Case Study 2 Statutory Approval

Statutory Approval in ……. ONE Second

Regulatory Room

Roadmap to automated regulatory processes in construction through BIM

Inspired by buildingSMART Canada Roadmap

Technology Organization Process	Low hanging fruits	Advanced BIM	Long term ambitions	
Engage **Foster engagement from government, software & industry**	Develop and communicate a BIM strategy	Inform the community through outreach programs and promotion Engage government regulatory bodies and push for strong leadership at state level	Create a movement to BIM	**Desired state** • **Government collaborate and share knowledge concerning automated permitting processes and code checking**
Technology **ISO 16739 – IFC, ISO 12003-2 IFD, ISO 29481 IDM, ISO 19650 Information Management, ISO xxxxx BIM-GIS, Archive**	Develop regulatory MVD Develop specification certification	Develop machine readable Regulation language	IFC properties	**Desired state** • **Complete set of standards supporting automated regulatory processes** • **Support from software**
Implementation **Guidelines, templates to support implementation**	Develop Exchange Requirement guidelines Terminology	Develop process templates Develop a guide for implementing national digital BIM platforms		**Desired state** • **Widespread and consistent government demand** • **Capability to fulfil the demand**
Evaluate **Measure, evaluate and assess the impact and maturity of BIM**	Develop metrics and KPI's for consistent performance and capability assessment	Develop a maturity model/ capability assessment framework	Communicate and compare performance and maturity level	**Desired state** • **Consistent metrics and measurement processes** • **Regular feedback of maturity on national level**
Sustain **Adapt and maintain the transition to**	Document and promote success stories Align and maintain buildingSMART specifications and guidelines with ISO			**Desired state** • **Harmonized regulatory processes** • **Relevant standards & guidelines**

e-Submission common guideline for introduce BIM to building process

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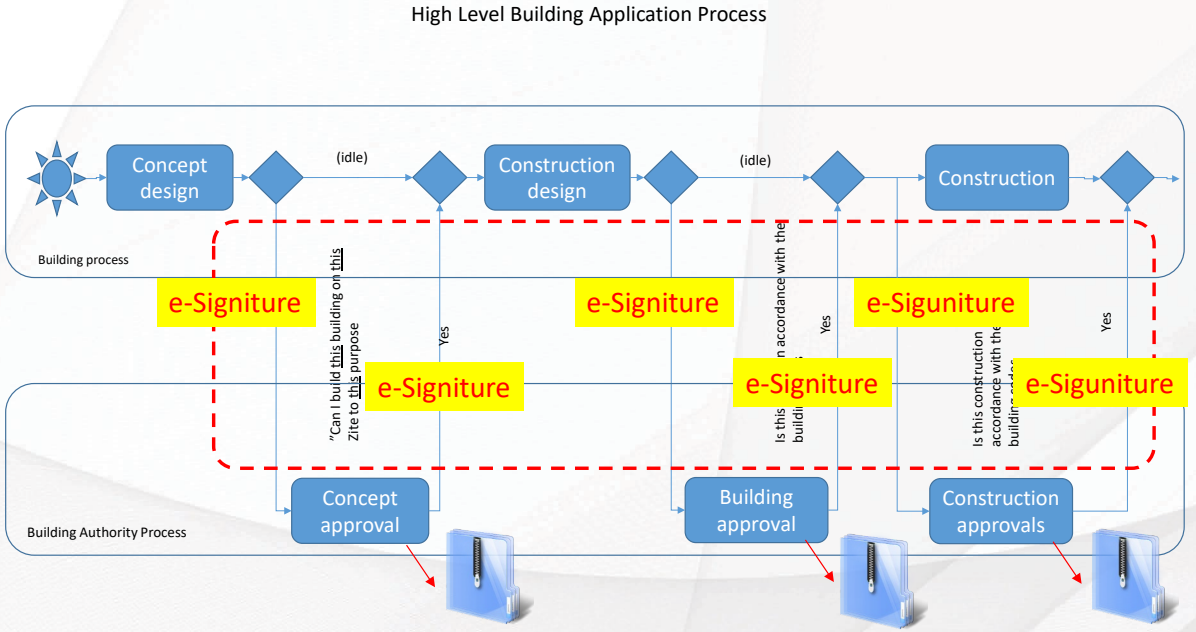
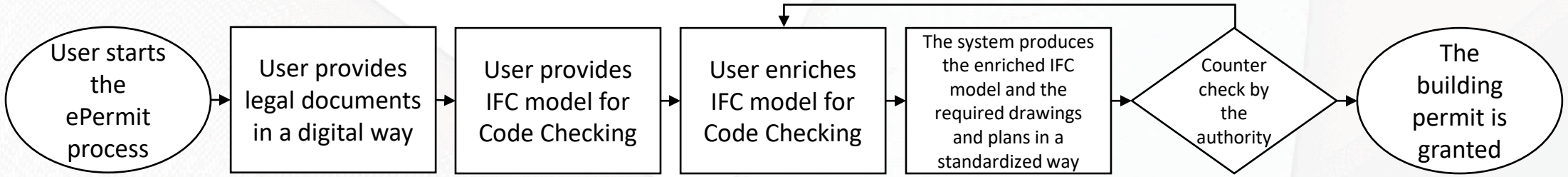


a) Establish e-submission platform
b) Initiation of BIM to paperless process as trial
c) Adaptation of guideline of preparing BIM model for submission
d) Step by step mandatory e-submission
e) Seeking further efficiency

openBIM ePermit and Code Checking

Building ePermit simplified process:

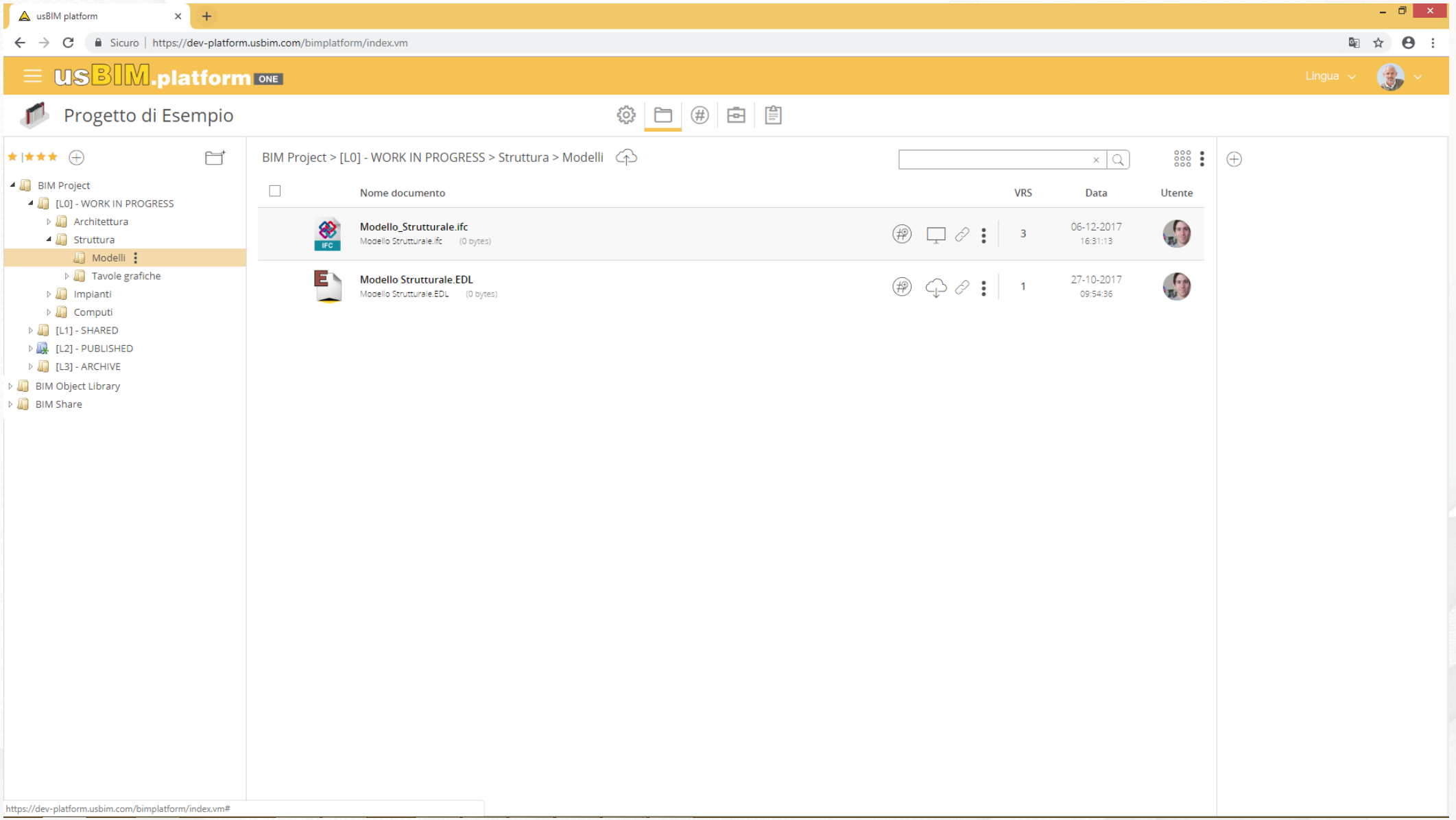


Keypoints:

- **All the data will be exchanged using open formats**
- **All the data will be gathered in one single place, where also the communication between the actors will occur**

This means that it will be easy to combine all the available open data and make further analysis and it will be evidence of how useful the open formats really are

The keypoints aims to give an **EVOLUTION** of the current process and procedures rather than a REVOLUTION from the actors point of view, using tools and instruments already available today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Sicuro | https://dev-platform.usbim.com/bimplatform/index.vm
usBIM.platform ONE
Lingua
Progetto di Esempio
BIM Project > [L0] - WORK IN PROGRESS > Struttura > Modelli
BIM Project
[L0] - WORK IN PROGRESS
Architettura
Struttura
Modelli
Tavole grafiche
Impianti
Computi
[L1] - SHARED
[L2] - PUBLISHED
[L3] - ARCHIVE
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BIM Share
Nome documento
VRS
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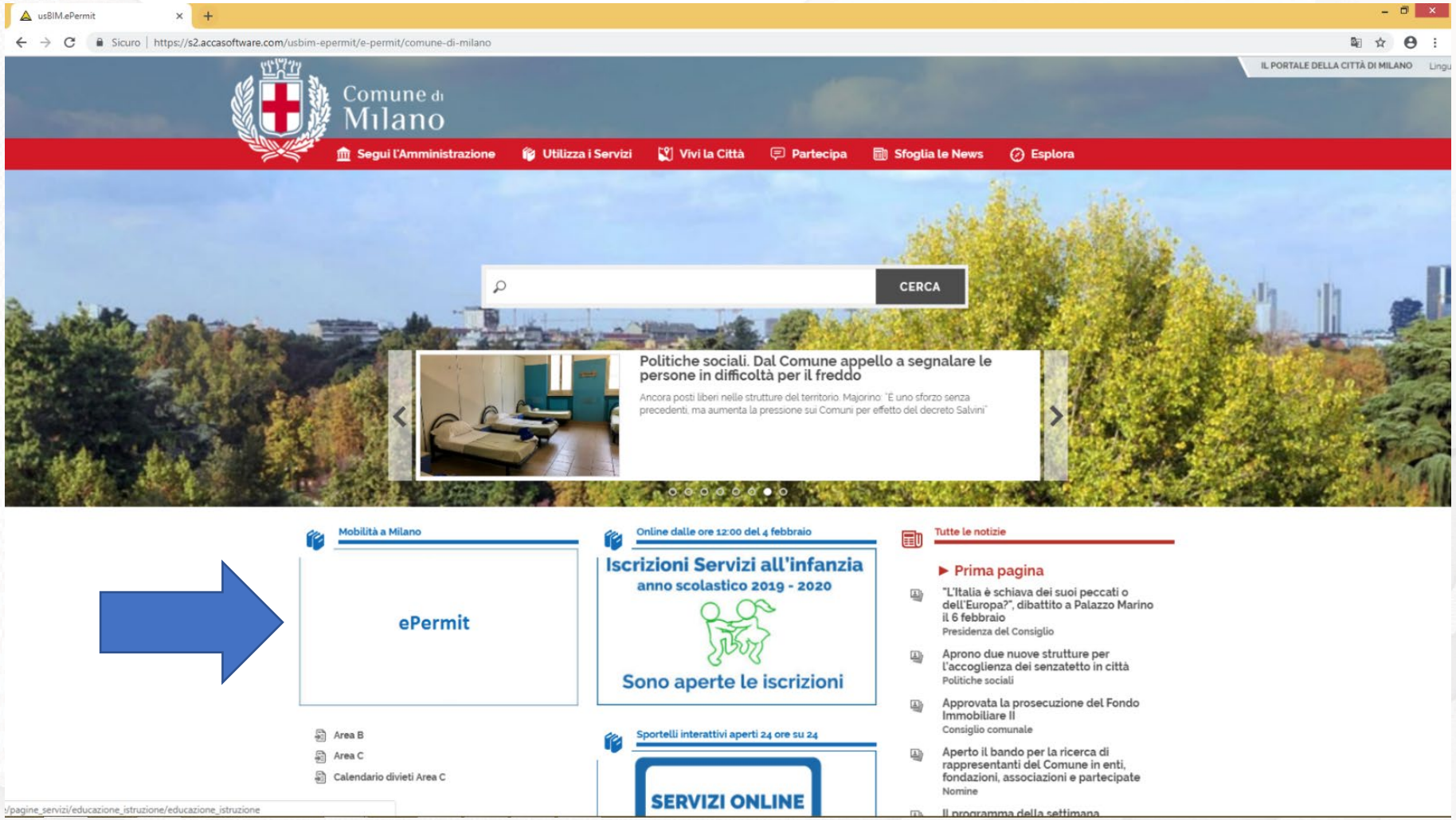
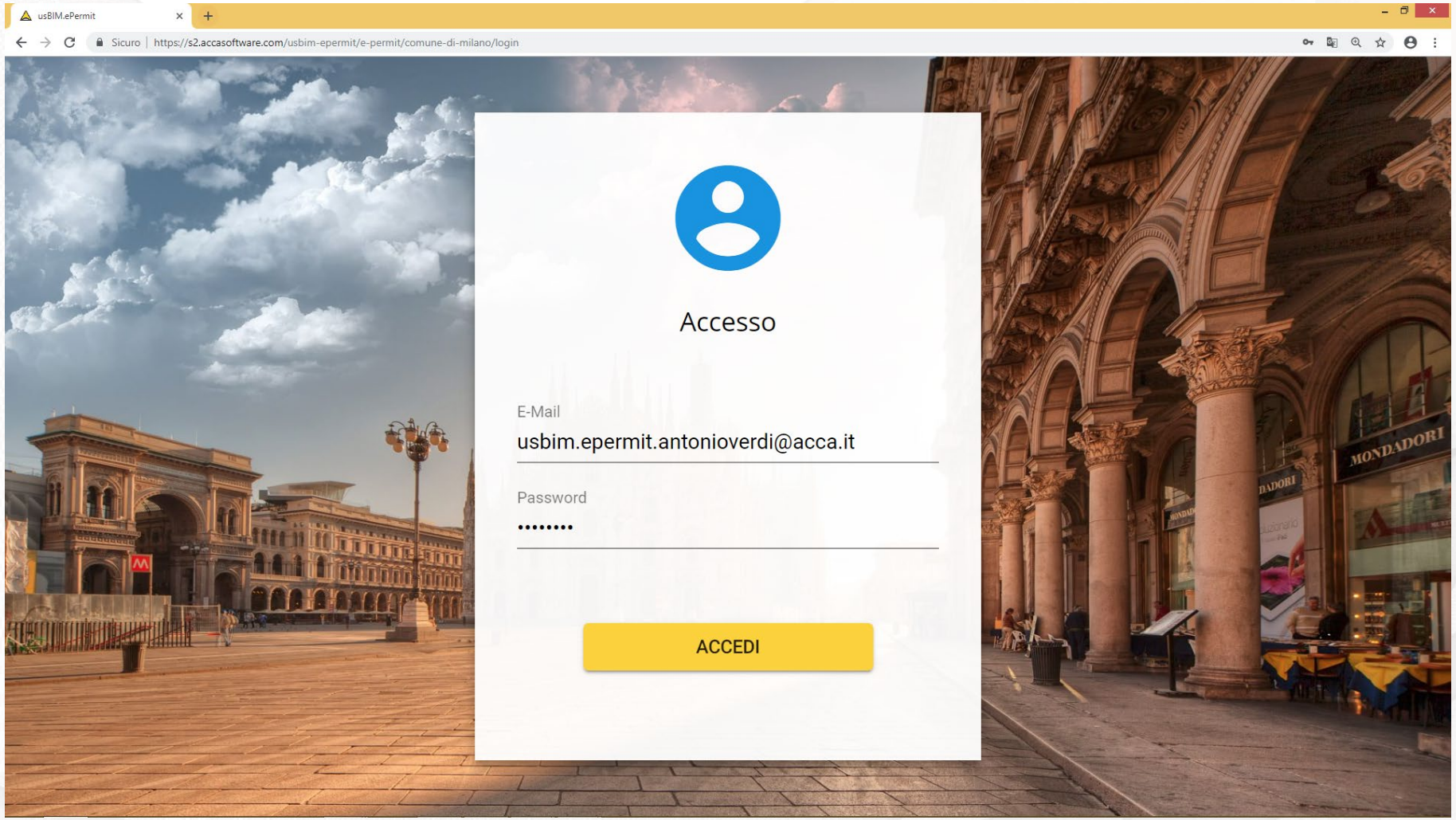
User starts the ePermit process



User starts the ePermit process → User provides legal documents in a digital way → User provides IFC model for Code Checking

User login


usBIM.ePermit
Sicuro | https://s2.accasoftware.com/usbim-epermit/e-permit/comune-di-milano/login
Accesso
E-Mail
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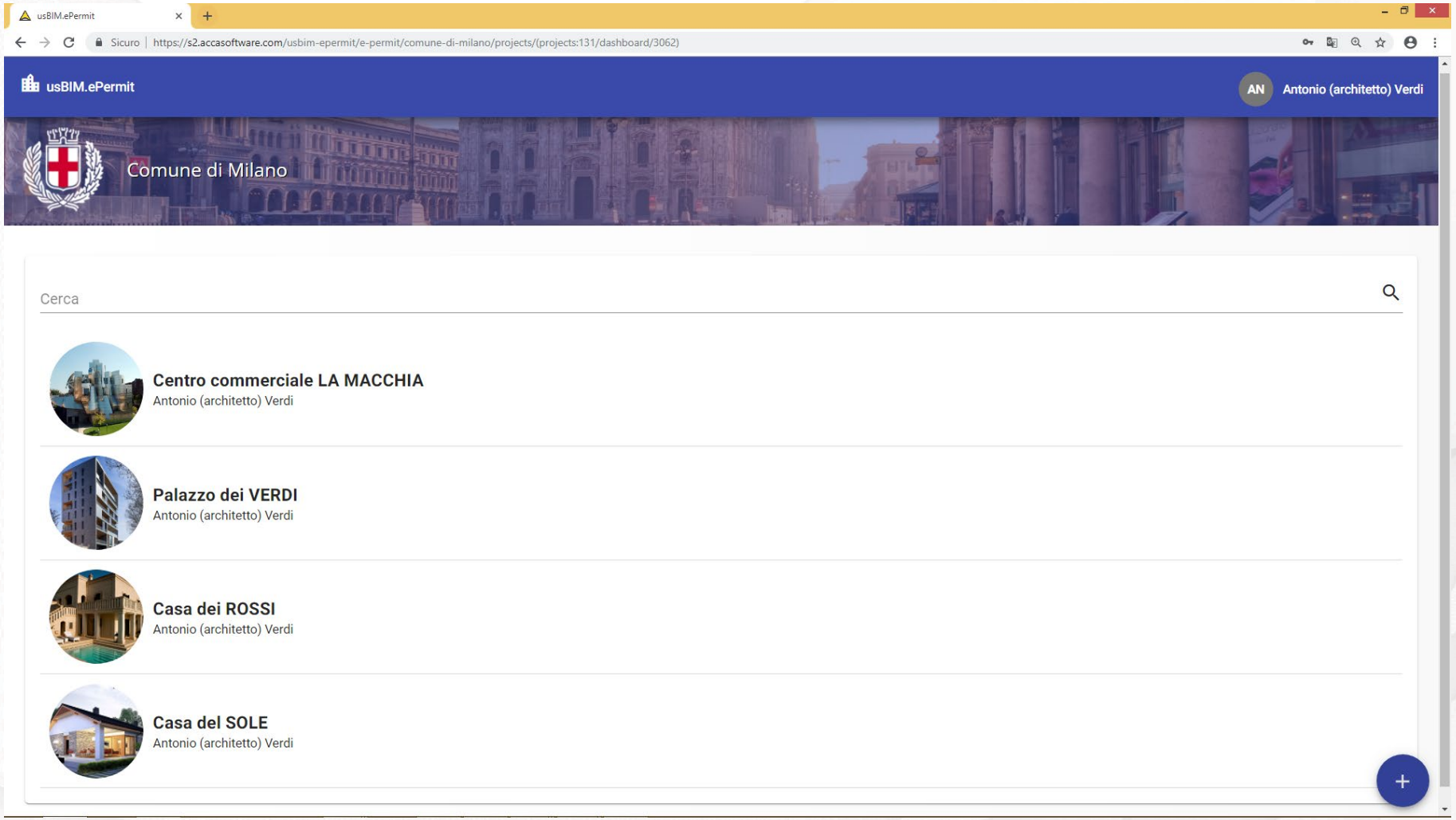
Password
ACCEDI
MONDADORI

User panel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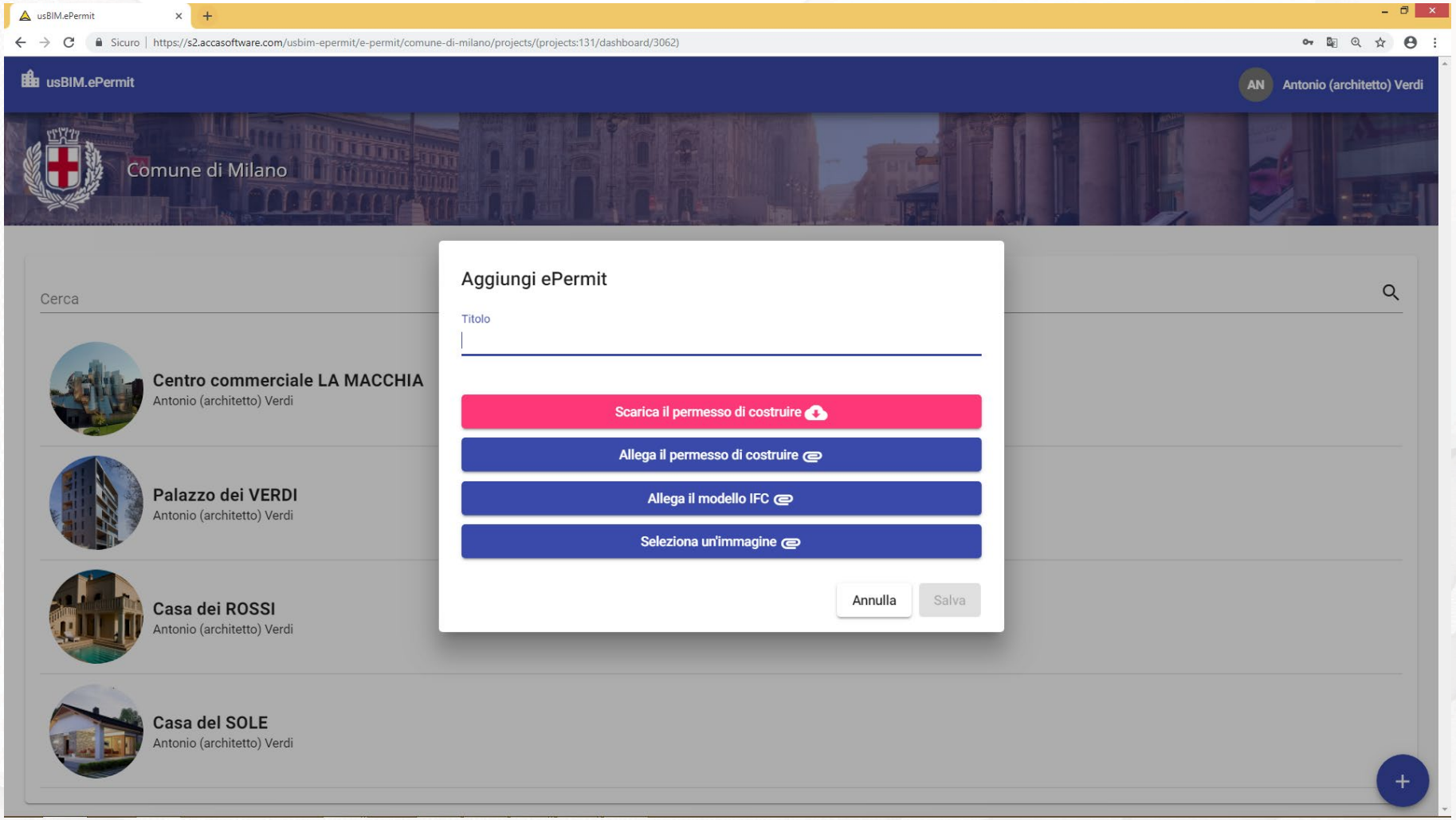
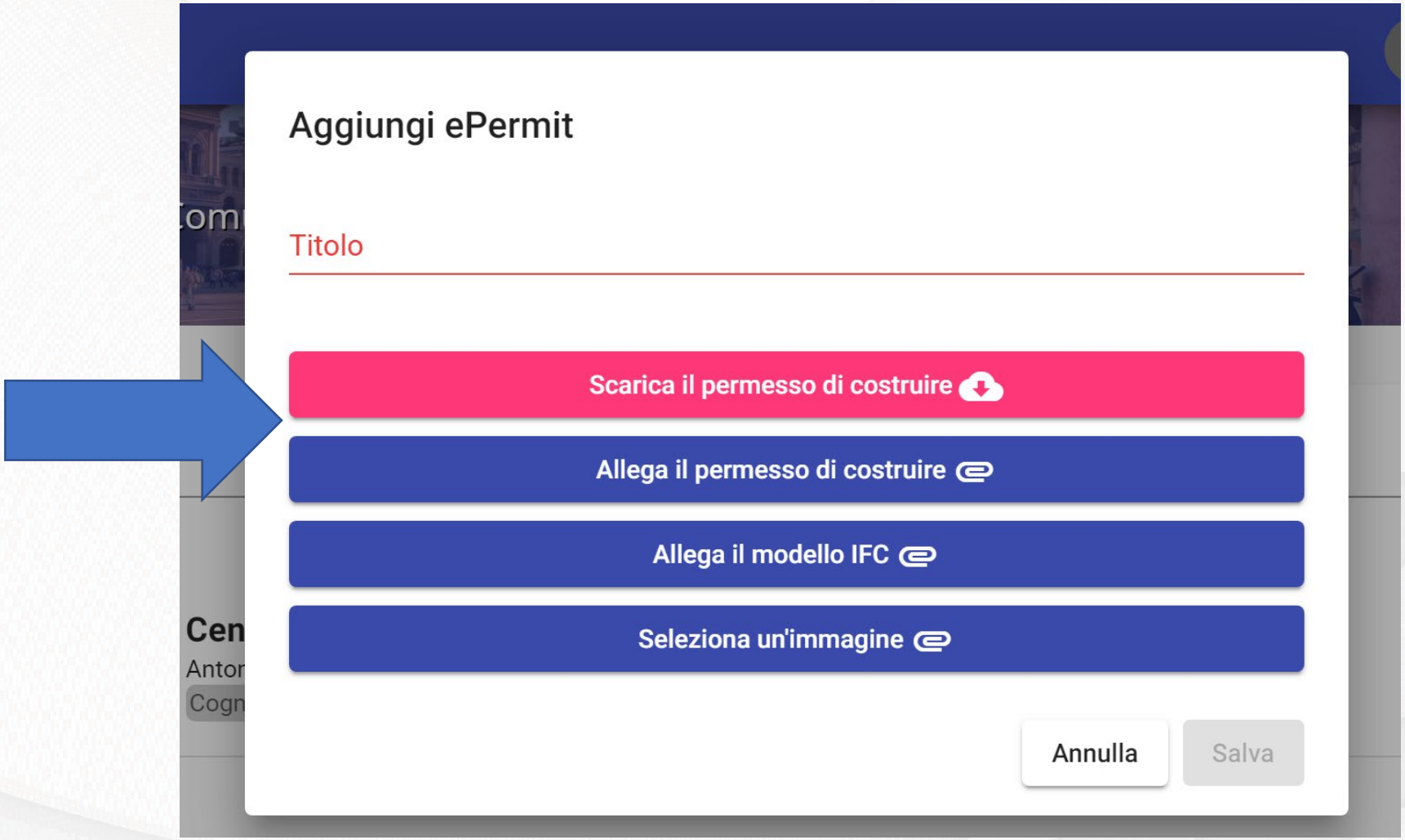
Sicuro | https://s2.accasoftware.com/usbim-epermit/e-permit/comune-di-milano/projects/(projects:131/dashboard/3062)
usBIM.ePermit
AN
Antonio (architetto) Verdi
Comune di Milano
Cerca
Centro commerciale LA MACCHIA
Antonio (architetto) Verdi
Palazzo dei VERDI
Antonio (architetto) Verdi
Casa dei ROSSI
Antonio (architetto) Verdi
Casa del SOLE
Antonio (architetto) Verdi

User provides legal documents in a digital way

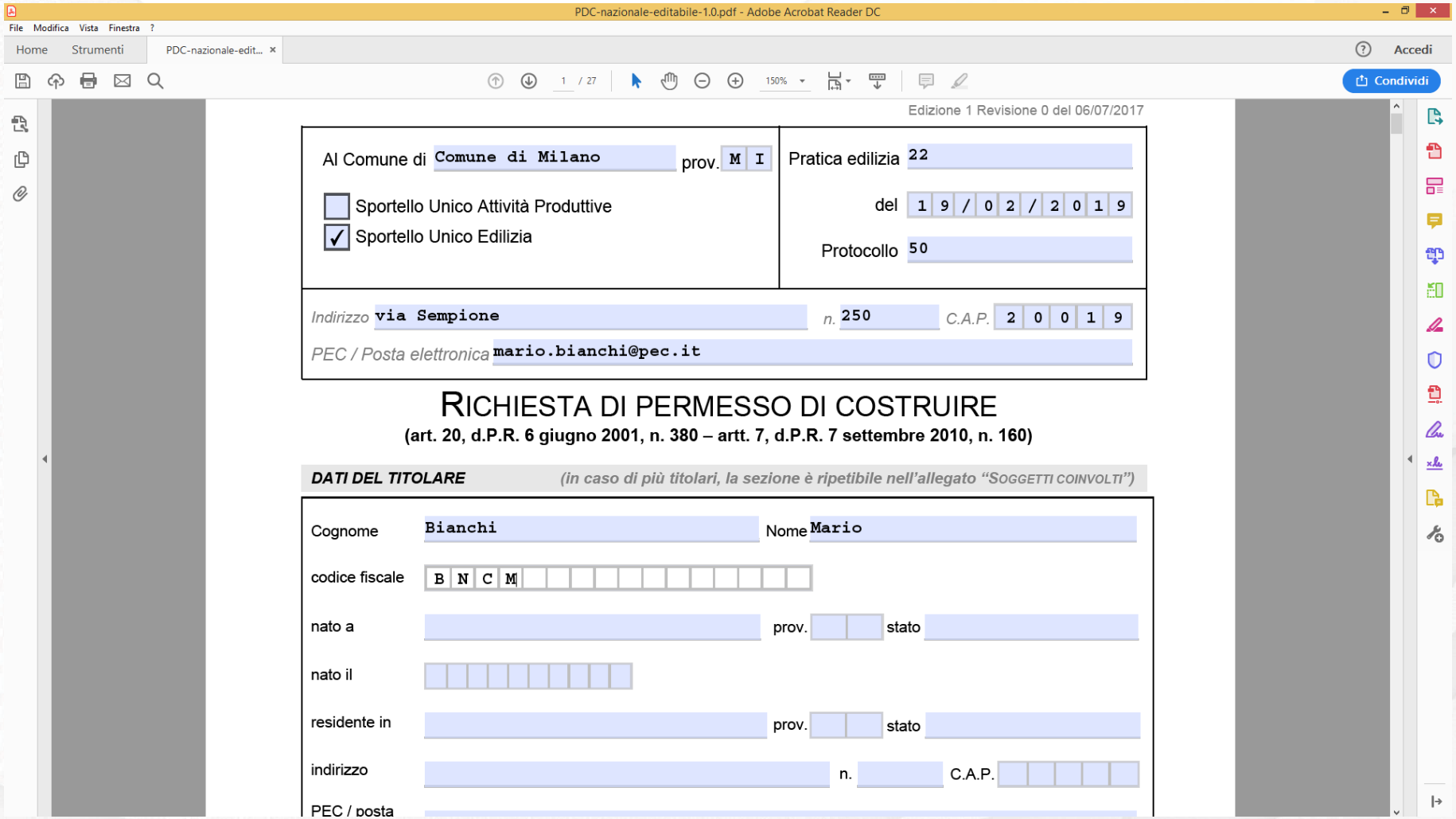


User starts the ePermit process → **User provides legal documents in a digital way** → User provides IFC model for Code Checking

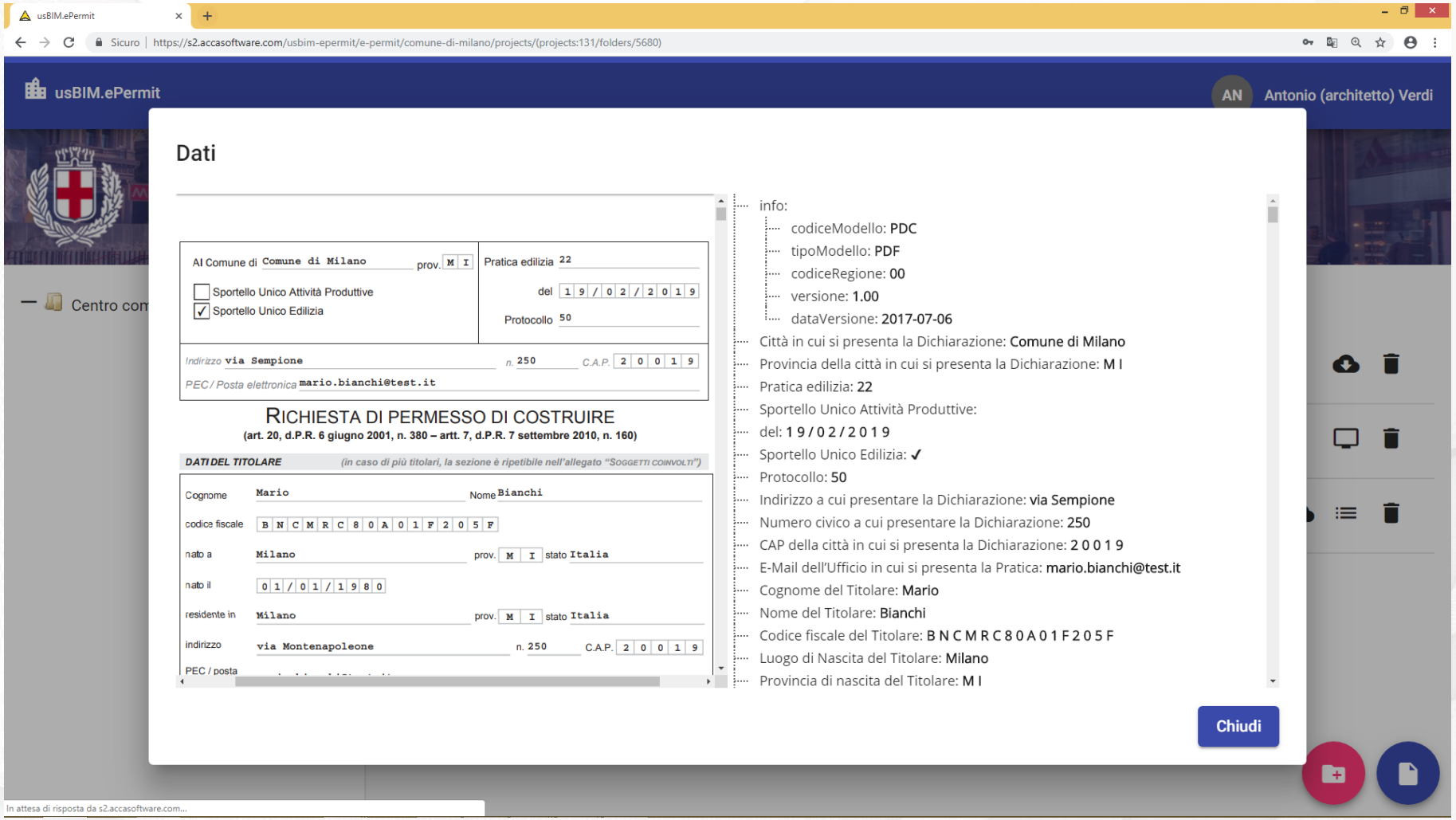
User provides legal documents in a digital way



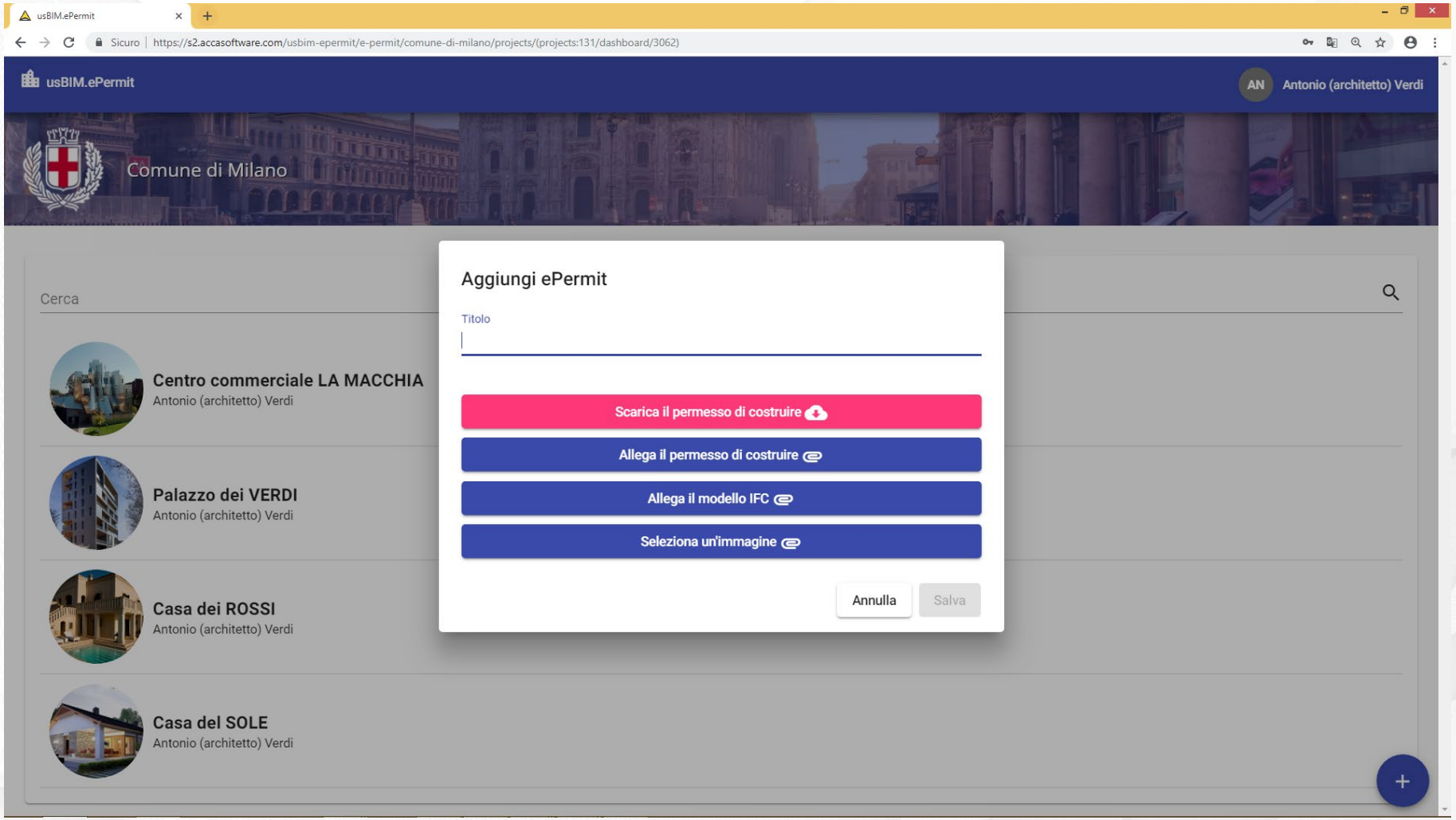
National standardized PDF model filling



National standardized PDF model data extraction

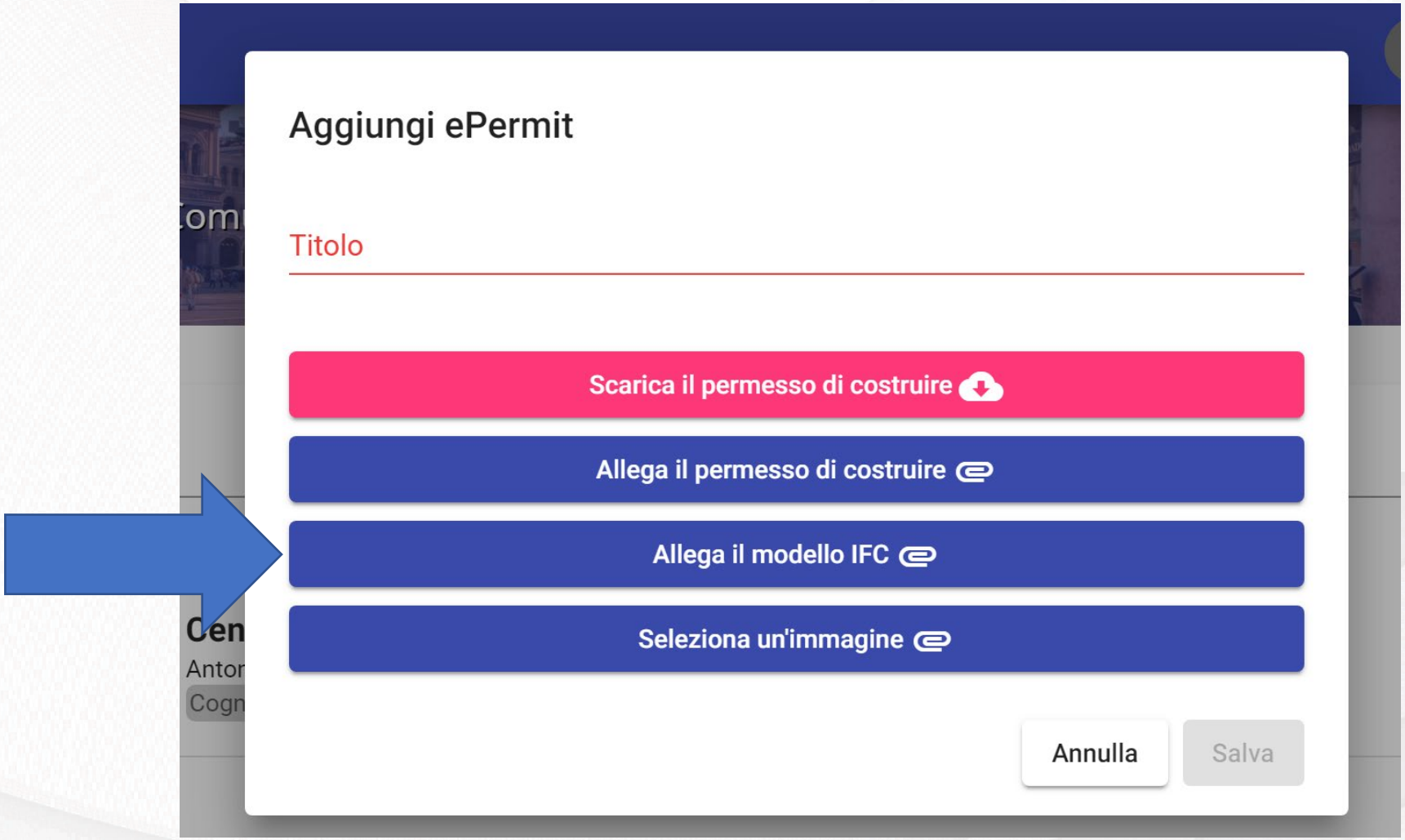


IFC model upload



User provides legal documents in a digital way → **User provides IFC model for Code Checking** → User enriches IFC model for Code Checking

IFC model upload



Code Checking in IFC (in theory)

MILAN Buidling Code

ARGOMENTO	ART.	DESCRIZIONE	PARAMETRO	U.M.	REGOLA	DEFINIZIONI
SCALE	Art.89.1	Le scale di uso comune sono disciplinate, quanto a larghezza, dimensioni e chiusure, dalla normativa nazionale e regionale vigente in materia di barriere architettoniche e di prevenzione incendi. Deve in ogni caso essere garantita la corretta fruibilità e la possibilità del trasporto di soccorso delle persone. Le rampe delle scale possono avere massimo 12 alzate consecutive negli interventi di nuova costruzione e 14 alzate consecutive negli interver edilizio esistente.	CAD	CAD	$N°_{alzate} \leq 12$	**$N°_{alzate}$**: Numero di alzate consecutive
	Art.89.2	All'interno delle singole unità imm realizzazione di scale a chiocciola che garantiscano comunque ido sicurezza e fruibilità. Quando tali scale sono l'unico a dell'unità immobiliare con prese dovranno avere una larghezza del 80.				
	Art.89.6	Tra la rampa della scala a scen locali che danno sul pianerottol dovrà esserci una distanza mini sulla linea di sviluppo della ramp scala a scendere e gli ingressi pros una distanza minima di m. 1,50.				
LOCALI SOTTOTETTO NON AGIBILI	Art. 90.2	Nei nuovi progetti l'altezza med sottotetto non agibili, calcolata della parte di sottotetto la cui per la superficie relativa, dovrà 2,35.				

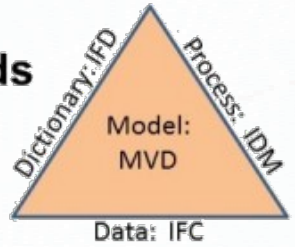
LONDON Building Code

ARGOMENTO	ARTICOLO/ APPENDICE	DESCRIZIONE	PARAMETRO	U.M.	REGOLA	DEFINIZIONI
Purge ventilation	F1 Appendix B Windows	For a hinged or pivot window that opens 30º or more or for parallel sliding windows (e.g. vertical sliding sash windows), the height x width of the opening part should be at least 1/20th of the floor area of the room.	SUPERFICIE	mq	se $\alpha \geq 30°$: $Sw \geq 1/20\ S_{room}$ Sw= HxW	**α**: angolo di apertura **Sw**: Superficie apribile di una finestra H=height, L=width **S_{room}**: Superficie della stanza
		For a hinged or pivot window that opens between 15º and 30º, the height x width of the opening part should be at least 1/10 th of the floor area of the room.	SUPERFICIE	mq	se $15° \leq \alpha \leq 30°$: $Sw \geq 1/10\ S_{room}$ Sw= HxW	
		If the room contains more than one openable window, the areas of all the opening parts may be added to achieve the required proportion of the floor area. The required proportion of the floor area is determined by the opening angle of the largest window in the room.	SUPERFICIE	mq	Sw=ΣSwn	**Swn**: Superficie apribile di una singola finestra
	F1 Appendix B External doors	For an external door, the height x width of the opening part should be at least 1/20th of the floor area of the room. If the room contains more than one external door, the areas of all the opening parts may be added to achieve at least 1/20th of the floor area of the room.	SUPERFICIE	mq	oppure $Sd \geq 1/20\ S_{room}$ Sd=Σ Sdn	**Sd**: Superficie apribile porte esterne **Sdn**: Superficie apribile singola porta esterna

POLITECNICO MILANO 1863

Code Checking in IFC (in theory)

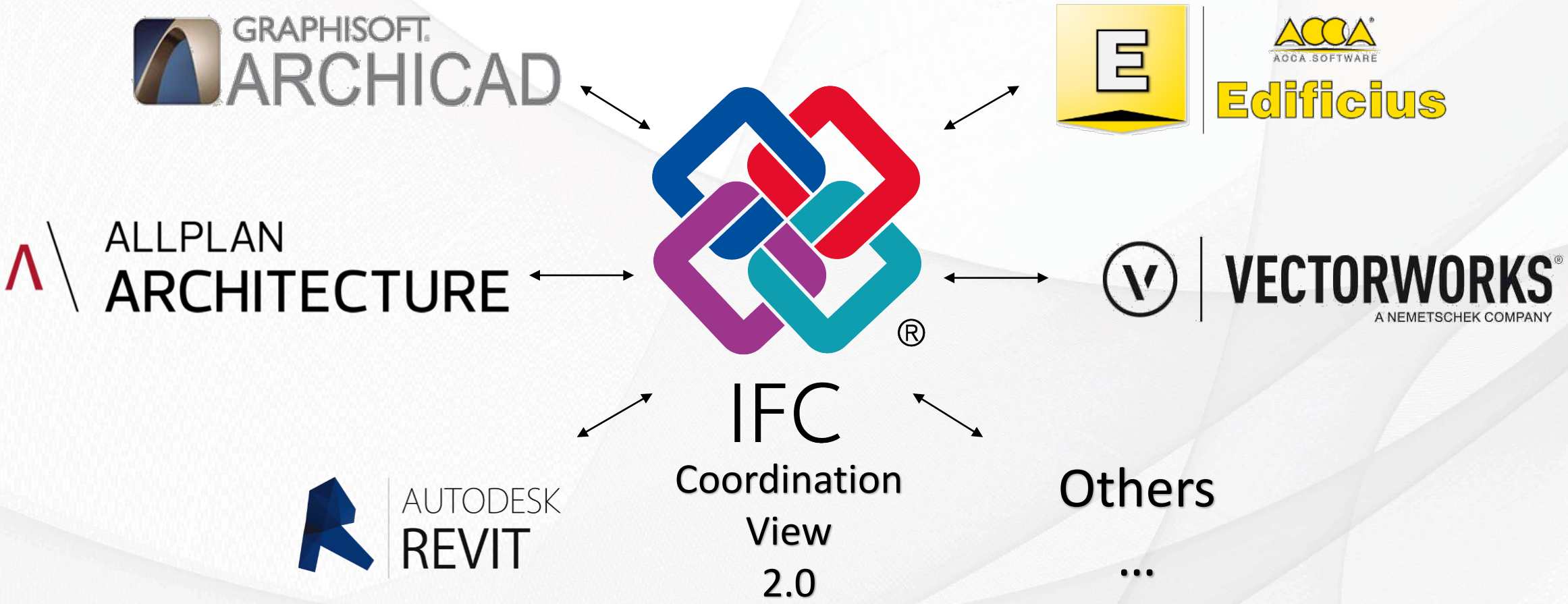
Technical Principles: Basic Standards



There are five basic methodology standards

What it does	Name	Standard
Describes Processes	IDM Information Delivery Manual	ISO 29481-1 ISO 29481-2
Transports information / Data	IFC Industry Foundation Class	ISO 16739
Change Coordination	BCF BIM Collaboration Format	buildingSMART BCF
Mapping of Terms	IFD International Framework for Dictionaries	ISO 12006-3 buildingSMART Data Dictionary
Translates processes into technical requirements	MVD Model View Definitions	buildingSMART MVD

The situation today



Code Checking in IFC (in practice)

PROBLEM

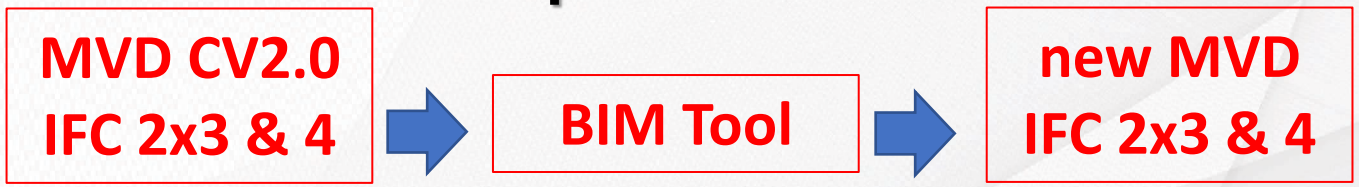
Do we really think that all the BIM Authorings will be compliant with all the MVDs produced by each regulatory body?

Even if they do, there is no guarantee that all files produced by such BIM Authorings always contains all the required information for Code Checking (i.e. some information may still be missing)

Code Checking in IFC (in practice)

IDEA: from IFC to IFC

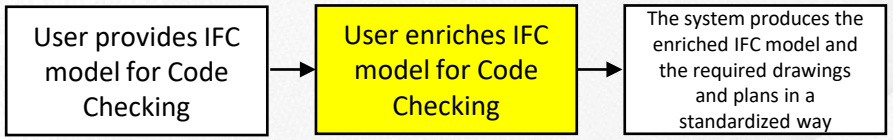
There should be specific BIM Tools that, starting with a common IFC model (e.g. Coordination View 2.0 files), may enrich it to be compliant with a MVD required from a specific regulatory body so it will be the regulatory body itself that will be interested and invest in the development of such BIM Tool, other than the interested software houses, and given the fact that we are using an open format, everyone who is interested in the development can contribute aswell



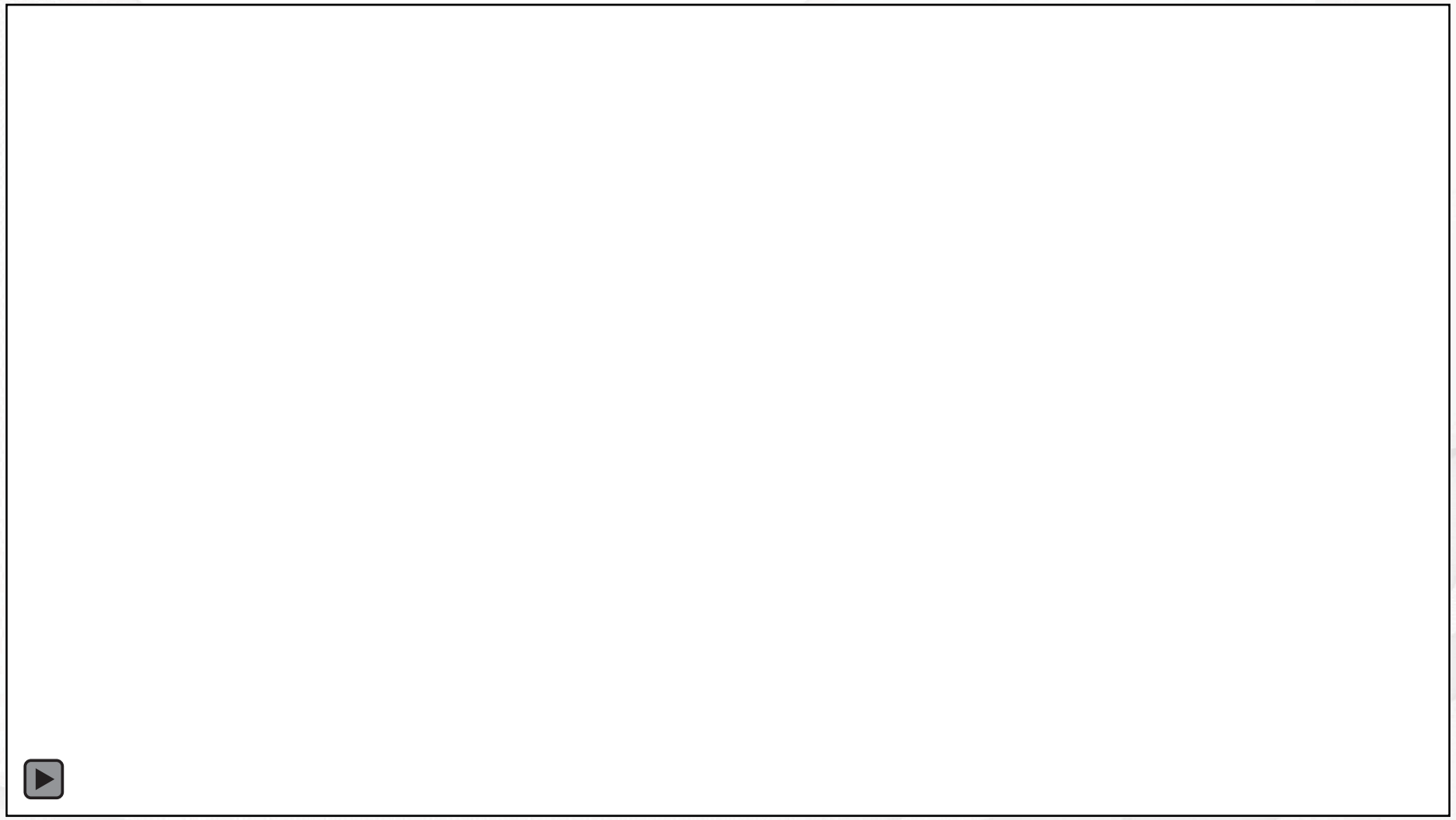
usBIM.code CODEmaker

CODEmaker is the BIM Tool that allows to digitalize, in IFC, the required/missing information and save an enriched IFC model

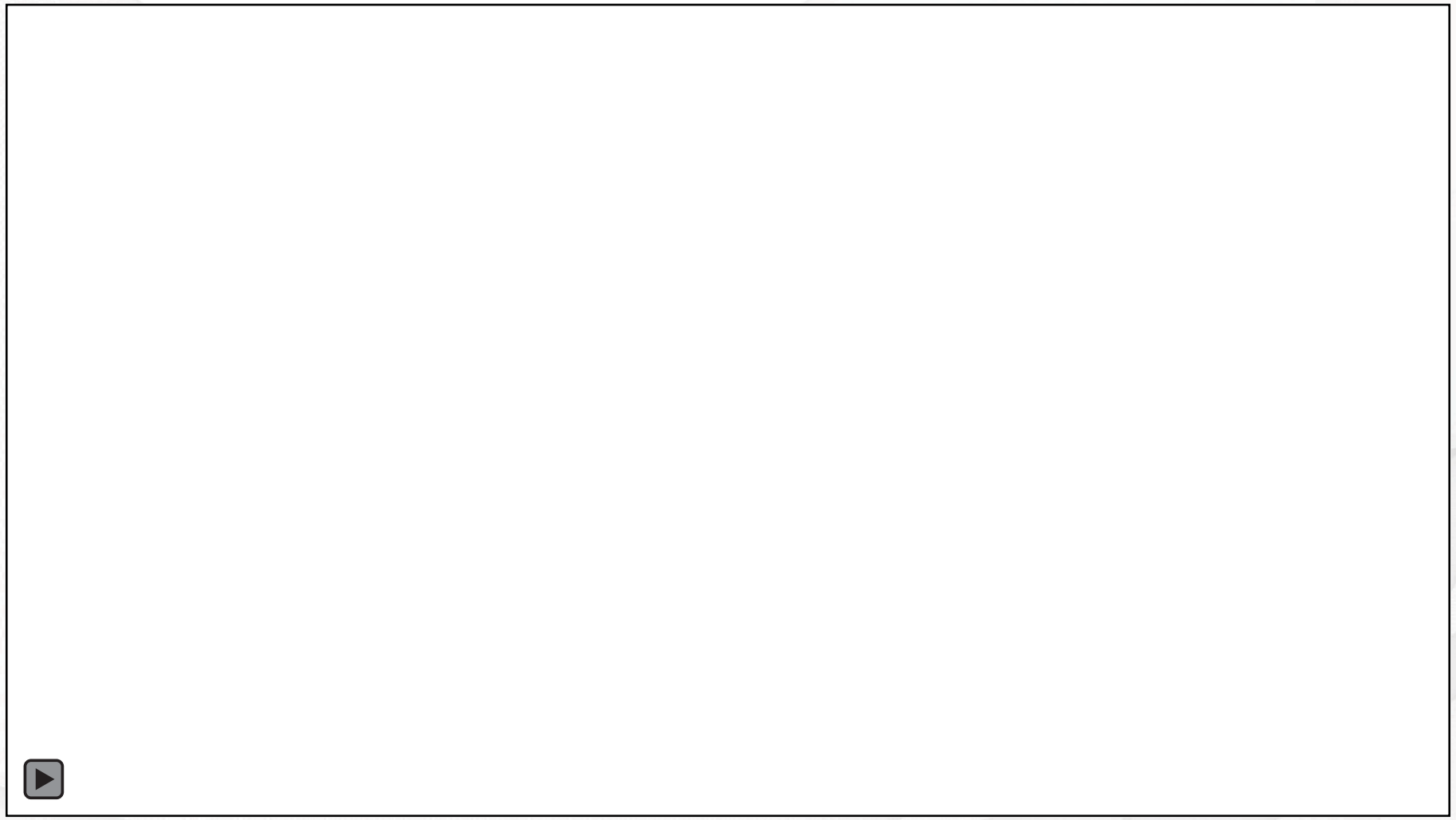
CODEcontroller is the BIM Tool that allows to apply the Code Checking itself using the newly added information



Focus: CODEmaker



Focus: CODEmaker



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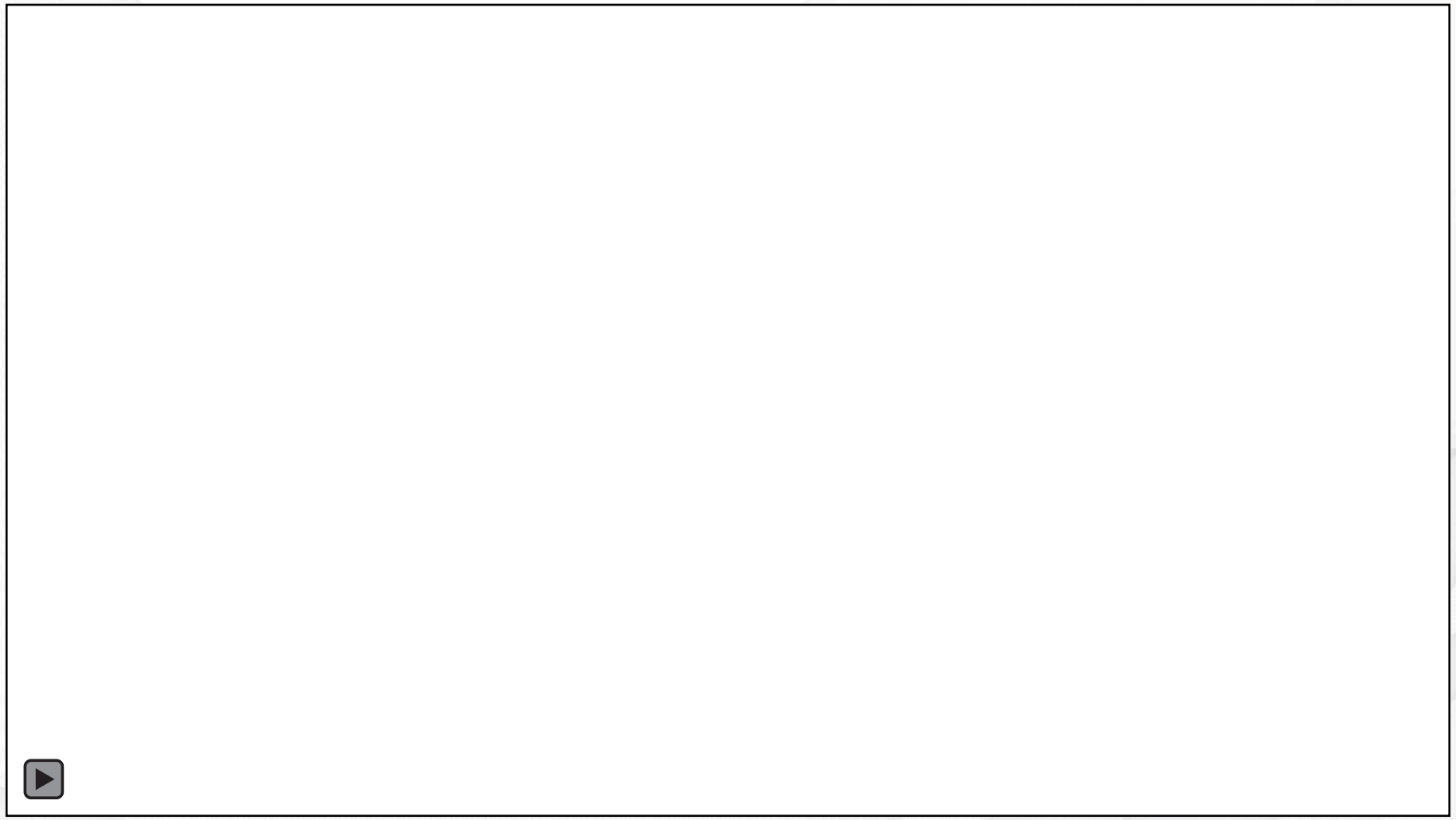
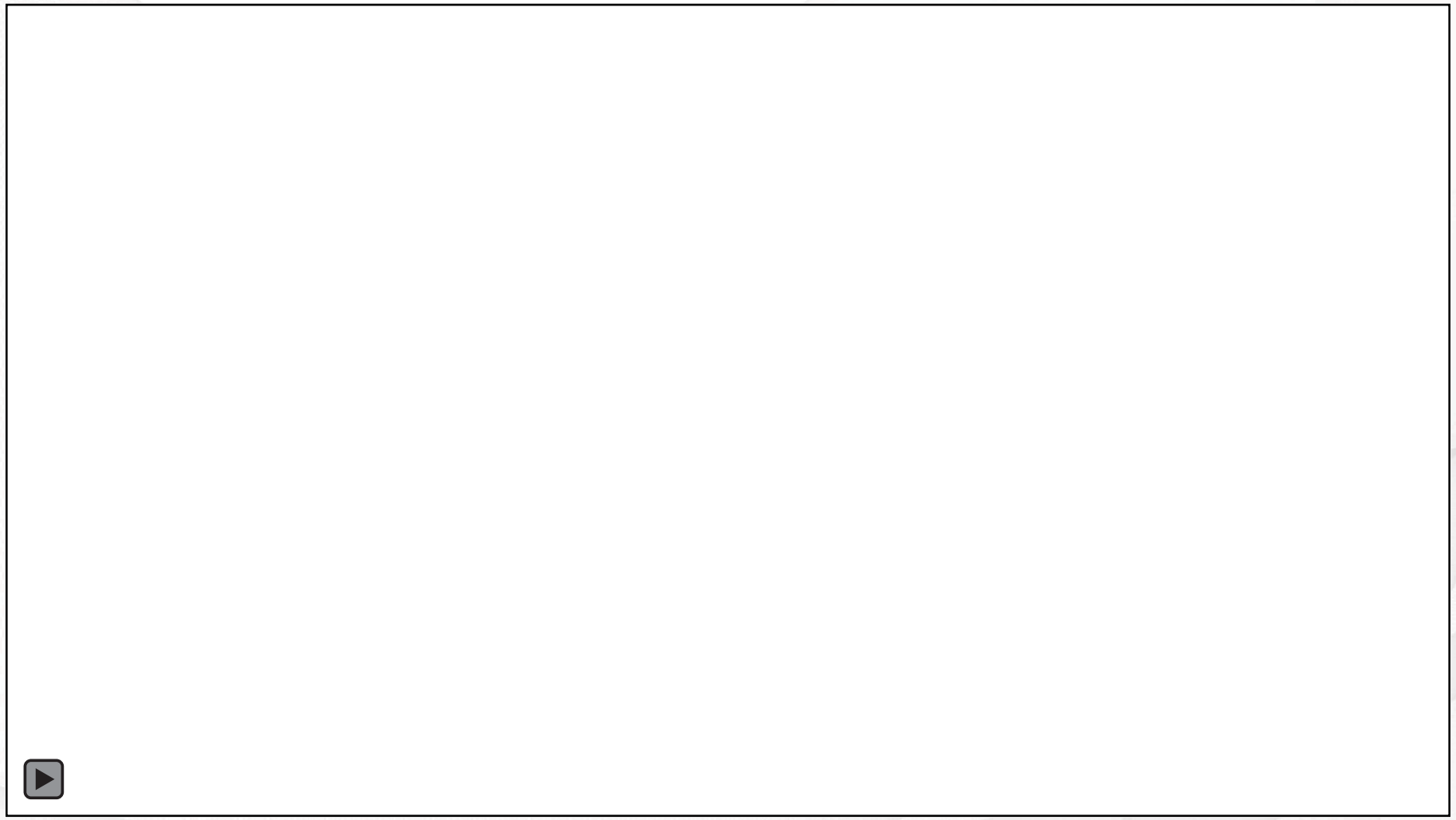
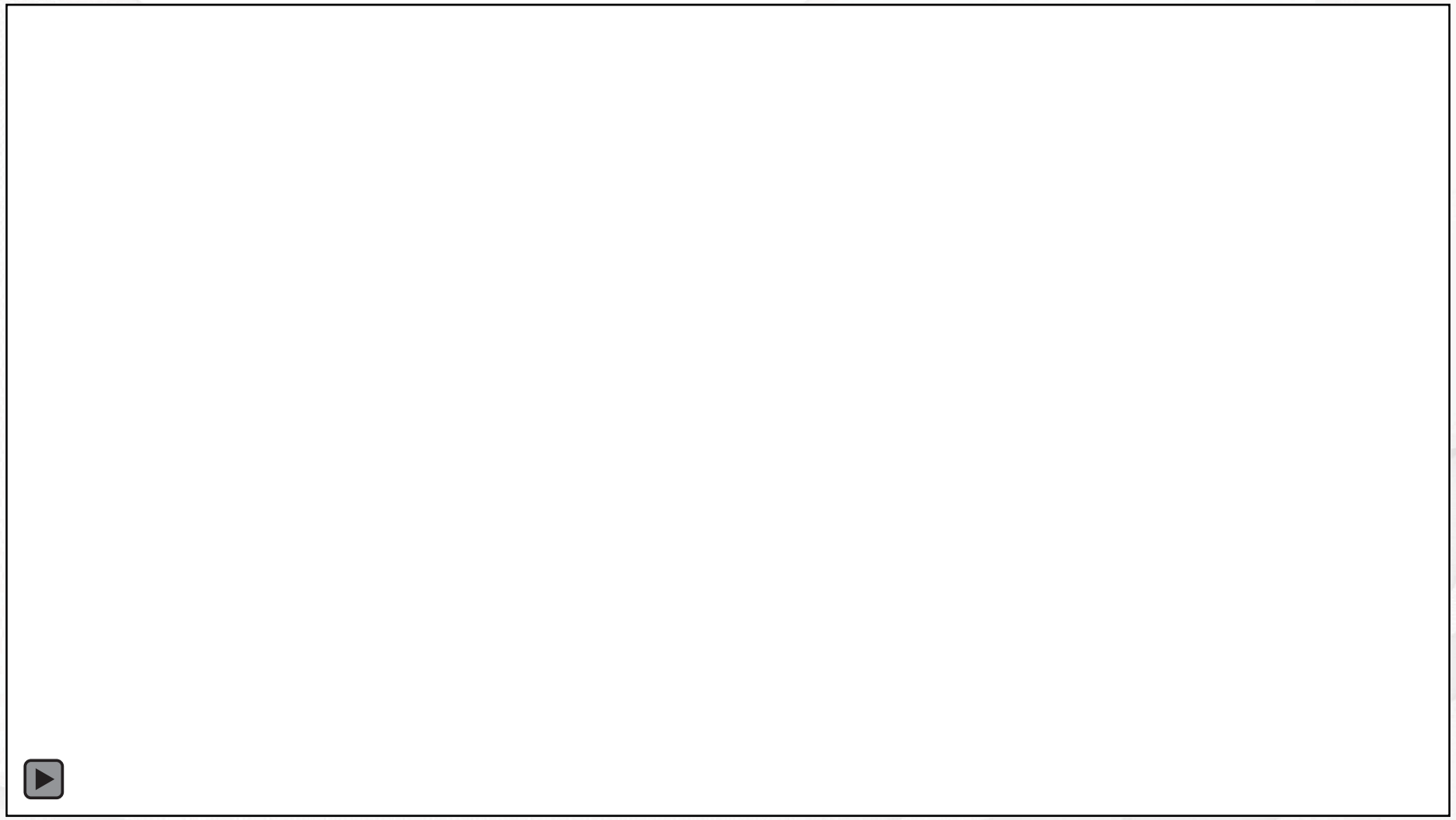


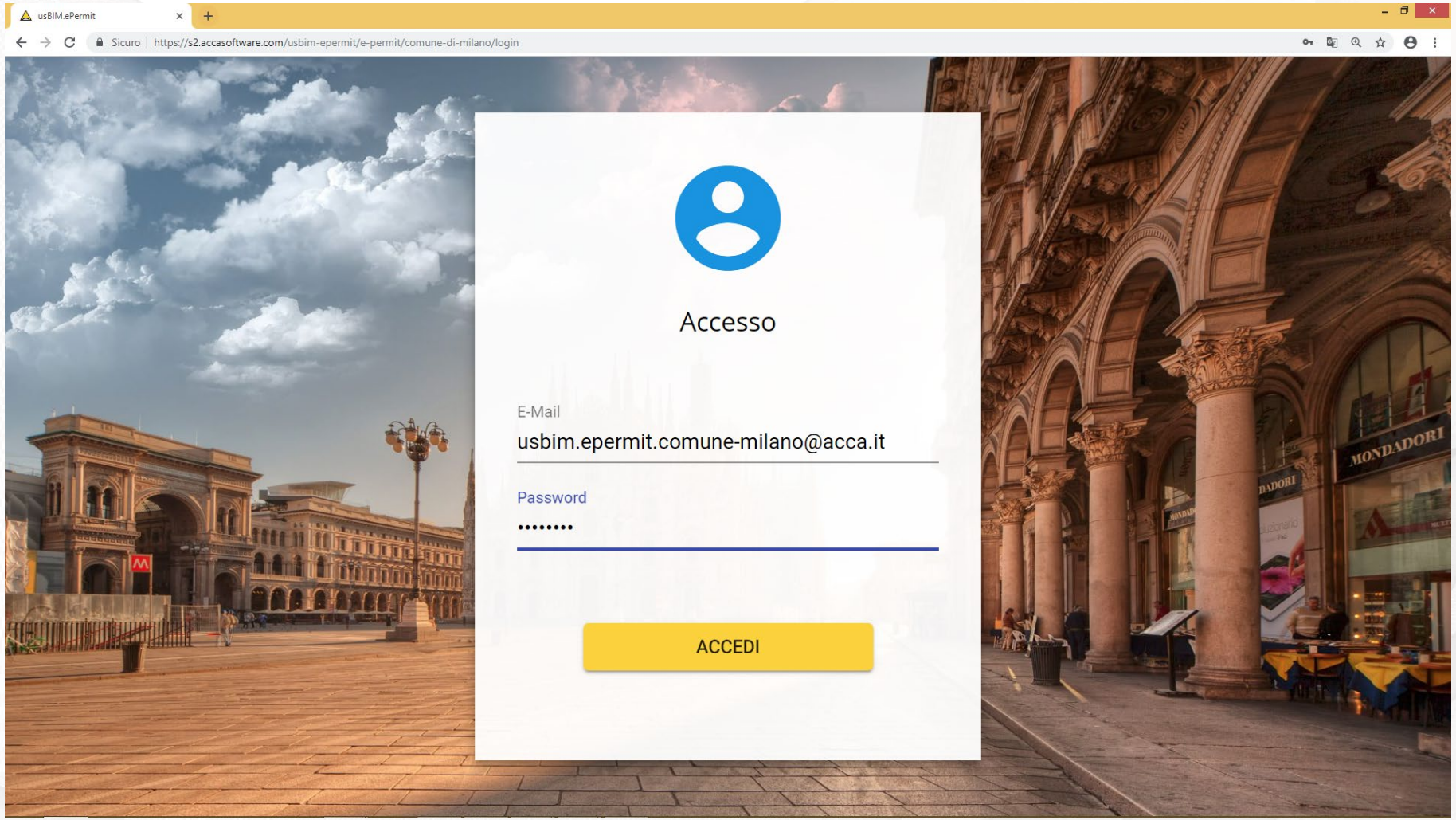
Focus: CODEmaker



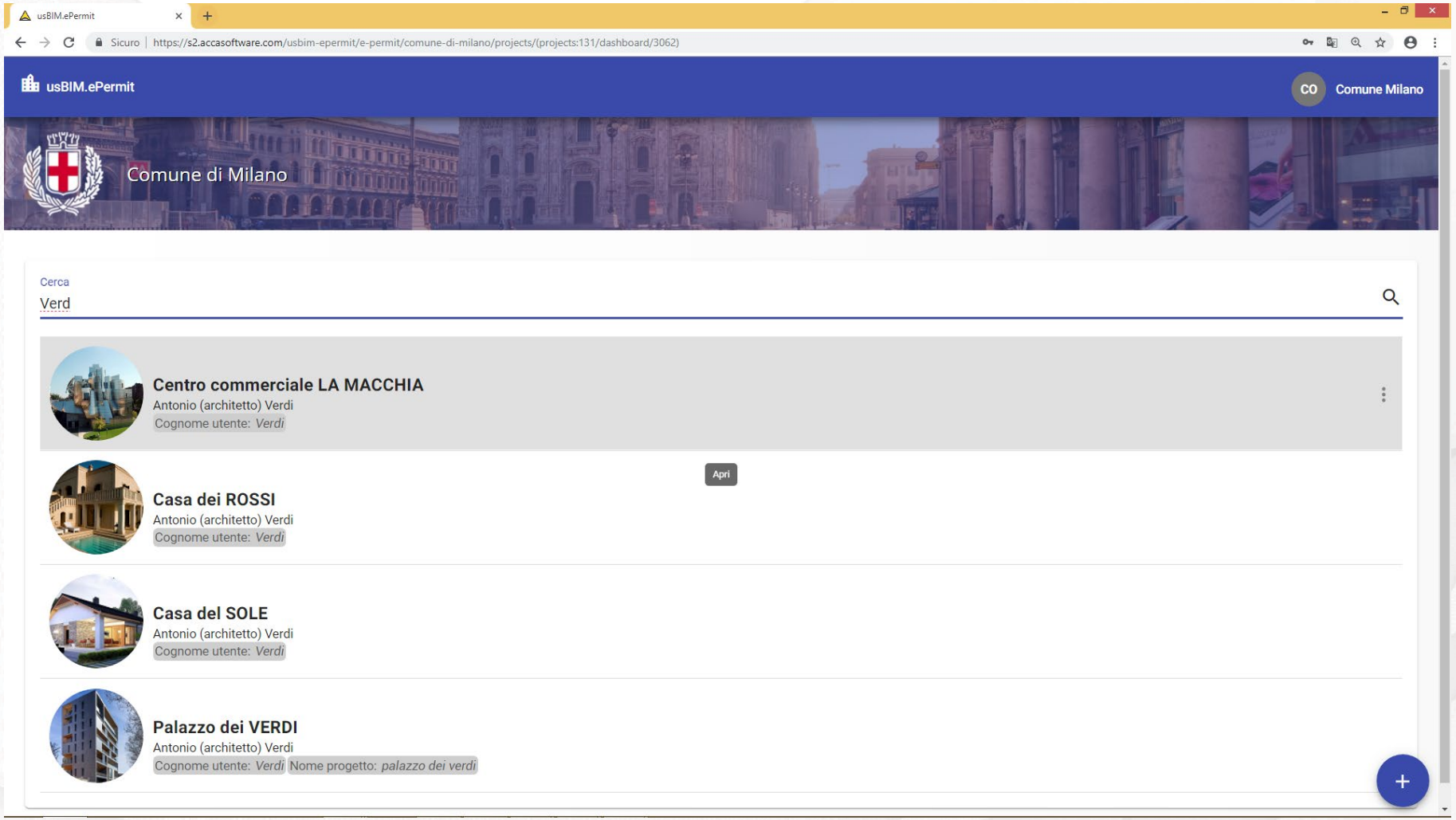
Focus: CODEmaker



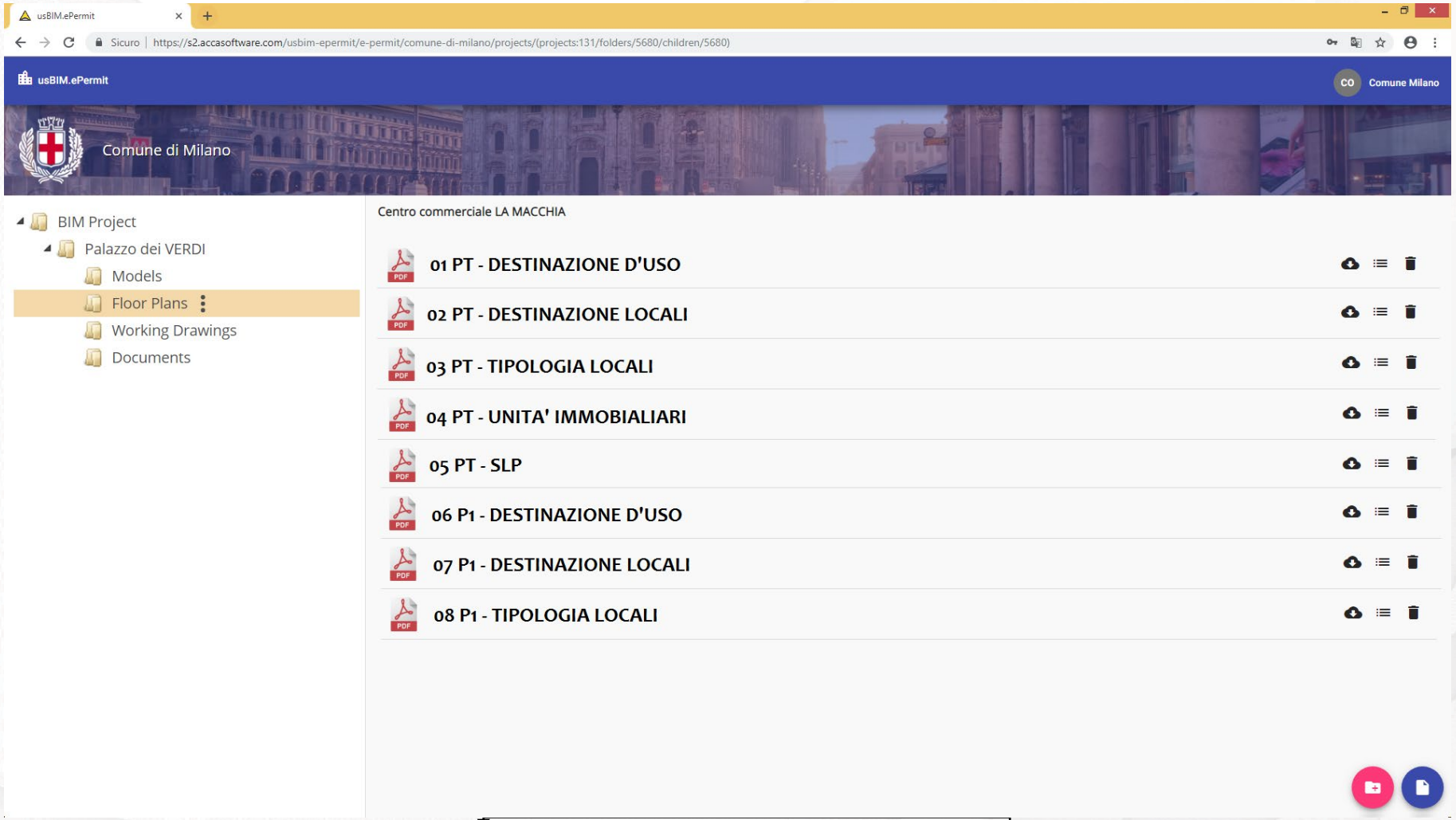
Regulatory body login

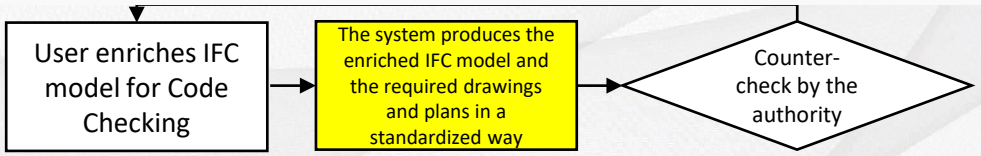


Regulatory body panel

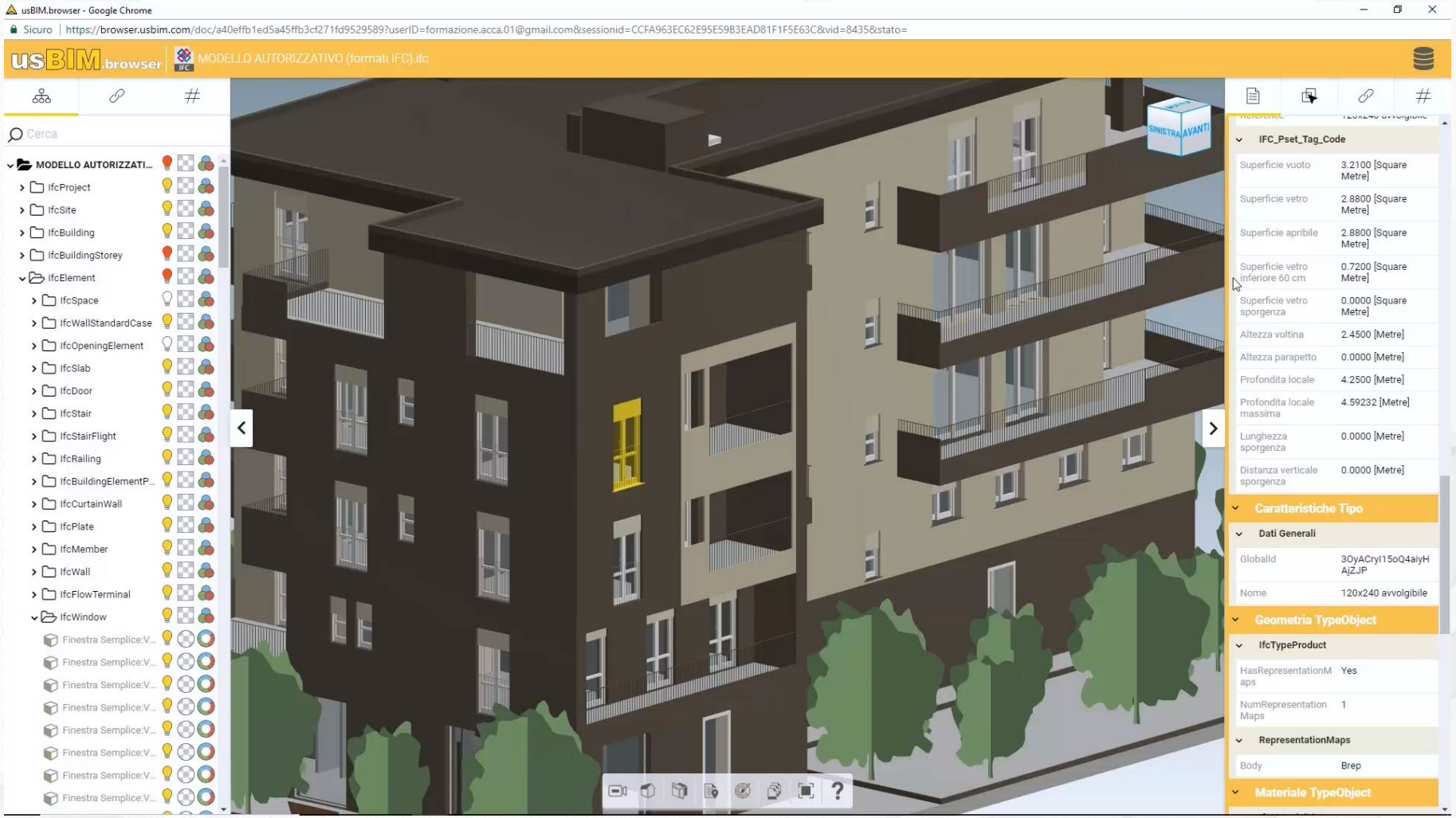


System generated folders

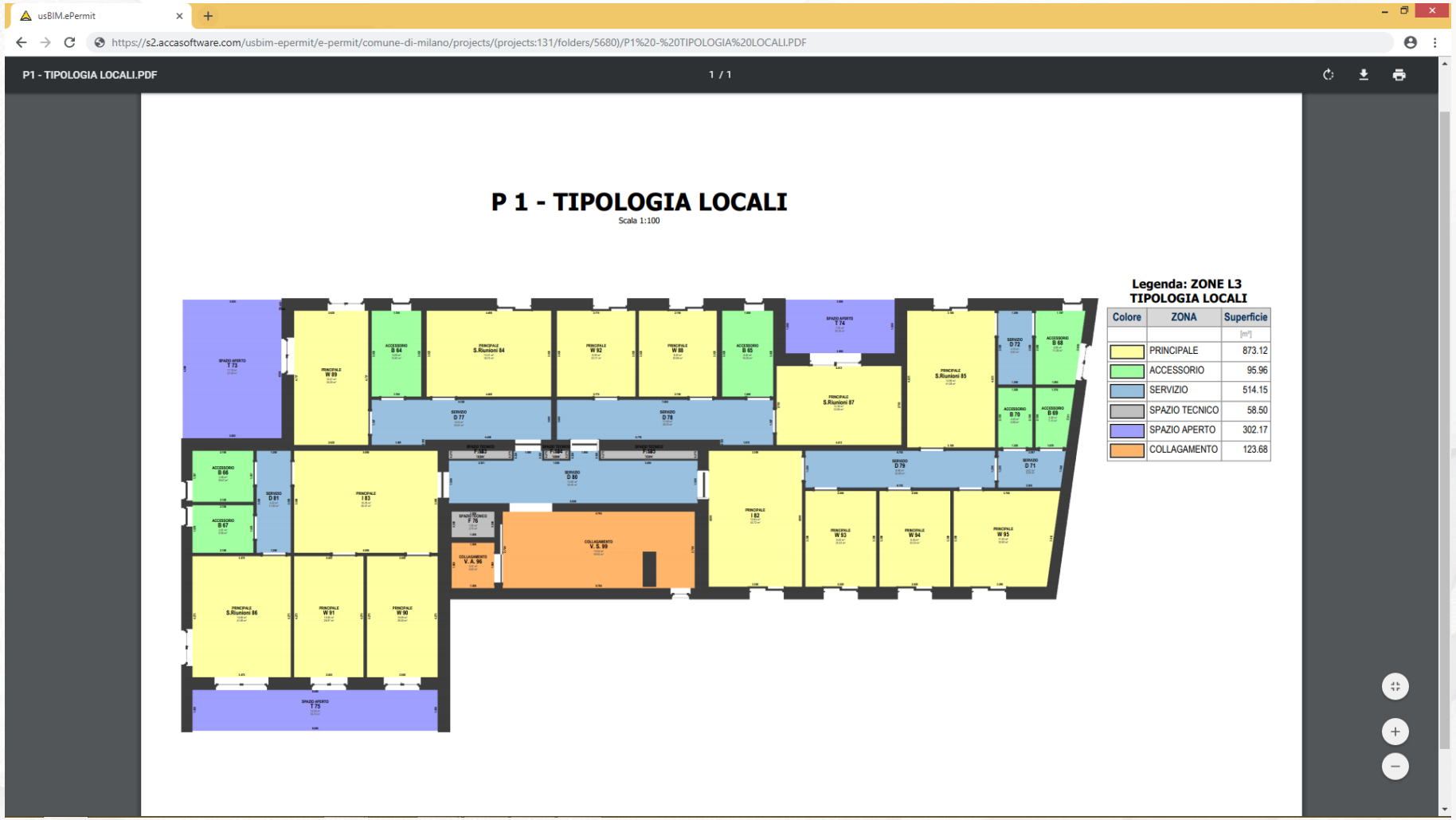




System generated enriched IFC model



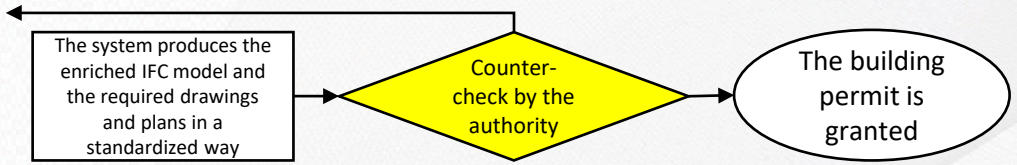
System generated plans and drawings



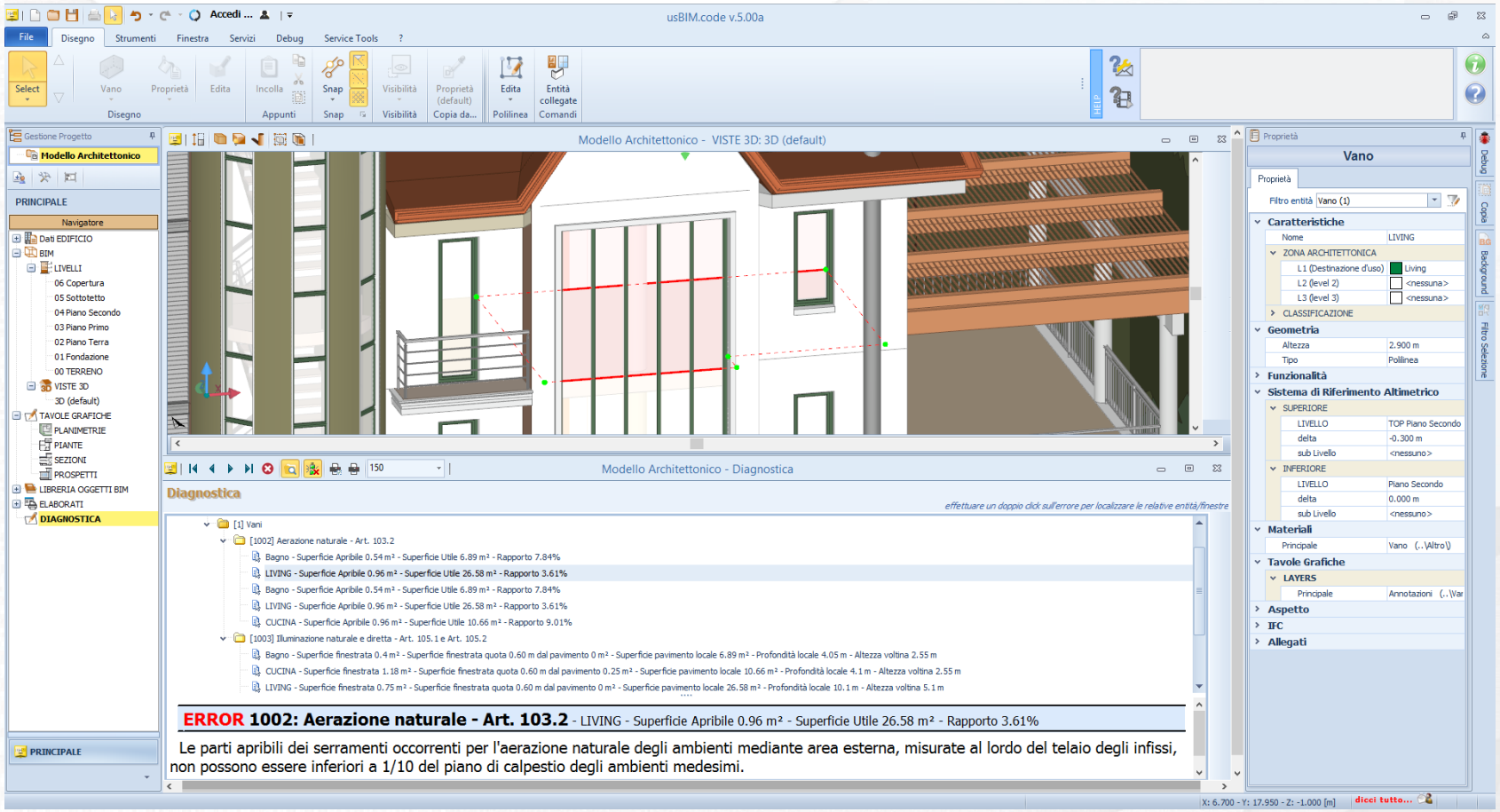
usBIM.code CODE controller

CODEmaker is the BIM Tool that allows to digitalize, in IFC, the required/missing information and save an enriched IFC model

CODEcontroller is the BIM Tool that allows to apply the Code Checking itself using the newly added information

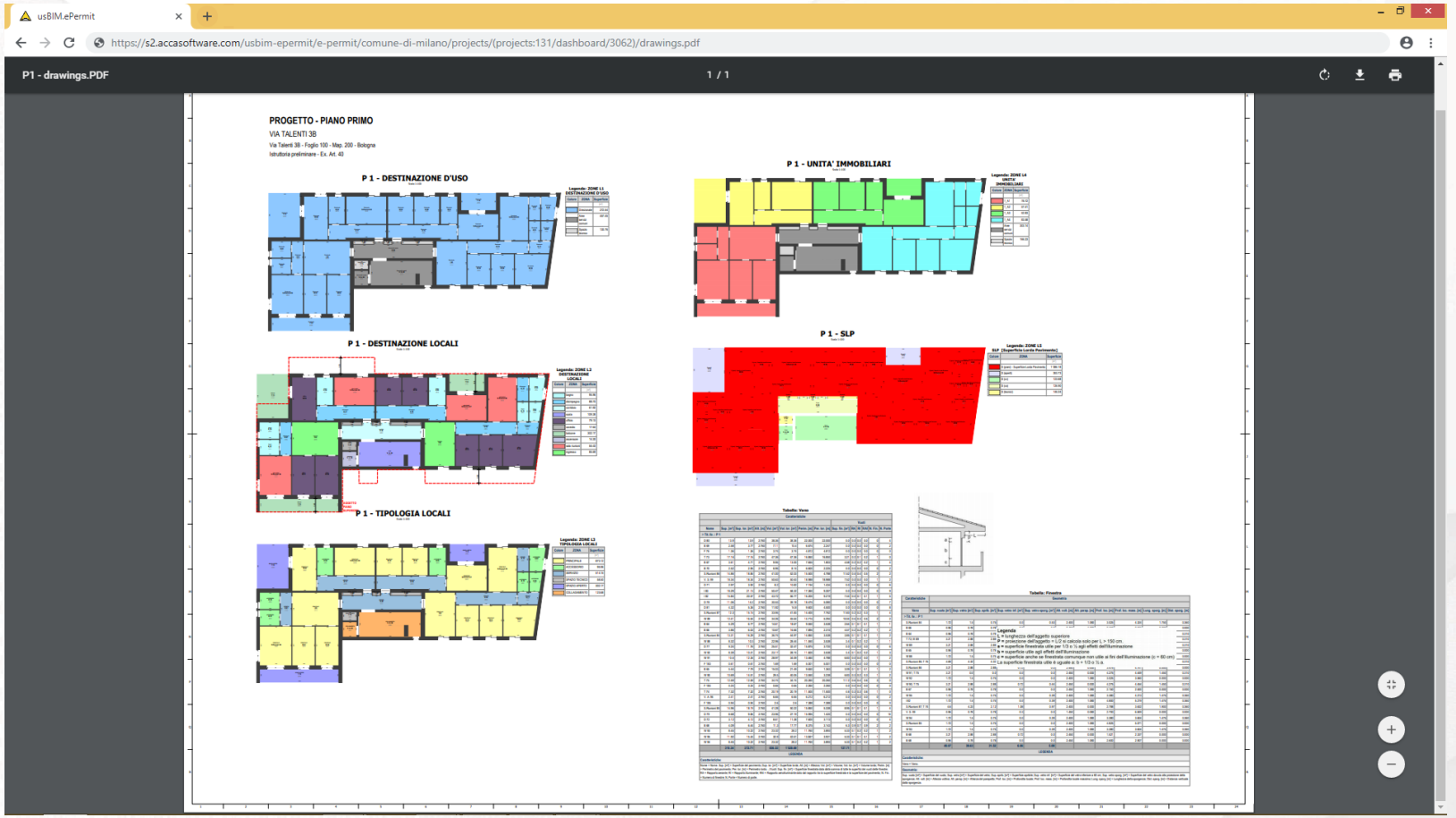


Focus: CODEcontroller (1/2)



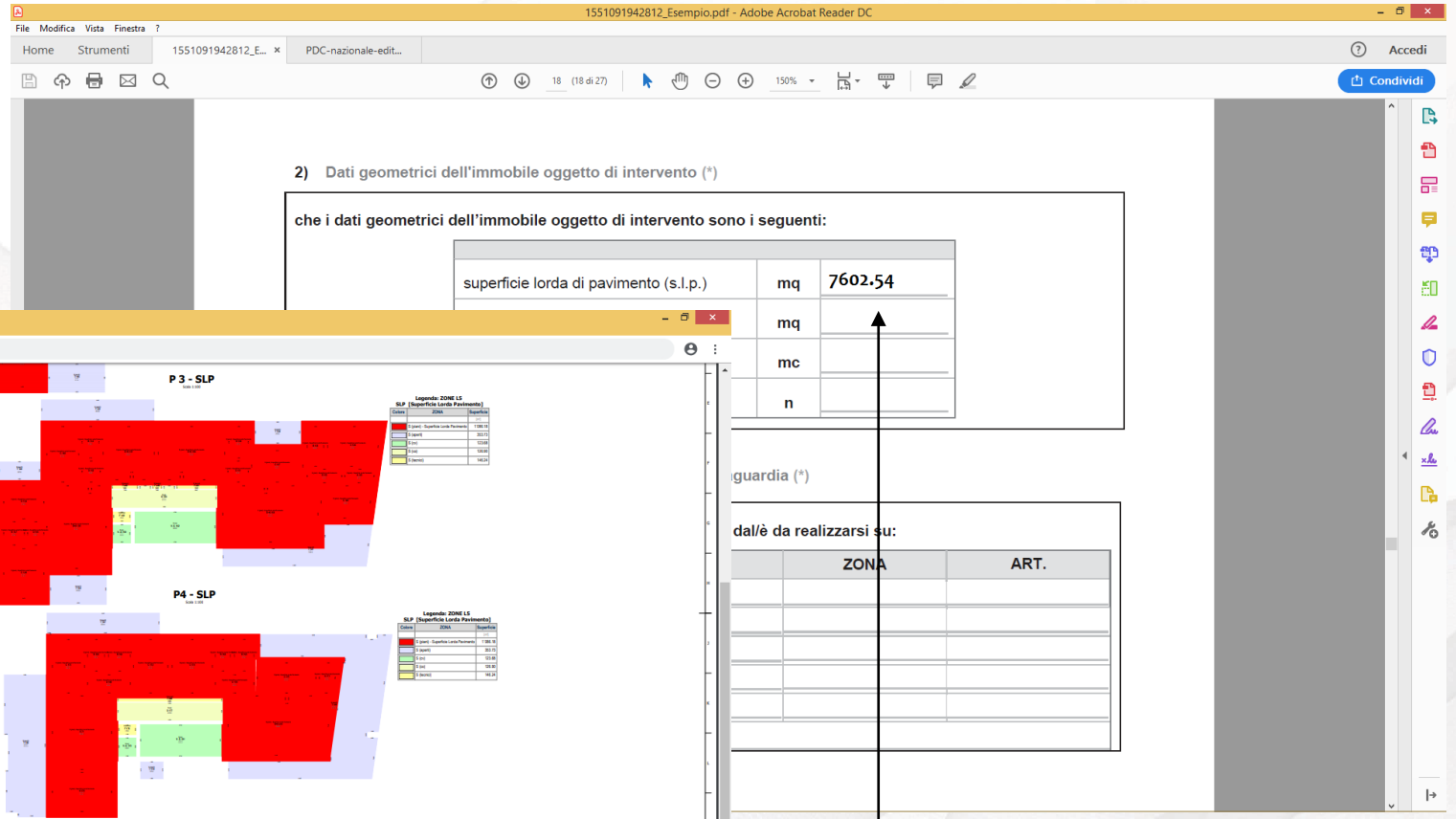
The regulatory body has access to the same diagnosis tool with errors/warnings allowing to trace back the entities that do not respect the required regulations

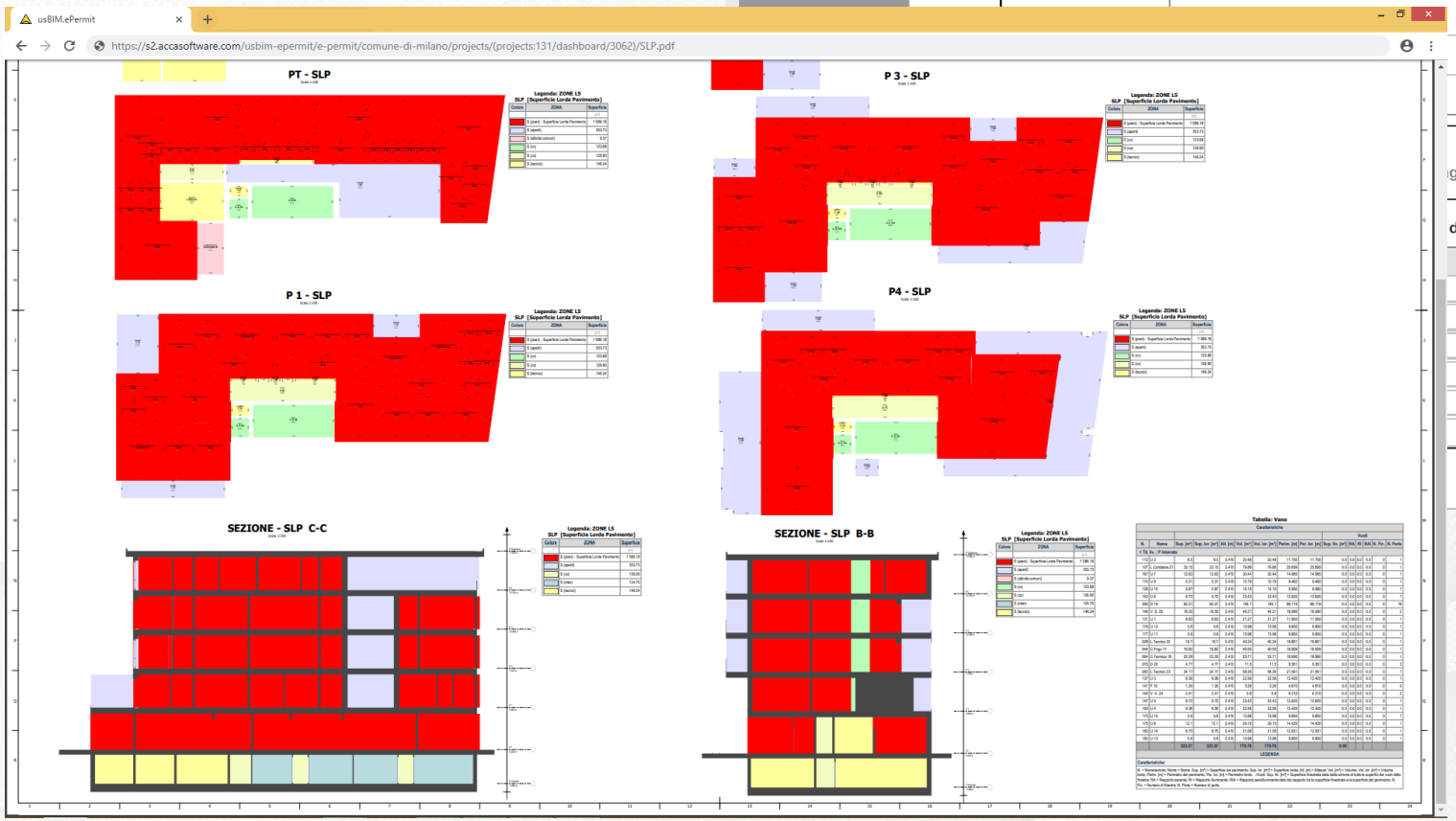
Focus: CODEcontroller (2/2)



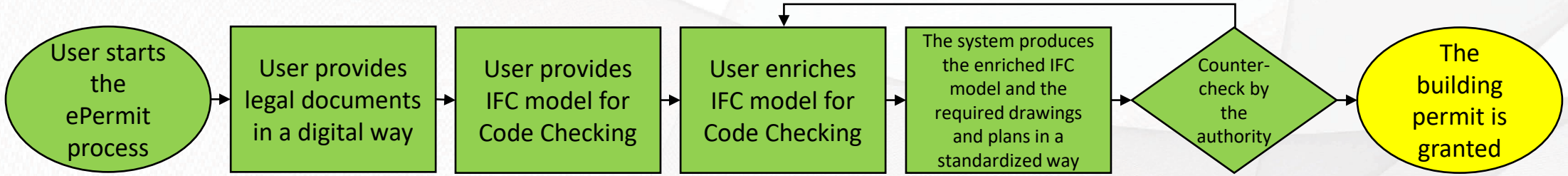
The technician have at his disposal all the standardized drawings and plans for manual inspection

Connected Data





Regulatory body approval / refusal



CONCLUSIONS

- We have seen how we conducted all the ePermit procedure using open formats exclusively (PDF, IFC, etc.) so no proprietary file formats are necessary at all
- All of the data and documents are acquired on the platform as open format and have being used for automatic checks, manual checks and for the automatic, standardized production of other technical drawings
- Again, all the data have been acquired in open format and are available on the platform as open format and hence usable for any other purpose
- **Here demonstrated how it is possible to work on an IFC model directly to enrich it in order to start from a common, standard MVD such as the Coordination View 2.0, produced by most BIM Authorings, and be compliant with the MVD required from the municipalities that are specific for Code Checking purposes**