Internet and IT technologies gained a central role for provision and dissemination of Culture.

An example is Fondazione MAXXI, which provides in its website an advanced functionalities to retrieve data about goods in its patrimony by searching items by date, historical period, author and so on.
Internet and IT technologies gained a central role for provision and dissemination of Culture.

In particular, most of the cultural institutions provide information about their assets and events by the way of web sites and mobile applications.

An example is Fondazione MAXXI, which provides in its web site an advanced functionalities to retrieve data about goods in its patrimony by searching items by date, historical period, author and so on.
In-house Search Engines

Such *in-house* search engines of course are useful. However, consider the following query

*Portraits of the Holy Roman Empire Federico II and of its closed relatives*

and the most specific one

*Tapestries portraying Federico II or some of its closed relatives.*
Realizing a search engine capable to answer these queries may be costly for a cultural institution: user interface, web and mobile set-up, database, ...
In addition, beside the catalogue of its goods, such an engine should rely on other knowledge bases concerning different knowledge domains, possibly authoritative.

For example, genealogies of historical figures are needed to provide an answer for Portraits of the Holy Roman Empire Federico II and of its closed relatives.
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For example, genealogies of historical figures are needed to provide an answer for Portraits of the Holy Roman Empire Federico II and of its closed relatives and to answer the following, some sort of technical information (what is a tapestry?) is required as well.

Tapestries portraying Federico II or some of its closed relatives.
But, what happens if one does not know where the items of interest are located?

**Example**

Suppose that I’m a person interested in Federico II (may be for study or professionals) and I’m in Naples for some reason. Where can I find here

*Places and artifacts related to Federico II?*
Internet Search Engines (google, yahoo, DuckDuckGo, . . . ) may help, but they have restrictions and issues as well. Some of them are:

- **Languages** - Parigi and Paris may represent the same city;
- **Homonymy** - there are more than 100 cities in the world called Paris.
Global Internet Search Engines

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Languages - Parigi and Paris may represent the same city;

Homonymy - there are more than 100 of cities in the world called Paris.
The Web was designed as an information space, with the goal that it should be useful not only for human-human communication, but also that machines would be able to participate and help. One of the major obstacles to this has been the fact that most information on the Web is designed for human consumption, and even if it was derived from a database with well defined meanings (in at least some terms) for its columns, that the structure of the data is not evident to a robot browsing the web.

Global Internet Search Engines - Limitations

As consequence, internet search engines in general do not provide precise results answering complex queries.

Example

Querying a prominent search engines for

*Federico II places*

I got just result about the university, and not about the emporor.

1. Università degli Studi di Napoli "Federico II" | OPEN Places
2. AOU - Policlinico "Federico II" - Napoli, Italy - Hospital | Facebook
3. Federico II Ingegneria Via Claudio - College and University | Facebook
4. MARIA CATERINA FONTE - www.docenti.unina.it
The Semantic Web Approach

Example

Suppose that I’m a person interested in Federico II (may be for study or professionals) and I’m in Naples for some reason. Where can I find here

*Places and artifacts related to Federico II?*

A *catalogue of catalogues* may help, may be *linked* with external and authoritative knowledge bases.
The Semantic Web Approach

Example

Suppose that I’m a person interested in Federico II (may be for study or professionals) and I’m in Naples for some reason. Where can I find here

*Places and artifacts related to Federico II?*

A *catalogue of catalogues* may help, may be *linked* with external and authoritative knowledge bases.

However, all these catalogues and knowledge bases have to be *machine-readable* and *interoperable*. In this way, third-party applications can use the data in the catalogues and provide them to users.
Semantic Web Technologies allow one to provide structured information about real-world items.

**Example (Federico II in the Semantic Web)**

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><a href="http://airpedia.org/typeWithConfidence">http://airpedia.org/typeWithConfidence</a></td>
<td>dbpedia-owl:Person dbpedia-owl:Monarch dbpedia-owl:Agent</td>
</tr>
<tr>
<td>dbpedia-owl:birthPlace</td>
<td>dbpedia-it:Jesi</td>
</tr>
<tr>
<td>dbpedia-owl:birthYear</td>
<td>1194-01-01 00:00:00 (xsd:date)</td>
</tr>
<tr>
<td>dbpedia-owl:deathPlace</td>
<td>dbpedia-it:Torremaggiore</td>
</tr>
<tr>
<td>dbpedia-owl:deathYear</td>
<td>1250-01-01 00:00:00 (xsd:date)</td>
</tr>
<tr>
<td>...</td>
<td>...</td>
</tr>
</tbody>
</table>
Such a structured description can be provided aside a web page.

Example (Federico II in Canonical and Semantic Web)

<table>
<thead>
<tr>
<th>Canonical Web</th>
<th>Semantic Web</th>
</tr>
</thead>
<tbody>
<tr>
<td>Federico II was born in Jesi in 1194.</td>
<td>birthPlace Jesi</td>
</tr>
<tr>
<td></td>
<td>birthYear 1194</td>
</tr>
<tr>
<td>He died in Torremaggiore in 1250.</td>
<td>deathPlace Torremaggiore</td>
</tr>
<tr>
<td></td>
<td>deathYear 1250</td>
</tr>
</tbody>
</table>
Automated agents can process and, in some sense, *understand* the data provided in this way. Consequently, *sound* answers can be provided for complex queries too.

**Example (Federico II in the Semantic Web)**

*Tell me the places related with Federico II*

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Using well-known *vocabularies* data in a knowledge base can be integrated in existing applications with no additional effort.
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In-house search engines are no more necessary.
Etherogeneous knowledge bases can be linked. For example, one in her own knowledge base can claim to be interested in the Mona Lisa, which is in turn described in another knowledge base.
Applications can use information from different data-sources.
Acually, Internet seach engines use linked open data!

Example

*query:* Mona Lisa  *results:* . . . , La Joconde à Washington, . . . , Bob
Europeana is the *catalogue of catalogues* for the European cultural heritage. Around 2300 cultural institutions from all over the European Union provide their catalogues through Europeana.
Europeana-based applications

Several mobile and web applications use the data provided through Europeana.
But Europeana is just a node of the Linked Open Data Cloud. The cloud connects more than 365 different knowledge bases: DBpedia, Linked Movie Database, Linked Geodata, AGROVOC, …
Summing up, why a cultural institution should provide information about its goods as open data?

*Europe has probably the world's greatest cultural heritage. Digitisation brings culture into people’s homes and is a valuable resource for education, tourism, games, animation and the whole creative industry. Investing in digitisation will create new companies and generate new jobs.*

*Neelie Kroes, European Commission*
As today is the 3rd Open Data Day in the world, I conclude with some calls for different people:

1. for *Cultural Institutions*: provide information about you and your assets as Open Data, they will be helpful for someone and someone will spread them around the world;

2. for *Developers*: use open data from Public Administrations and privates, they are really free;

3. for *Citizens*: ask Public Administration to publish their data as open data, because these data belong to all of us;

4. for *Citizens* again: be hackers! Download data from your Public Administration, seek what can be of your interest and use it.
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Thank you.