their work is completed and validated by the relevant managers, it becomes visible on a mobile application, in the form of a cultural journey that can be used by external users. The project is currently active at various institutes in the Campania and Puglia regions.



Elena e-learning platform

The Elena platform derives from the union of the terms e-learning and NAOS, and was created to guarantee a completely online form of learning. It consists of a web platform through which teaching is delivered. The e-learning training offer responds to the needs dictated by digital transformation and to reach the greatest number of people by exploiting smart channels to upload, archive, catalog courses, lessons, activities, linked to educational and refresher programs for students and teachers, similar to the different needs of the Educational world.



eLENA



Atlas Project

Atlas of Knowledge

The Atlas - Atlas of Knowledge project was born as a tool placed at the service of the cataloguing, agile and rigorous at the same time, of the material and immaterial Cultural Heritage, with the aim of making the global reading of all the cultural expressions of the cultural realities of the territories immediate and transversal. The platform, in fact, presents the user with a subdivision of the assets into thematic macro areas, corresponding to the different disciplinary sectors identified by the current legislation in the field of cataloging adopted by the Istituto Centrale per il Catalogo e la Documentazione (ICCD); within each macro area the cataloging sheets relating to the individual objects are included, each available both in Extended mode, for the complete entry of contents, and in Smart mode, for a more streamlined and essential compilation, both to be enriched with multimedia and digital documentation.

In addition, the platform extends the possibility of valorising all the resources of the territory by also preparing specific sections for the census of craft activities, traditions and customs, accommodation and restaurant facilities and landscape beauties, as well as a lemmary for the indexing of idiomatic words: in this way the mission of the Atlas project is fully realized, combining cataloging and safeguarding the identity of places with practical and contemporary methods of fruition and valorisation, also for tourism purposes, of all the vocations of the territory.

It is precisely with the aim of giving life to a dynamic, experiential and customizable use that Atlas provides the possibility of relating different cards, associating them in Routes - to build, for example, complete visit itineraries - or in Groups, to create homogeneous sets, for example for the presentation of cultural events. The desire to reach all types of users and to respond appropriately to the increasingly complex and aware cultural demand of our times is the basis of the "open" structure of the platform, which allows the sharing of contents on external applications.

The concept of the portal is embodied by the mascot, Atlas, a refined and contemporary reworking of the mythological Atlas, the one who supports and carries with him the weight of knowledge, caught in a rapid leap towards the future.



KROTON LAB

KROTON LAB

The Kroton Lab Project, born as part of the Living Labs organized by the Calabria Region, was financed under Axis I of the POR CALABRIA FESR-FSE 2014-2020. The project proposed by the NAOS company and the Department of Civil Engineering of the University of Salerno introduces new mechanisms for using the identity resources of the municipality of Crotona.

"Kroton Lab" operated with the aim of activating and supporting a participatory process of knowledge construction aimed to:

- Increase the cultural and experiential elements of the territory;
- Strengthen the relationship between cultural heritage and its context of origin;
- Consolidate the relationship between the city and the supply chain of structures, services and technological elements.

For this purpose, several technological solutions have been created capable of innovating and enriching the governance and promotion system of the territory to give the community the opportunity to reclaim its heritage.

To stimulate the interest of those who are not familiar with the city's cultural offerings, strategic places have been identified, the National Archaeological Museum of Crotona, the Capo Colonna National Archaeological Museum and Park, the historic center of the city with the Charles V Castle and the city walls. Furthermore, two different modes of use have been designed, such as the On Site visit and the Off Site visit.

Thanks to the ON SITE visit, non-invasive solutions have been introduced, in which visitors are accompanied during the visit, having the possibility of enabling navigation with continuous and contiguous information levels, consisting of texts, videos, animations, films, three-dimensional models and settings and information contextualized to any significant element to support the visit. The ON SITE visit is supported by different types of applications, such as the mobile app, information kiosk application, serious game application, virtual reality application, AR application, all set in the two museums and in the historic center of the city.

For the OFF SITE visit, the information contents can also be used outside the places of interest, with the particularity that the resulting level of in-depth analysis is limited to the purpose of channeling and stimulating the user to visit the proposed places. The mobile application favors this type of visit, in fact the user can download the app, look at the multimedia gallery and only partially access the in-depth information sheets, to facilitate his arrival in the real locations and enjoy the general contents live. The augmented reality application also allows for a type of offline use.

Finally, to make the experience even more personal, three user profiling models suitable for use have been defined, "child", "adult", "expert". This type of division/segmentation responds to the need to build a tailor-made offer, capable of stimulating the interest of visitors by touching a sensitivity that varies depending on age, previous studies and type of interest.





V.I.S.A

Visualizing Innovative and Social Artworks

The V.I.S.A. project, financed under Axis I of the POR CALABRIA FESR-FSE 2014-2020, was created to respond to the challenge launched by the Ministry of Cultural Heritage on the use of digital as a privileged tool for communication and enjoyment of works of art, and the definition of a 3.0 museum space.

The R&S project, of which NAOS Lab is the leading proponent, together with the scientific partner, the DARTE Department of the Mediterranean University of Reggio Calabria, managed by Professor Francesca Fatta, has contributed, through the support of today's technologies, to improving the proposals for the use of 6 different demonstrators, such as the Roman Carratelli Codex, the Vito Capialdi National Archaeological Museum, the National Archaeological Museum and Park of Locri, the Museum of Bretii and degli Enotri of Cosenza and the Jerace collection in the Municipality of Polistena, thanks to the creation of different types of applications.

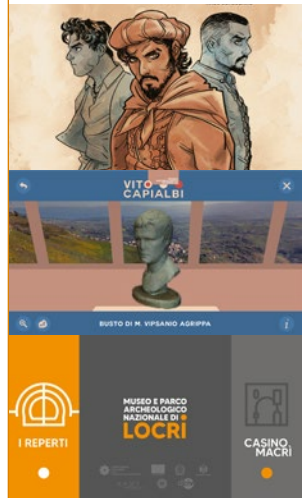
The Roman Carratelli Codex: thanks to a process of bibliographic and archival researches, the mapping of the main towers mentioned in the late sixteenth-century codex was created and thanks to the use of drones for surveys and computer graphics, these towers were modeled in 3D, accessible through a digital map via viewers and touch applications. To introduce also a younger audience to the project, a comic was created, which can also be browsed in augmented reality.

The Vito Capialdi National Archaeological Museum: to strengthen the educational and training offer of the Archaeological Museum, an app has been implemented to support the visit itinerary, which provides the virtualisation of all environments and offers in-depth information on the various exhibition sections. For a complete and integral reading of the finds, the most representative ceramics of the collection and the entire coin collection were acquired with 3D modeling and can now be explored and manipulated thanks to tablet devices and applications downloadable from the main stores. Particular emphasis was reserved for the complex acquisition and valorisation of the undoubtedly most precious find, the gold little plate with an Orphic inscription, which can now be virtually manipulated and readable in its entirety.

The National Archaeological Museum and Park of Locri: the most important intervention for the Locrian museum took the form of the virtual reconstruction of the entire park area thanks to the aid of photogrammetry acquisitions of images captured with drones; in particular, the rooms of the Roman baths obliterated by the foundations of the Casino Macri have also been virtually reconstructed.

The Bretii and Enotri Museum of Cosenza: for the Cosenza museum, the entire coin collection has been acquired, now accessible to users in a digital version using tablets present on site; the finds thus acquired in 3D mode become objects that can be manipulated and easy to interrogate thanks to in-depth captions.

The Jerace Collection in the Municipality of Polistena: on the occasion of the inauguration of the house-museum of the sculptor Francesco Jerace, a native of Polistena, the company created a path to enjoy the works using beacon technology.





REMIAM Project

Network of Intelligent Museums
with Advanced Multimedia

The Remiam project, presented by the DATABENC District and financed by the POR CAMPANIA FESR 2014-2020 - Specific Objectives 1.2.1 - aims to improve the cultural accessibility of museums and territories, through the "Museum Network" paradigm. Within a team made up of companies and the Federico II University and the University of Salerno, Naos has created the "Museum Network" web portal which has as its objective the promotion of cooperation policies to improve the quality and methods of access to the cultural services offered to the public, stimulating the birth of a new museum reality, capable of generating forms of technological innovation, economic growth of the territory, change in styles and quality of life.

The Portal provides a concrete and broad programming of cultural services, overcoming the fragmentation and isolation of interventions on individual museums in the area, involving and systematizing all available human, material and intangible resources. Within the Network, the Museums talk to each other, sharing a rich and differentiated offer of services aimed at promoting and increasingly realizing their cultural, educational and didactic function. The Portal allows the user to explore the area through the network of museums so as to be able to plan their visit routes by customizing them based on (average) length of stay, proximity and services of the attracting places called SPES.

In deeper detail, through the backend area, the user accredited with the role of "network manager" can build and manage, through a virtual noticeboard, his specific network by indicating its name and searching among the available SPES for those to add. In addition to the Network Portal, NAOS has designed solutions that allow the introduction of a new model of use based on user interaction and the use of a very strong multimedia component within the Madre Museum of Naples, an operation carried out together with the DISPAC Department of the University of Salerno.

In agreement with the Donnaregina Foundation for contemporary arts, it was decided to intervene on new models of use starting from Daniel Buren's work, *Axer/désaxer*, installed in 2015 in the atrium of the museum building, creating an audiovisual product, a gaming app and a mobile app.





AMI Project

Advanced Modalities of Interaction

The project, financed under Axis I of the PON "Business and competitiveness" 2014-2020 FESR, aims to design a new model of museum space, called Museum 3.0 in which art, technology, new types of interaction and innovative communication techniques support the process of transformation of traditional museums. All the applications were created for different demonstrators: the Gaetano Filangieri Museum of Naples, the Circolo Artistico Politecnico and the sites of historical-artistic interest in the municipalities of Morra De Sanctis and Torella dei Lombardi.

For the Gaetano Filangieri Museum of Naples, various technological applications have been created capable of making the user's visit more interactive and participatory thanks to augmented reality, Bluetooth technology, capable of allowing the detailed viewing of both the painted works and the textual contents, the serious game section intended for the younger audience, virtual reality capable of making the user carry out an "impossible" experience, simultaneously visiting the places involved in the AMI project, allowing the user to carry out an imaginary journey from rooms of the G. Filangieri Civic Museum to the Comencini Hall of the Circolo Artistico Politecnico of Naples and from here leaving to Morra De Sanctis and Torella dei Lombardi.

For the municipality of Morra De Sanctis the bell tower of the SS Pietro and Paolo church of was virtually rebuilt, seriously mutilated by the tragic earthquake of 1980, through a rigorous three-dimensional survey process of the surviving structures compared with historical photos. A mobile application has been implemented with two main sections, one dedicated to the fruition of some artefacts kept in the Antiquarium Museum of Morra Da Sanctis, the second about the gaming.

A virtual reality application has been created for the municipality of Torella dei Lombardi in which it is possible to admire the 3D model of the coats of arms arranged inside the courtyard of the Ruspoli castle in Candriano and the Monumental Fountain of the Municipality.

A short cartoon entitled The Adventures of Mia unifies all the places involved in the AMI project, transforming them into locations of the fantastic journey undertaken by the curious, little Mia.



Girolamini

Girolamini

Fruition project for the **Complesso monumentale del Girolamini in Naples**

The project includes the creation of a solution that allows visitors to carry out a virtual visit to some of the main places of the Girolamini Complesso Monumentale in Naples, closed to the public pending an upcoming opening. Thanks to the creation of a virtual application, the Church, the Sacristy, the Vico Library have "reopened" their doors to visitors, providing an intelligent visit and offering users the opportunity to look closely at environments, details, works of painting, sculpture and ceramics, read the information sheets associated with them, to live a total experience.

The final product can be used by users visiting the Complesso via a touch station.



The Museum "outside the Museum"

It is the title of a project born from the desire to pay homage to a series of influential personalities from the recent past, who have, in different ways, intertwined their biographical story with the history of Ravello (SA). Through a mobile device it is in fact possible to deepen the link between the profiles of these characters and the places of the city. The app offers the user three different visit itineraries enriched by descriptive texts and photo galleries of the individual cards, and by audio tracks recorded by the local inhabitants. The contents, available in three languages and also accompanied by videos and manipulable three-dimensional models, can also be viewed remotely through the Catalog mode.

After the birth of the first project, a second project was carried out for the Municipality of Ravello, The Museum in 4 times, to enhance the pictorial collection owned by the municipal body through the creation of a user app and a web portal. The most captivating aspect of the mobile device is the smart AR use proposed for a selection of seven paintings, which is accompanied by a more traditional, but equally engaging, use of interactive information content. Thanks to the use of modern technologies and the creation of 360° videos, the user, by framing the work with their device, has the sensation of "entering inside the painting" thus having the possibility of recognizing the real views of the cities and how these were seen by the artist's eye.

il Museo fuori dal Museo

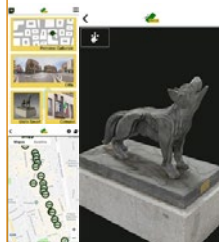




TALKCosenza

It is a project designed to offer citizens and tourists the opportunity to follow an interactive visit to the MAB (Bilotti Open-Air Museum) of Cosenza and the city centre; walking along the main arteries, the user can read and listen to the stories of the works, delve into the history of places that are in the immediate proximity or scroll through an art catalogue, if distant.

Thanks to the photogrammetry survey and the use of specific software, three-dimensional models of some representative works of the route were obtained. In this way the user has the possibility to manipulate objects and deepen the vision of details.



VIDE Project

NAOS Lab created the installations in the various locations, the development of the technologies, the creation of the storytelling and brand identity of the widespread temporary exhibition *VIDE. Viaggio dell'Emozione* inaugurated with the support of the Calabria Regional Museums Directorate and the Calabria Region on August 28th, 2019 and open until February 28th, 2020.

Focused on the many possible variations of the theme of travel through a focus on a single work of art or archaeological find, chosen to represent each site, the widespread exhibition was designed to be an operational means of promoting and enhancing the National and Regional Museum System as a whole and in the link between the various locations and the cultural landscapes in which they exist. The exhibition had its irradiating center in Cosenza, at Palazzo Arnone, where an immersive room, developed with modern computerized graphic animation technologies, allowed visitors to embark on a virtual journey following the fil rouge that conceptually unites the sixteen stages of the journey. Inside the other museums and places of culture involved in the project, visitors can then deepen their knowledge of each individual object featured on the route, thanks to a dedicated application.





COMUNE DI CALITRI

CeramicApp

e il lato smart della Ceramica

CeramicApp

The purpose of this application is to offer an "interactive" guide to the public who arrives in the municipality of Calitri and wants to visit its ancient village. The term interactive is used because the system created, via Bluetooth beacons on site in a stable manner, connects to users' mobile phones, in this way intercepts them and every time they approach the vicinity of a specific point of interest, it is activated on the mobile phone with the relevant card. Therefore it is not the visitor who has to search among a list of cards for the one that interests him, but it is the card that is activated giving the user the opportunity to read all the information relating to it. The <Start route> button allows the App to start scanning the Beacons, after activating Bluetooth, in order to identify the points closest to the position of the user's device.

The cards include textual, multimedia and photographic content. A background voice suggests reading the text.

Through the <Map of talking points> it is possible to discover which places are talked about and reach them more easily.

If the user is far from the village, but wants to discover the places in advance, with the catalog mode, present on the App, he can read the contents of the main points of interest of the village and the Museum.

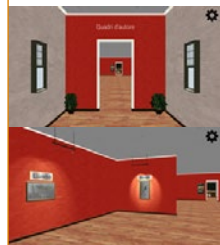




MUSE@HOME

MUSE@HOME

MUSEO@HOME – Smart Service and Technologie for Virtual Tours in Museums and Archeological Sites Enjoyable@HoME is a project financed under the Action and Cohesion Plan (PAC) – Line 2 – CULTURE WITH INCREASED IMPACT. In this context, new interaction models, technologies and intelligent services have been developed for the use, promotion and valorisation of cultural assets and sites through semi-immersive virtual paths in augmented reality. The project led to the creation of a technological platform with advanced and cutting-edge services that allows an innovative and contemporary model of use of virtual visit routes, possible directly from home, through the Smart TV, or through mobile devices.



NAPPSTONES

Born with the aim of promoting and spreading knowledge of the geological heritage through the exploration of the sites and works of art of the city of Naples, the project is aimed at the creation of a mobile application for smartphones and tablets whose multimedia information contents focus on the geological aspect of some of the most characteristic cultural places of the city of Naples, with particular attention also to the materials with which they were made.





TALK Morra De Sanctis

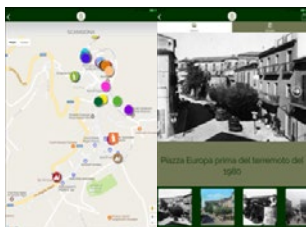
It is an app created on the occasion of the inauguration of the monument dedicated to the Morresi emigrants, to give voice to the theme of emigration, which is strongly felt by the community. Starting from the description of the monument and its photographic reportage, it continues with a section dedicated to the stories of the Morresi's families and of who, starting from the nineteenth century, abandoned their native land to seek their fortune elsewhere, first in America, then from the second half of the twentieth century, in Switzerland. By clicking on the menù it will be able to enter into the stories of each family, and also see documents, such as the lists written at the time of their landing in America. Furthermore, to celebrate the entire Morra's community, two sections have been dedicated, one describes the most important points of the town, the other guides the visitor towards those places. The app, in the presentation menu, has 5 sections, the central one is dedicated to the Monument to the Morra's Emigrants, then there are Smart Visit, Map, Stories and Municipality.





Torella's Memories

Memories of Torella - A journey into the past for the memory of the future is an open air exhibition with the aim of recovering the historical memory of Torella dei Lombardi. It is an innovative model of enjoyment of city places, divided into points of memory and points of interest: the "places" present themselves to the visitor, attract him, involve him and make him participate in their history and their radical changes. Today technology provides useful tools to navigate the past and retrace its traces: places take shape again and stories voice, the story thus re-proposed is reborn to become more fascinating. The exhibition offers a route that leads visitors to discover the places and live this new experience through special guides: the first is the classic one and includes a pedestrian route punctuated by illustrative panels, each representing a point of memory. This route sees the beginning and end ideally coincide in the heart of the town: the Ruspoli Castle of Candriano. The second modality involves the support of modern technologies through a mobile APP and a website. Through the application, the visitor can discover what the "memory points" are, open the information sheets and access the multimedia contents; furthermore, by activating the "Smart" visiting mode, the App recognizes their proximity and proposes their use, and then subsequently suggests the visit of others who are in the immediate proximity.





Castles of History

Castles of history, a project which, through the combination of innovative tools and classic communication tools, aims to promote territories to increase their value. The project concerns the historical-cultural heritage of the castles located in the municipalities of Morra de Sanctis, Torella dei Lombardi, Bisaccia, Sant'Angelo dei Lombardi and Monteverde, in the province of Avellino.

For this project, a website was created that brings together the network of municipalities, highlights their cultural heritage and their tourist and gastronomic offer, an application for interactive tables and a mobile app whose purpose is the valorization of cultural heritage, allowing the visitor an innovative use.

This application enhances the heritage, transforming the tourist into a virtual traveler and allowing him to access all the information relating to ongoing local initiatives. Based on the geo-location of the mobile device, the application allows to build itineraries based on the points of interest chosen by the visitor, a serious game that can be used in mobile mode which allows the user to learn information about the 5 manors and their territory. Virtual Tours created with latest generation photogrammetric techniques, and an application for Interactive Table.

For the project, a strong visual identity was created, an exclusive graphic concept, and paper materials were also created such as a guide catalog of the Municipalities relating to the project, brochures, flyers, pamphlets, postcards, folders; materials were provided for the back office of the museums of the 5 Municipalities, advertising stands and fairs.

For tourism promotion, a series of videos and promotional spots have been created that municipalities can use on their channels, for events and festivals.





ISPH3RA

It is an augmented reality application created for mobile devices. It allows to view the virtual anastylosis of the archaeological area of Paestum, obtained by superimposing the 3D modeled images of the three existing temples. This realization began with a rigorous survey of architectural emergencies using advanced techniques (e.g. laser scanner); the data thus produced were then processed to produce 3D models using three-dimensional meshes with high polygonal density.



DiMostra

It is an application designed as an original support for educational-laboratory activities in schools and museums. Thanks to this tool, in fact, the creations of young aspiring artists are acquired in digital format using modern technologies, and uploaded - together with a descriptive caption and the multilingual audio file - onto the DiMostra platform, which reproduces the environment of a real art exhibition: the works are thus placed within a virtual exhibition space and can be used both from mobile devices and from the web.



snecs

SNECS

Social Network of Historic Center Entities



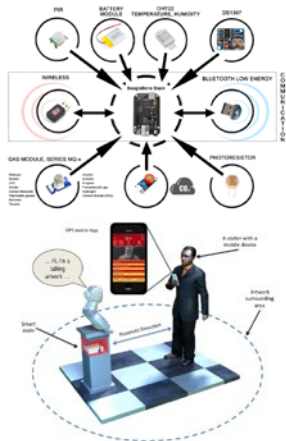
It is a project financed under Axis I of the PON R&C, aimed at enhancing the historic centers of the Campania Region and experimenting with new strategies based on ICT technology.

As part of the SNECS project, important demonstrators were developed in which NAOS actively participated with its creations. Among the most significant are:

- The exhibition *Il Bello e il Vero. Neapolitan Sculpture of the second half of the nineteenth century and the first of the twentieth century*, curated on behalf of Databenc by Isabella Valente, professor of the University of Naples Federico II, and held at the monumental complex of San Domenico Maggiore in Naples, from October the 30th, 2014 to June 6th, 2015. Unique in its kind in terms of dimensions - 300 works of Neapolitan sculpture from the second half of the nineteenth century on display - the exhibition was characterized not only by its great scientific and cultural relevance and ability to attract tourists, but also for the novelty of the technological installations to support the fruition and valorisation processes.

In fact, 120 smart crickets were installed and 7 displays were deployed, sensors that communicate with visitors through apps for mobile systems, touchless interactions with 3D reconstructions on very high resolution screens, virtual navigation, production of multimedia and multi-channel content and broadcast of the virtual visit to the exhibition on OTT TV channels. The event, present due to its relevance at the Universal Forum of Cultures, attracted 81,122 visitors, many of whom were foreign.

- On December 12th, 2015 it was inaugurated the permanent exhibition *Castel Nuovo Smart Tour, works and places tell their story*. Inside, exceptional exhibitions made use of an innovative model of use based on Internet of Things technologies. Furthermore, using touchless navigation systems based on an app developed for interaction with smartTVs, it was possible to have a virtual overview of spaces and museums in the city of Naples, particularly relevant from a historical and artistic point of view.





Consulting projects

Innovative technologies

Since NAOS Lab's vision is oriented towards technological innovation, the latest technologies are tested to ensure innovative solutions in various fields:

- *Database*
- *WebDatabase*

Given the multimedia nature of the content that is handled today, traditional relational databases are no longer the ideal solution for archiving such content. For this purpose, more innovative non-relational databases are tested in the laboratory:

- *Hadoop*
- *MongoDB*
- *Elasticsearch*

These, each with its own peculiarities, guarantee the storage of non-relational content, guaranteeing data security and their distributed storage.

WEB

The integration of front-end and back-end activities is a trend driven by the evolution of business processes, particularly those related to the operations. If the front-end and back-end provided different resources and technologies until a few years ago, their integration today concerns both. As for technology, one of the examples that can be cited belongs to the Industry 4.0 paradigm and KET (Key Enabling Technology) which contributed to the fourth industrial revolution.

To get this aim, innovative open source technologies are tested in the NAOS laboratories. To have a perfectly integrated Front-end and Back-end architecture (full-stack development), the "SpringBoot" back-end framework has been integrated with the "Angular" front-end framework. All with JDK 11 or higher.

Applications for the world of telephony

Using one of Oracle's most high-performance and innovative platforms, OCCAS 7.0, orchestral software was created for a leading Italian telephone company on an IMS network, allowing customers to interact with advanced, latest-generation switchboards, such as Genesys. In fact, through dialogue with MRFs (Media Resource Functions), the customer who calls a contact center is helped to make the appropriate choices in order to speak to an operator with the skills to resolve the problem they are calling about.



Application for the world of Big Data and multimedia

Faced with a world oriented towards multimedia content, for an Italian telephone company, software was created for archiving and listening to multimedia content, in order to validate its content. All with the following frameworks:

- *Angular*
- *SpringBoot*
- *JPA*

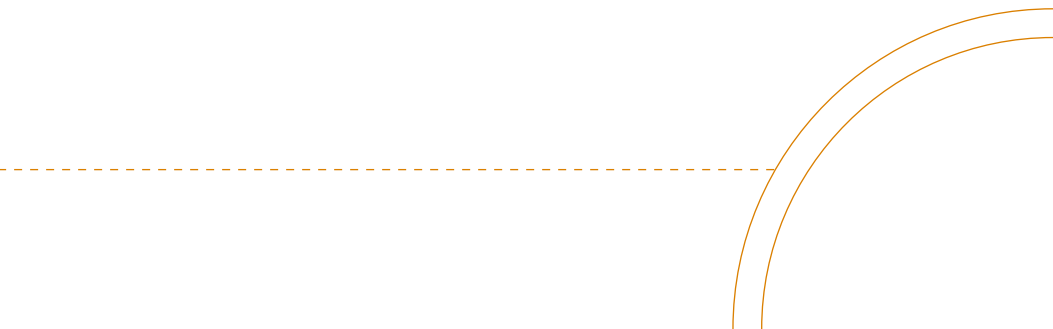
Atatic contents are cataloged in Oracles Database 12c, while dynamic contents in MongoDB.

Deep web application

The deep web is the set of information resources on the World Wide Web that are not indexed by normal search engines.

To explain the mass of data present on the deep web, the metaphor of an iceberg is used: the part above the water, corresponds to all the web pages indexed by search engines (the so-called accessible pages); while the substantial part of the iceberg is submerged and corresponds to the deep web.

In order to search for unindexed content, a prototype crawler was created that connects to the deep web via the TOR network. By connecting to well-known sites that catalogue content, a database of sites catalogued by keywords was created.





NAOS 