

RealEstateCore



What is RealEstateCore?

It's the common language that will enable control over building and development of new services

It uses and maps present standards in a pragmatic manner
– a minimum viable design

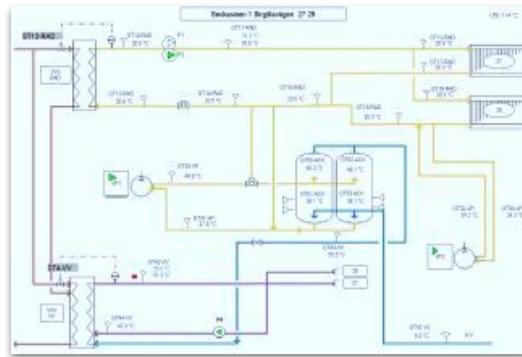
Smart city enabler: Enables the property owner to make their buildings inhabitants of the smart city



"English" for buildings & enable scale of operations



BIM

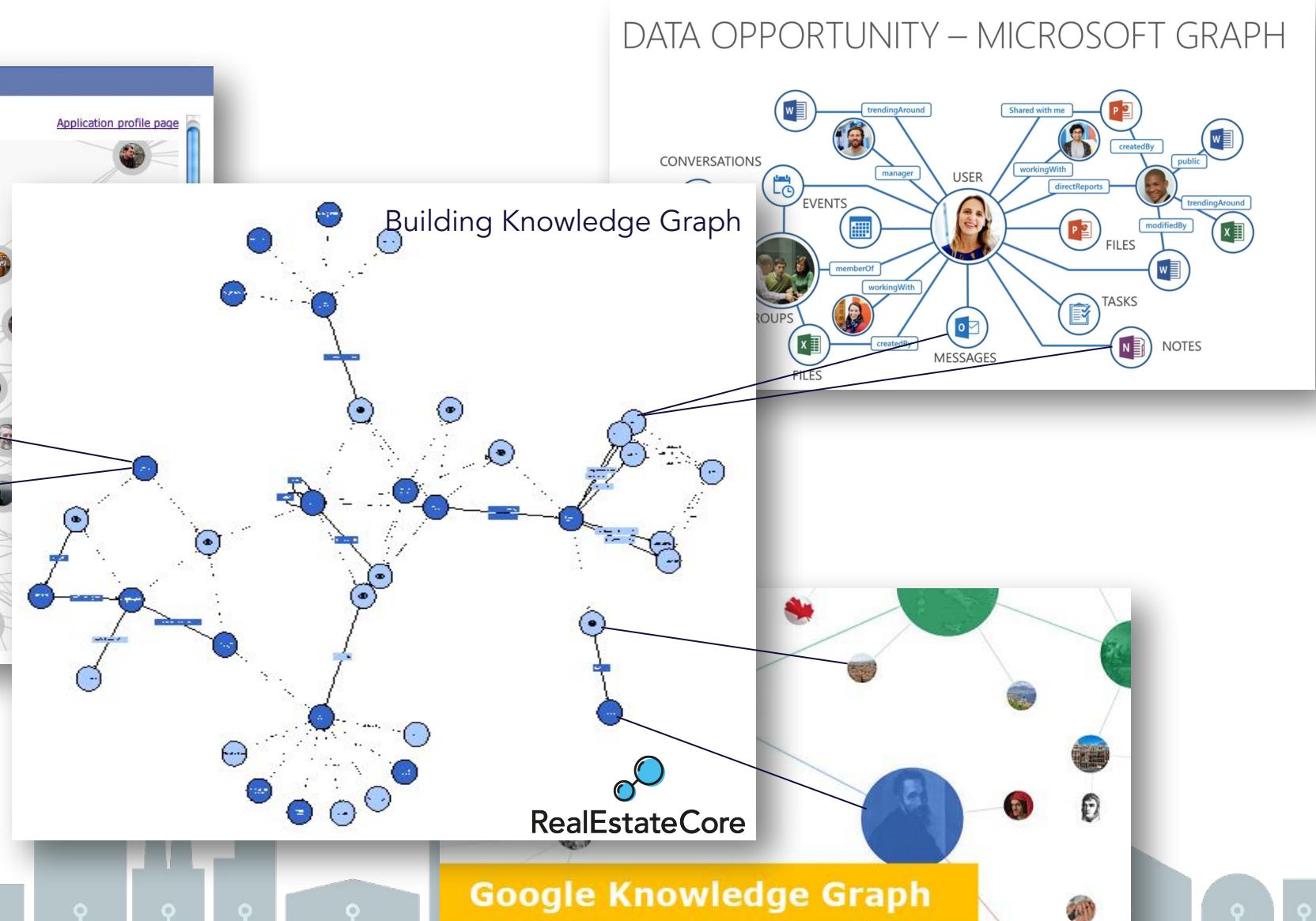
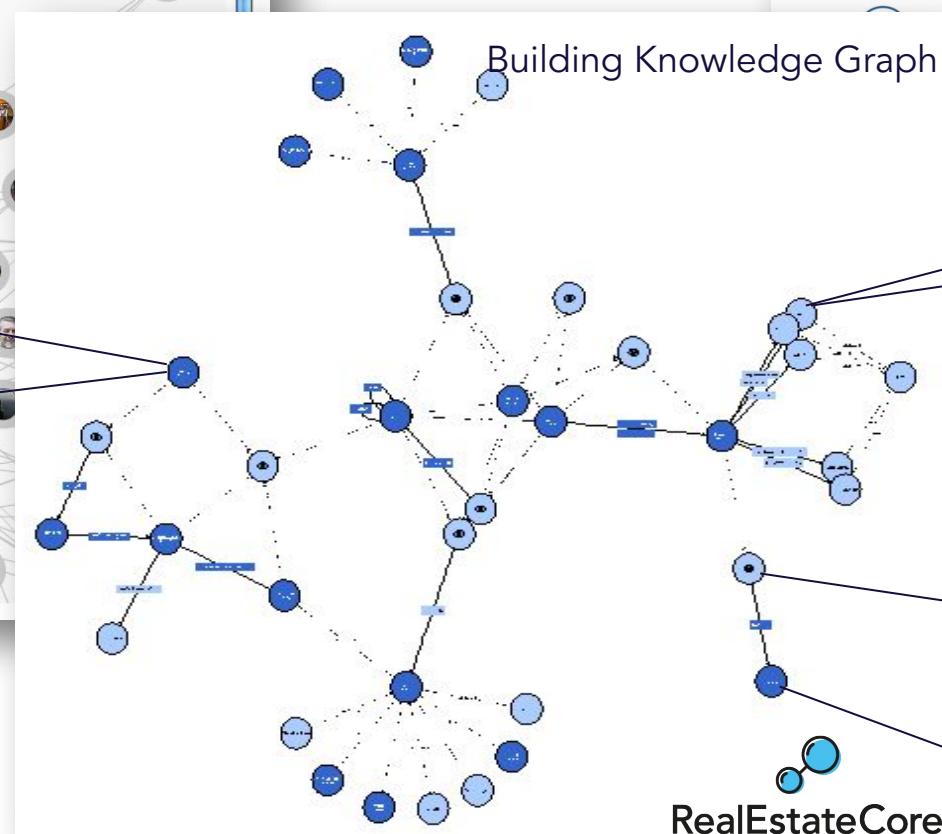
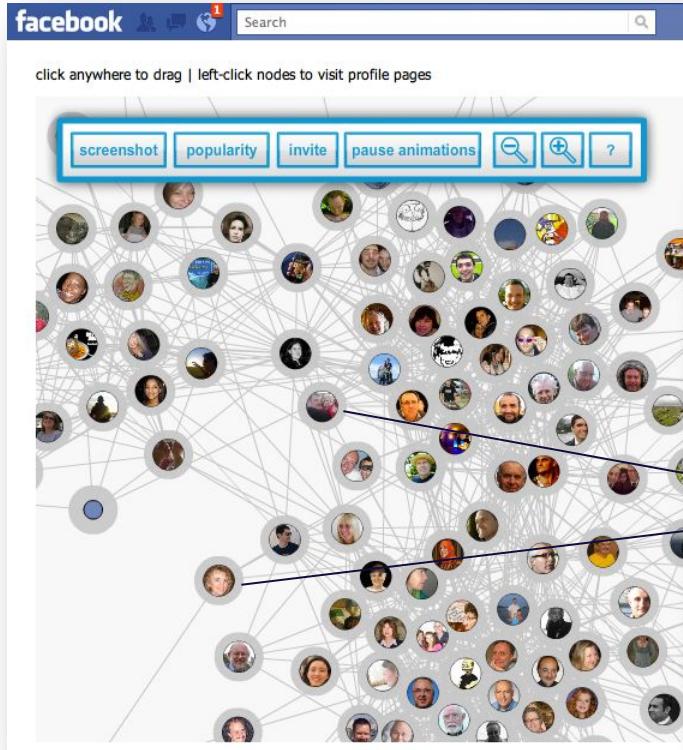


Building Automation System

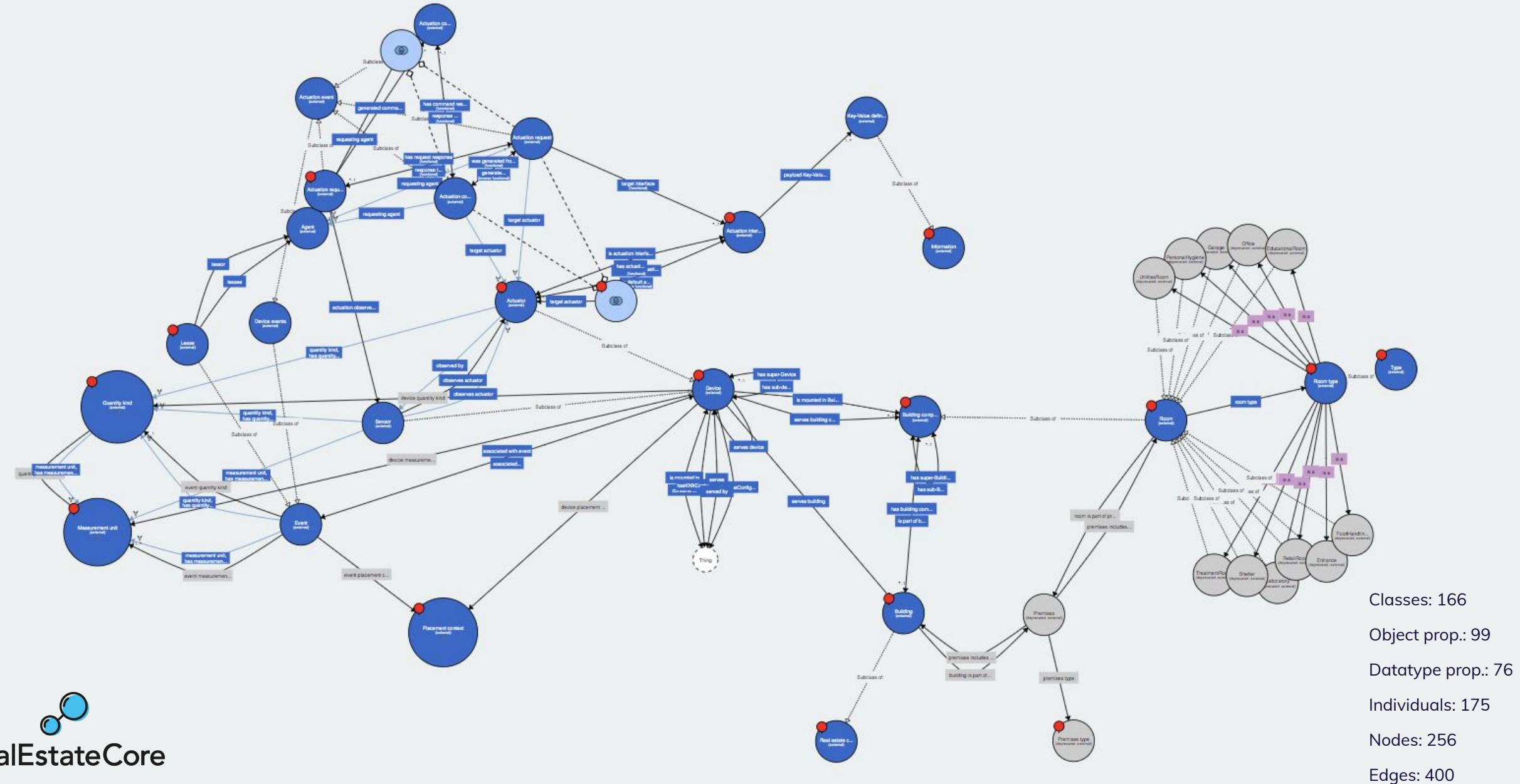


IoT

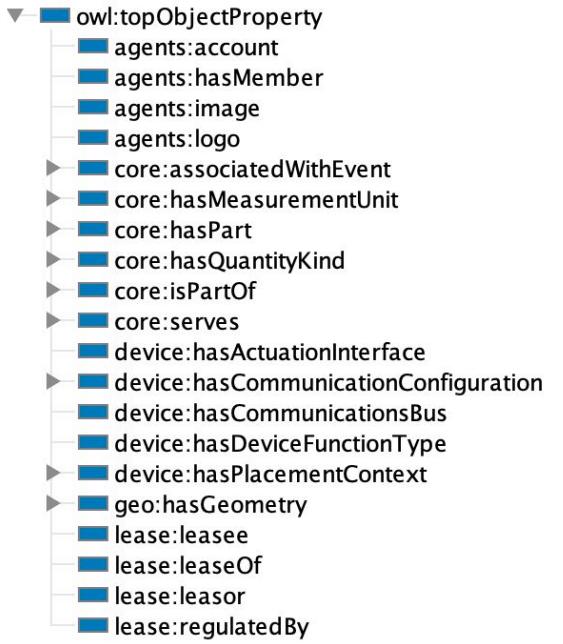
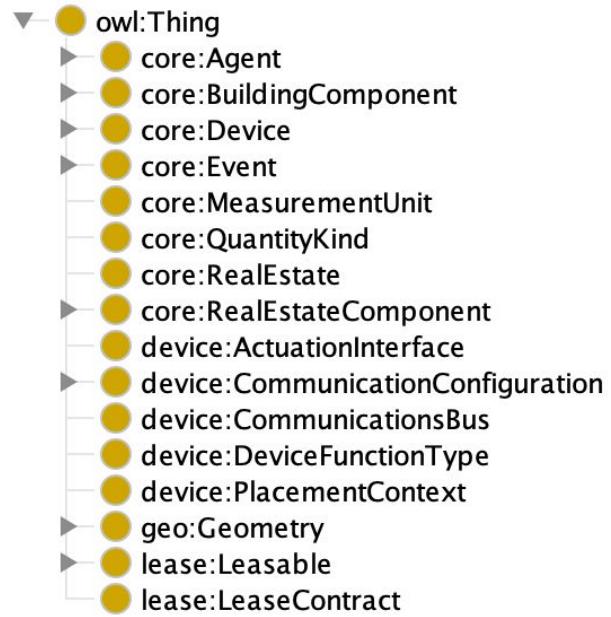
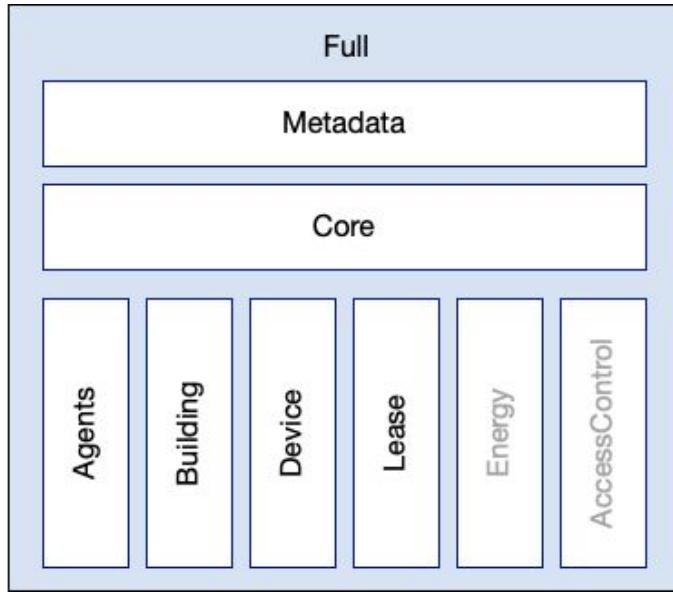
Why: Create and Connect Knowledge Graphs



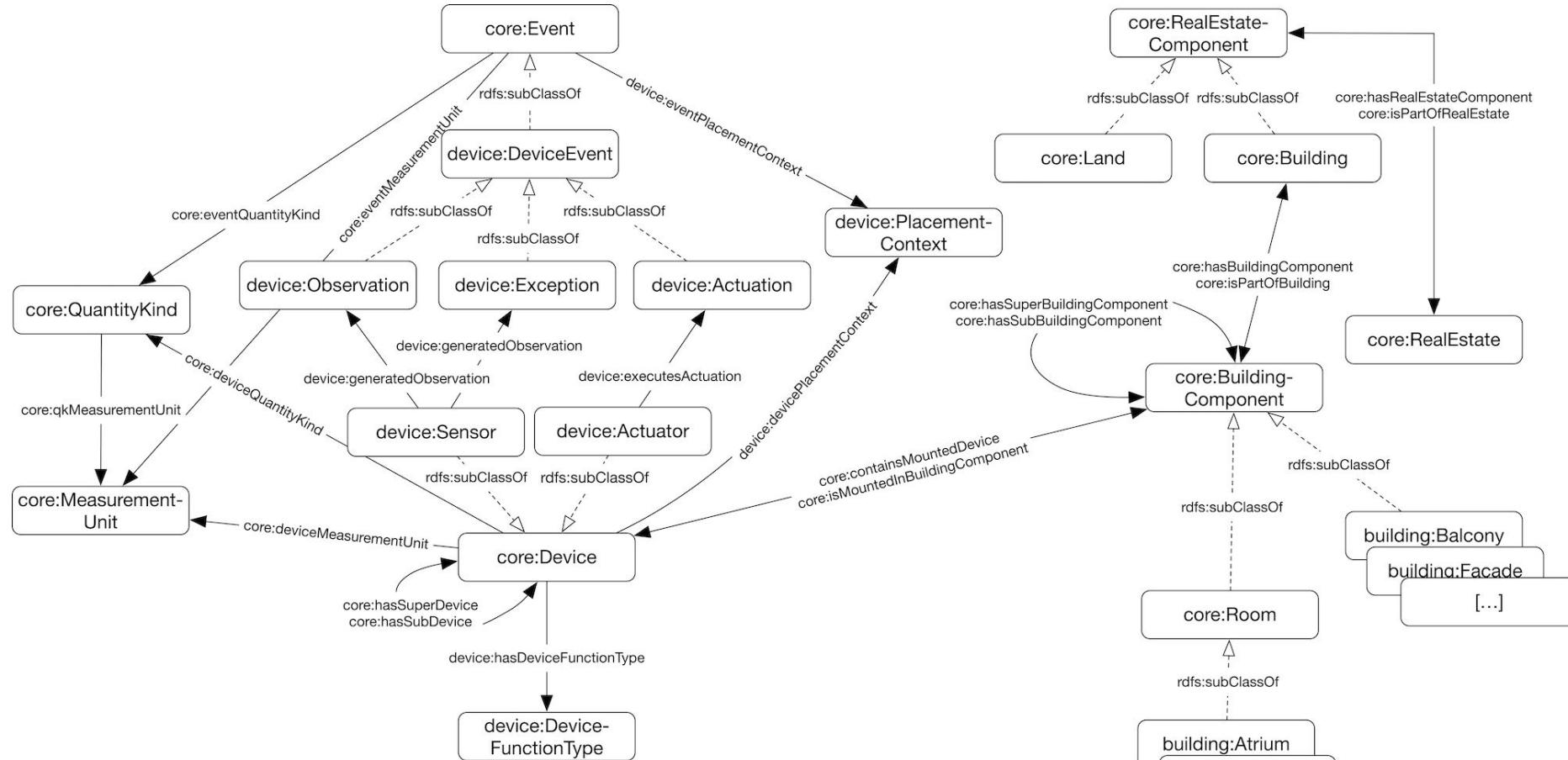
Google Knowledge Graph



RealEstateCore Design



RealEstateCore Design



RealEstateCore Development Process

- Academia and industry in collaboration
- MVP perspective: build, deploy, iterate – get it in the hands of devs
- Always emphasize usability, applicability, over generalisability
- Minimize external dependencies; clone structure/definitions if needed
- Map to existing standards when possible/valuable
- Modularity



Ongoing

- OpenAPI API auto-generation and data validation (3.2) – OWL2OAS
- Generated / synthetic data points (e.g., predictions, aggregates, etc) w/ provenance (3.2)
- Alignment to other ontologies (SSN/SOSA, MS DTDL, BOT)
- Certification module (e.g. ARC/LEED, 3.2)

The screenshot shows the Swagger UI for the Idun Real Estate Graph API. The top navigation bar includes the Swagger logo, the URL '/api/v3/api-docs', and a 'Explore' button. Below the header, the title 'Idun Real Estate Graph' is displayed along with the note 'Idun API v2.0 OAS3'. A sub-note states 'The API adopts Real Estate Core v3.1 (<https://www.realestatecore.io>).'. The 'Terms of service' section indicates 'Idun Real Estate Solutions AB - Website' and 'Send email to idun Real Estate Solutions AB'. The main content area features a 'Servers' dropdown set to 'https://idundev.proptechos.com/api - Generated server url' and an 'Authorize' button. Under the 'ActuationInterface' section, there is a 'Actuator' subsection with two 'GET' requests: '/deprecated/actuator' (Find actuators based on filter) and '/actuator' (Find actuators based on filter). Both requests have a 'Try it out' button. The '/actuator' request also includes a note: 'Find actuators based on filtering options. (URL should never be longer than 2048 characters)'. Below these, a 'Parameters' table is shown with one entry: 'realestate_ids' (string, array) with the description 'A comma separated UUID list of real estate unique identifiers'.

RealEstateCore

Ontology
API specification
Edge message format

+

Ecosystem



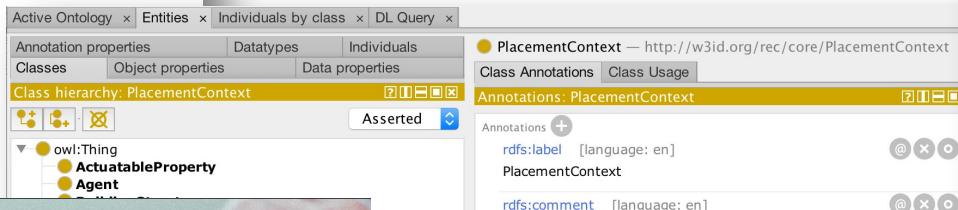
Documentation and tools



First public release

RealEstateCore

Release 2018-05-31



<https://www.realestatecore.io>
<https://github.com/RealEstateCore/>

Download serialization: Format [RDF/XML](#) For [OWL](#)

License: License [MIT License](#)

Visualization: Visualize with [WebVowl](#)

Making the Knowledge Graph of a building

In this section you will find examples of how to use the RealEstateCore ontology both as triplets (the foundation of semantic web technologies) and how we use it in a high capacity production environment with document oriented storage (using JSON or JSON-LD).

The data model of a building

First the data model of how we describe the buildings and its components.

The highest level in the hierarchy is RealEstate which consists of 1 or more BuildingStructure(s) and Land(s). RealEstate is the legal entity.

- A BuildingStructure consists of one or more BuildingStructureComponents.
- A BuildingStructureComponent can be: Room, Roof, Facade, VirtualComponent, etc.
- A VirtualComponent is a BuildingStructureComponent that does not need to physically exist, but is useful to attach data to that are calculated or received from external sources (e.g. an energy meter reading from a utility company or a weather forecast).
- Premises = a collection of Rooms or other spaces or

Instances +

- CirculationAir
- ColdWaterFlow
- ColdWaterReturn
- DistrictCoolingFlow
- DistrictCoolingReturn
- DistrictHeatingFlow
- DistrictHeatingReturn
- ElectricalGridIntake

RealEstateCore kravställning för BIM

20180905/ Hanna Torlén, Marcus Sinclair, Erik Wallin

Vad är RealEstateCore?

RealEstateCore är framtaget för att hantera befintliga standarder inom byggnation, styr och reglering samt IoT. Den använder sig av de dominerande standarderna och gör en tolkning och överbyggnad (mapping).

RealEstateCore är en sammanställning av hur data från olika system skall klassificeras – det gemensamma ”språket” som skall möjliggöra teknisk kontroll av byggnader samt möjliggöra för framida tjänster. En domänonologi som förbereder byggnaderna för att interagera med andra Smart City-aktörer.

RealEstateCore fokuserar på att slå samman och överbygga tre domäner:

1. Digital representation of byggnadens konstruktionselement (t ex BIM)
2. Kontroll och drift av byggnaden (t ex Belok, Modbus, Haystack)
3. IoT-teknik (t ex SSN, WoT, IPSO)

RealEstateCore är inte en ny standard. RealEstateCore använder och kartlägger nuvarande standarder på ett pragmatiskt sätt – ett ”Minimal Viable”-angreppssätt.

RealEstateCore är publicerat som OpenSource och finns att ladda ner på:

ActuationInterface Actuation Interface Controller
Actuator Actuator Controller
AliasIdNamespace Alias Id Namespace Controller
BuildingStructure Building Structure Controller
BuildingStructureComponent Building Structure Component Controller
Device Device Controller
REC Definitions Rec Definitions Controller
RealEstate Real Estate Controller
Sensor Sensor Controller
StoreyLevel Storey Level Controller
Models

Community, free, open

- Open Source
- No fees
- Non-profit consortium



VASAKRONAN



SKANSKA

 RealEstateCore/api

D) The JSON:API schema for reporting errors is not JSON-LD either (similar to collections solved with Hydra), do we need to fix this with Hydra too?

↳ 5 replies

@hammar good point on the parsed ontologies, as to self-descriptiveness (discoverability) let's push that for next API Spec version?

↳ 1 reply

Karl Hammar @hammar jan 31 10:54
I just turned on threading in this room

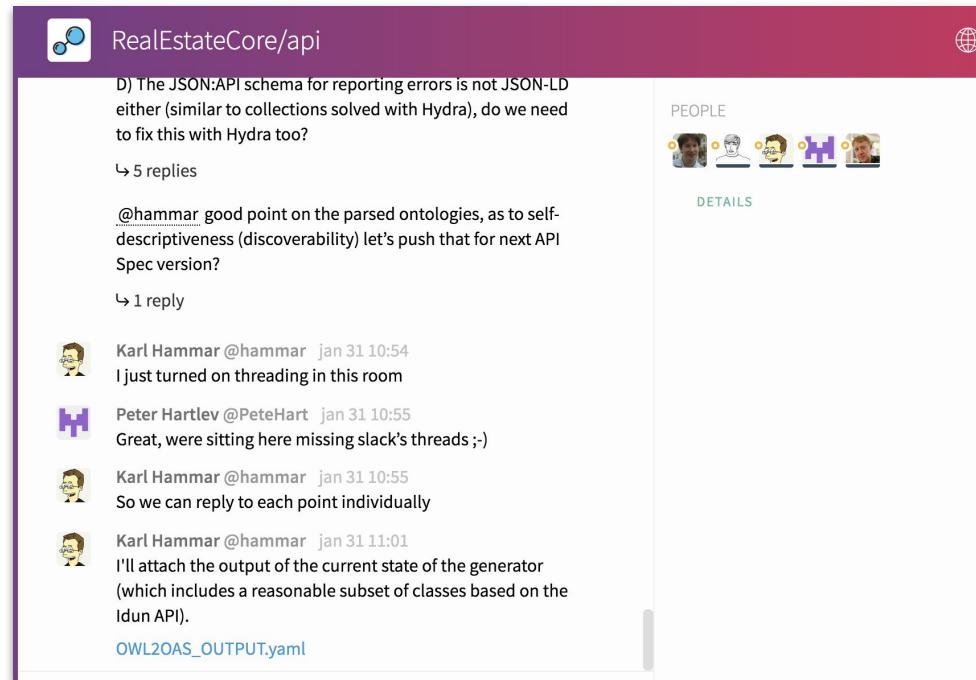
Peter Hartlev @PeteHart jan 31 10:55
Great, were sitting here missing slack's threads ;-)

Karl Hammar @hammar jan 31 10:55
So we can reply to each point individually

Karl Hammar @hammar jan 31 11:01
I'll attach the output of the current state of the generator (which includes a reasonable subset of classes based on the Idun API).
[OWL2OAS_OUTPUT.yaml](#)

PEOPLE

DETAILS



 RealEstateCore / rec

Code Issues 19 Pull requests 0 Actions Projects 0 Wiki Security Insights Settings

Unwatch 10 Star 7 Fork 6

RealEstateCore ontologies. <http://realestatecore.io>

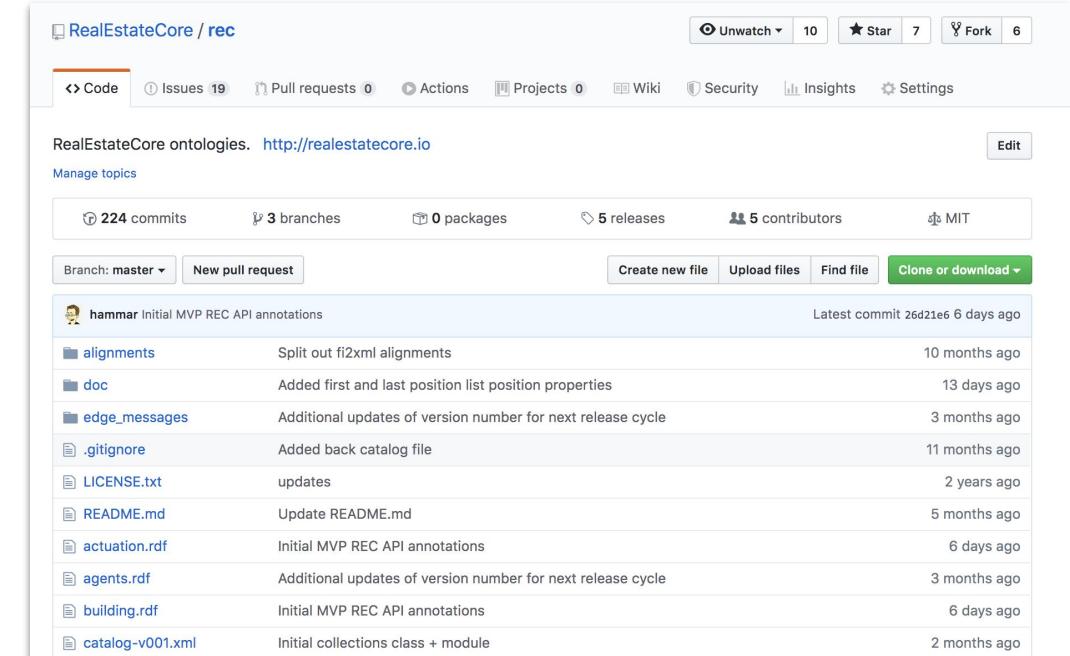
Manage topics

224 commits 3 branches 0 packages 5 releases 5 contributors MIT

Branch: master New pull request Create new file Upload files Find file Clone or download

hammar Initial MVP REC API annotations Latest commit 26d21e6 6 days ago

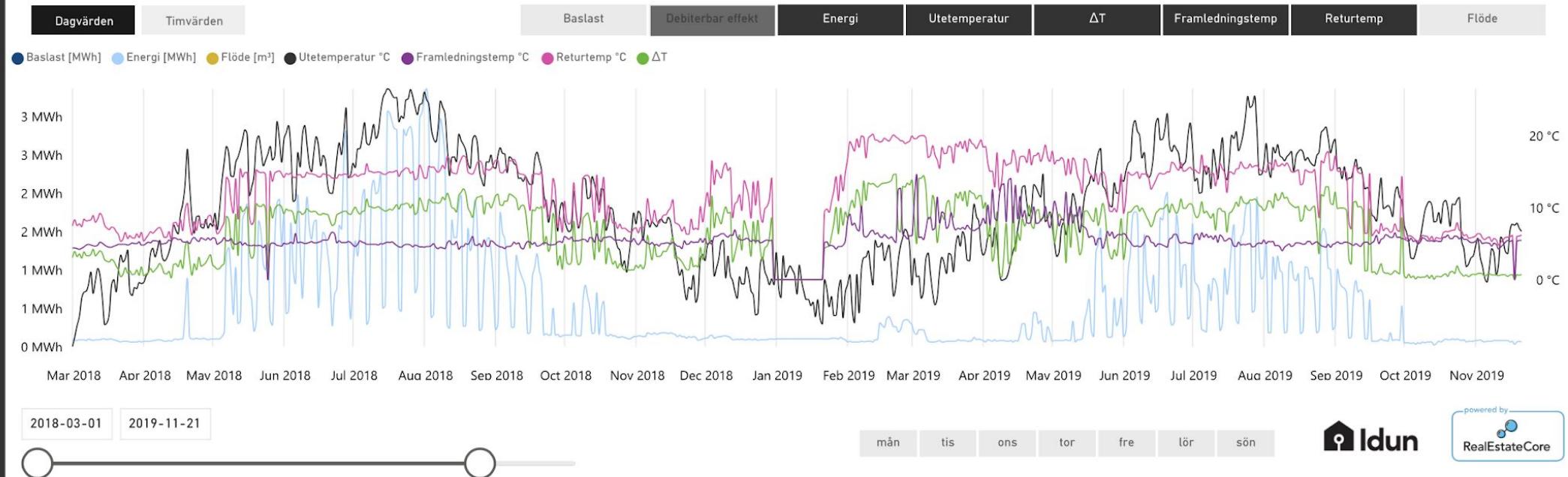
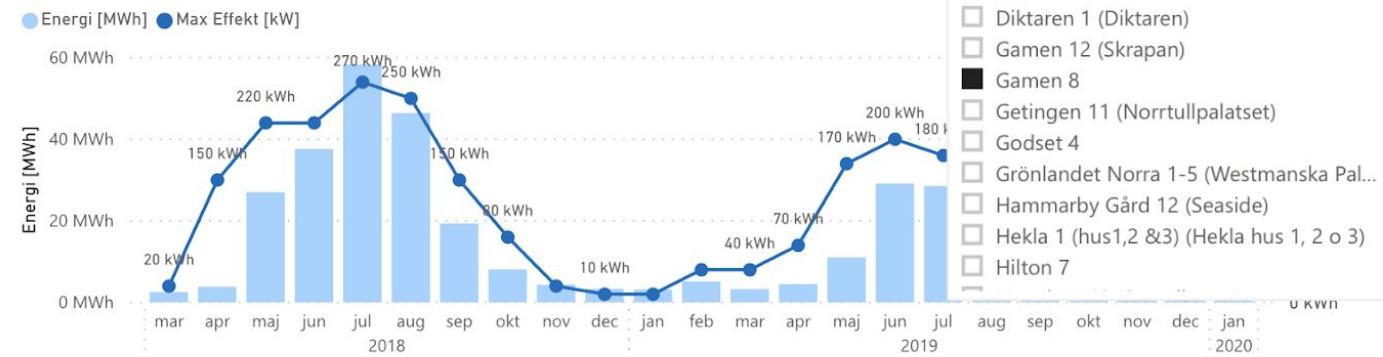
File	Description	Last Commit
alignments	Split out fi2xml alignments	10 months ago
doc	Added first and last position list position properties	13 days ago
edge_messages	Additional updates of version number for next release cycle	3 months ago
.gitignore	Added back catalog file	11 months ago
LICENSE.txt	updates	2 years ago
README.md	Update README.md	5 months ago
actuation.rdf	Initial MVP REC API annotations	6 days ago
agents.rdf	Additional updates of version number for next release cycle	3 months ago
building.rdf	Initial MVP REC API annotations	6 days ago
catalog-v001.xml	Initial collections class + module	2 months ago



<https://gitter.im/RealEstateCore/>
<https://github.com/RealEstateCore/rec/>

VASAKRONAN Fjärrkyla : Gamen 8

År	mån	Energi	Medelvärde ΔT	Max Effekt
2018	mar	2,5 MWh	2,3 °C	20,0 kWh
2018	apr	3,8 MWh	1,9 °C	150,0 kWh
2018	maj	27,0 MWh	4,0 °C	220,0 kWh
2018	jun	37,6 MWh	9,1 °C	220,0 kWh
2018	jul	58,4 MWh	9,7 °C	270,0 kWh
2018	aug	46,5 MWh	10,3 °C	250,0 kWh
2018	sep	19,4 MWh	9,7 °C	150,0 kWh
2018	okt	8,1 MWh	2,5 °C	80,0 kWh
2018	nov	4,3 MWh	2,7 °C	20,0 kWh
2018	dec	3,3 MWh	6,5 °C	10,0 kWh
2019	jan	3,2 MWh	0,0 °C	10,0 kWh
2019	feb	5,1 MWh	13,2 °C	40,0 kWh
2019	mar	3,2 MWh	11,9 °C	40,0 kWh
2019	apr	15 MWh	7,0 °C	70,0 kWh





Certify

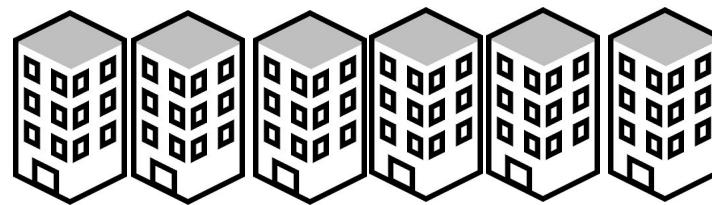
ProptechOS

Compliance DW
+
Vitec
energiuppföljning



QL

PiiGAB
QuickLoop



Encoded to
RealEstateCore



Thank you!

Erik Wallin

RealEstate Consortium and Idun Real Estate Solutions AB

erik.wallin@idun.tech

