Defragmenting the Construction Industry

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Head of Digital Construction
Ministry of Economic Affairs and Communications
Estonia

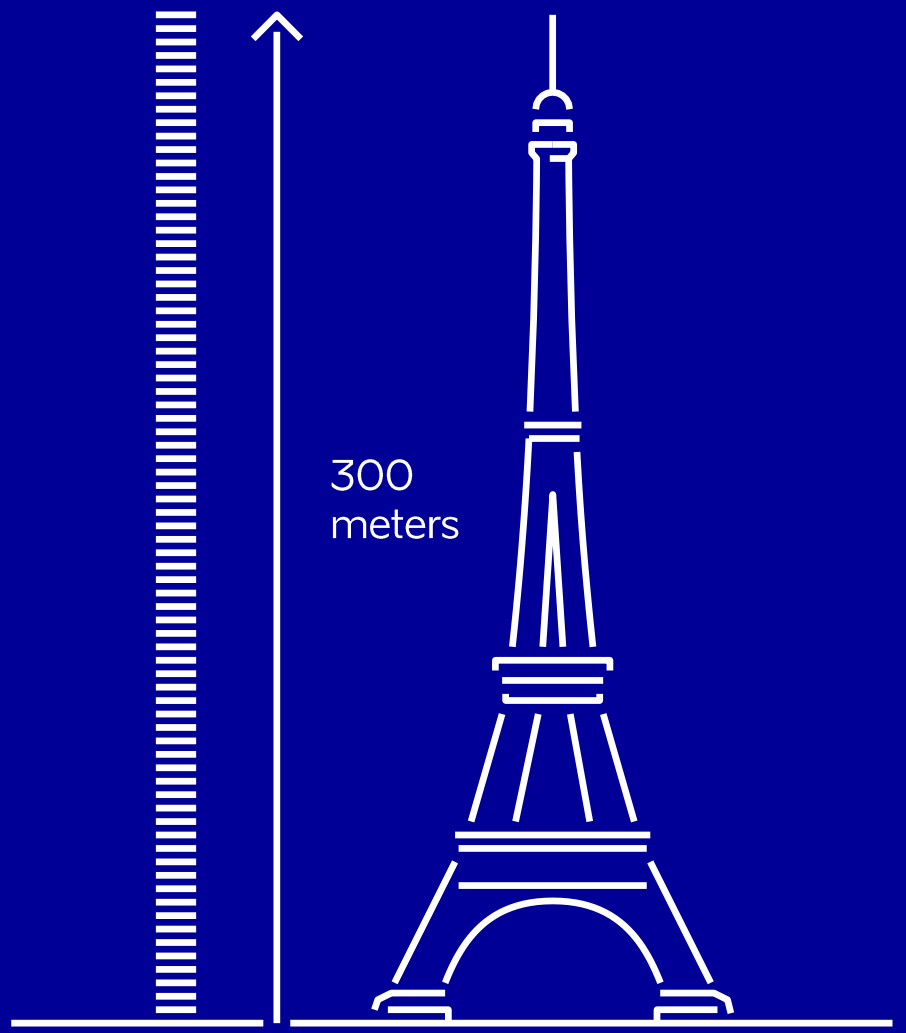
August 28th 2019

a modest country that extends beyond its borders

+ population: 1.3 million
+ area: 45,339 km2
+ currency: Euro
+ member of: EU, NATO, WTO, OECD, DIGITAL 9
+ ICT sector: 7% of GDP

we are a digital society

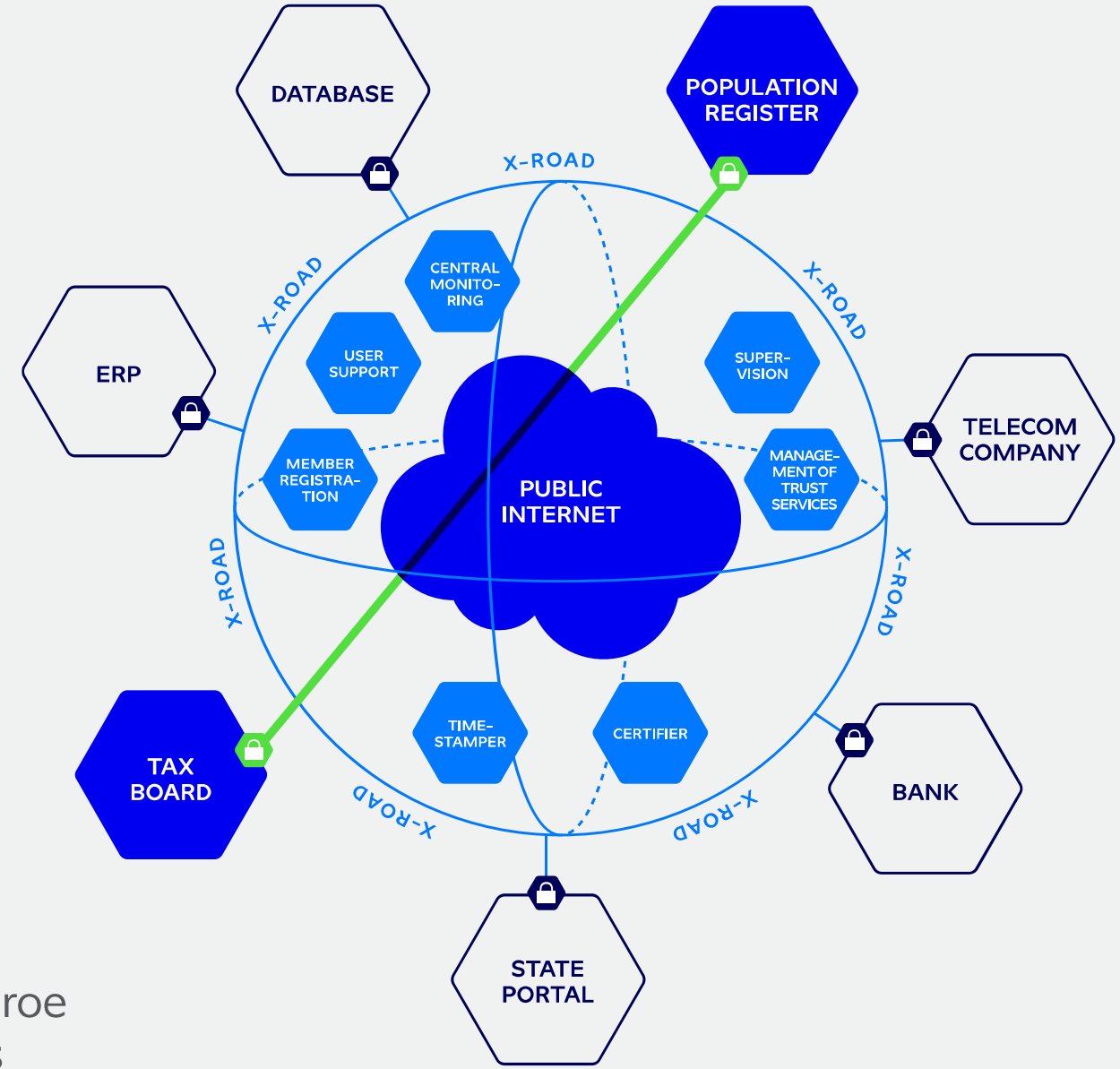
+ digital signature saves 5 days a year
+ 99% state services are online
+ #1 ITU global cybersecurity index (europe)
+ #1 BARCLAYS 2016 digital development index
+ ‘the most advanced digital society in the world’ — WIRED Magazine



A stack of paper saved each month

exchange

The busiest highway of e-Estonia — X-Road from 2001.



+ saving 1407 years annually
+ 651 institutions and enterprises
+ 504 public sector institutions
+ 2691 different services
+ over 900 million transactions per year
+ exported to Finland, Kyrgyzstan, Namibia, Faroe Islands, Iceland, Ukraine, and other countries

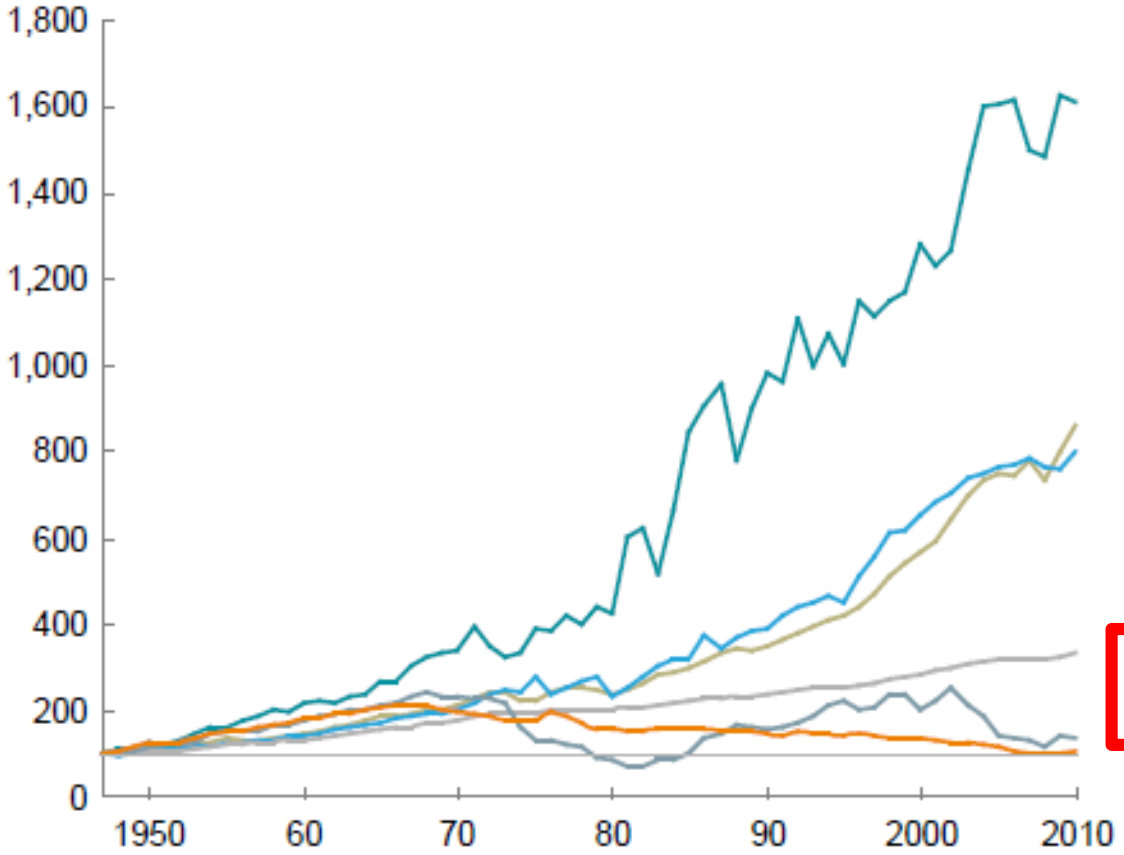
ease of doing business

Simplest and fastest business environment.

+ a few hours to start a company
+ hassle-free e-taxation
+ full automatization in tax reporting by 2020
+ e-Residency — Estonian e-services to every world citizen
+ 100% digital building permit process

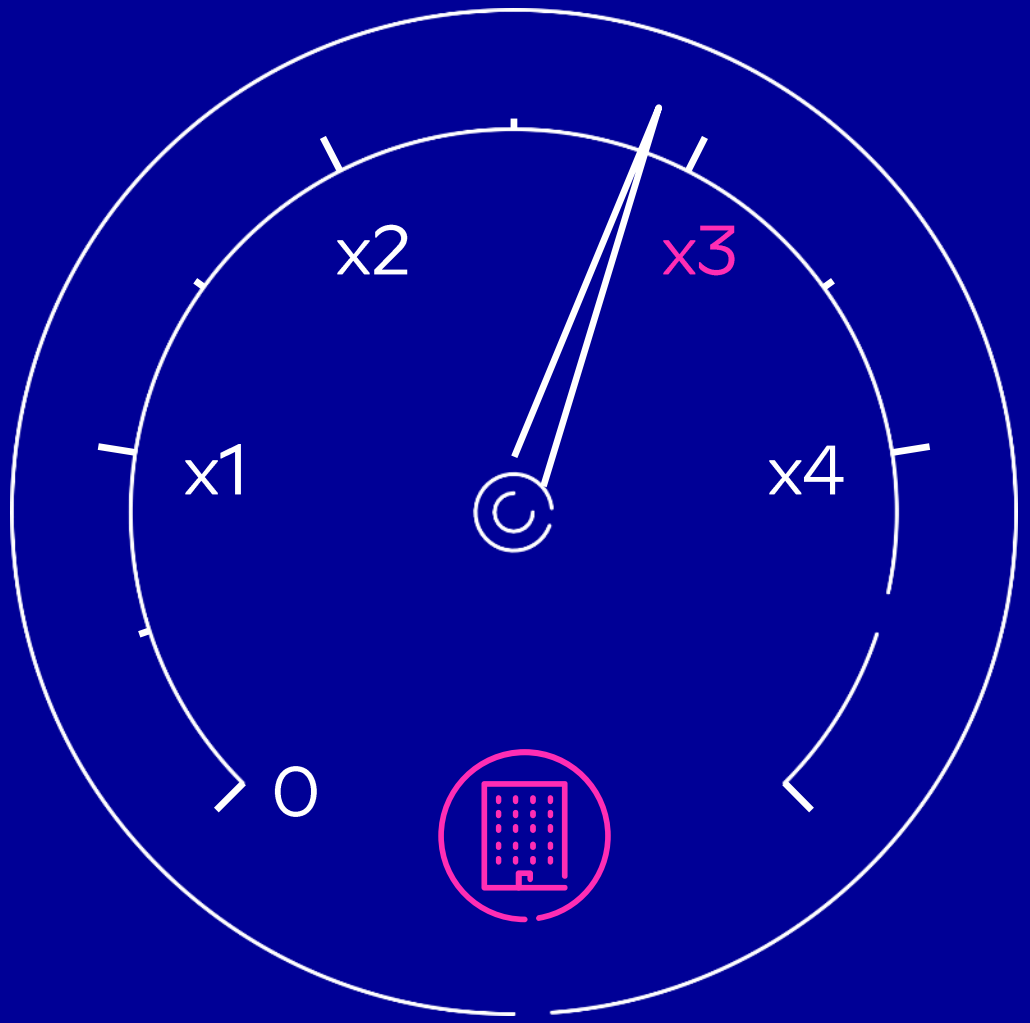
what is the problem?

Gross value added per hour worked, constant prices
Index: 100 = 1947



	Compound annual growth rate, 1947–2010 %	Total change
Agriculture	4.5	16.1x
Manufacturing	3.5	8.6x
Wholesale and retail	3.4	8.0x
Overall economy	1.9	3.3x
Mining	0.5	1.4x
Construction	0.1	1.1x

objective:
increase productivity x3



+ Government aims to increase construction sector productivity x3 by 2030
+ Current productivity is below EU average

how gov influences sector?

Legislation

Direct and influence adoption of new solutions using relevant legislation

Process improvement

Map and improve existing processes, support adoption of new tools and methods

Education

Develop educational curriculums and government orders to develop skills for innovative

Create the environment for secure and reliable data exchange

>> e-construction platform

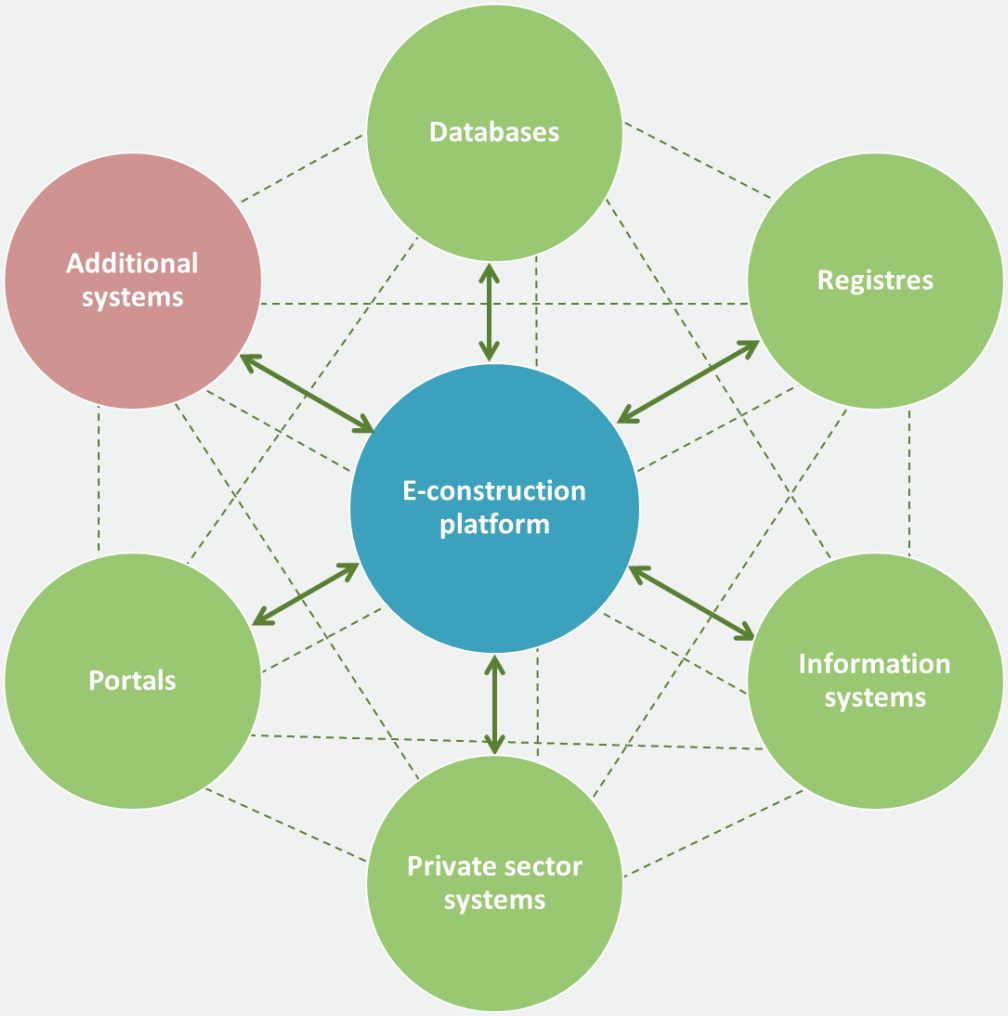
e-construction platform vision

lossless exchange of standardized and trustworthy data between all stakeholders throughout the building lifecycle

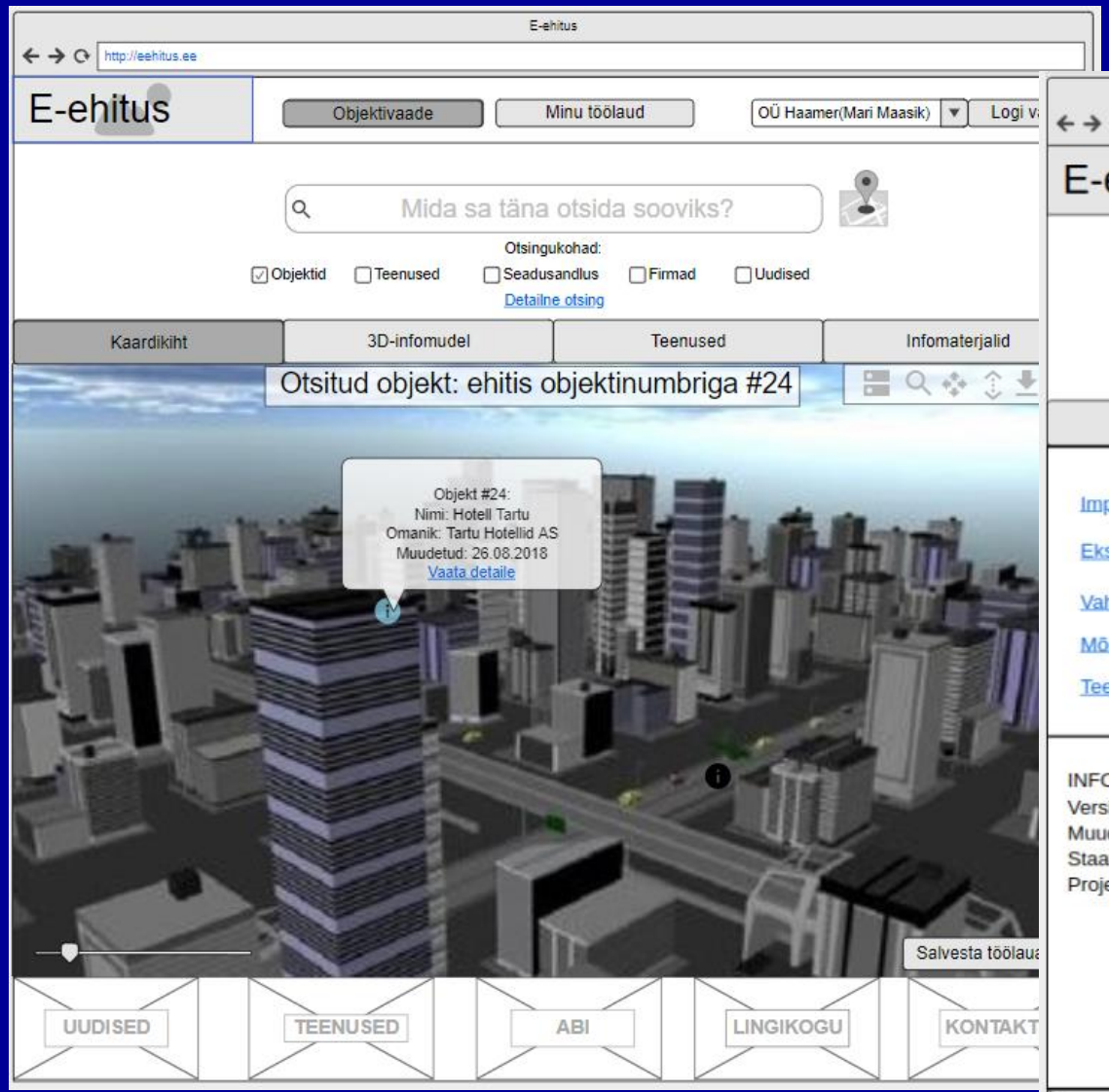
+ Better data management = improved decision making
+ BIM becomes the norm
+ more efficient and transparent public processes
+ added value from new digital products and services

integration

connecting built environment data and services without a centralized or master database



+ built on top of existing e-gov infrastructure
+ open platform and API-s
+ secure by design with e-ID authentication
+ KSI blockchain used for integrity verification of government registries
+ built for automation and AI
+ access point to digital twin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Omanik: Tartu Hotellid AS
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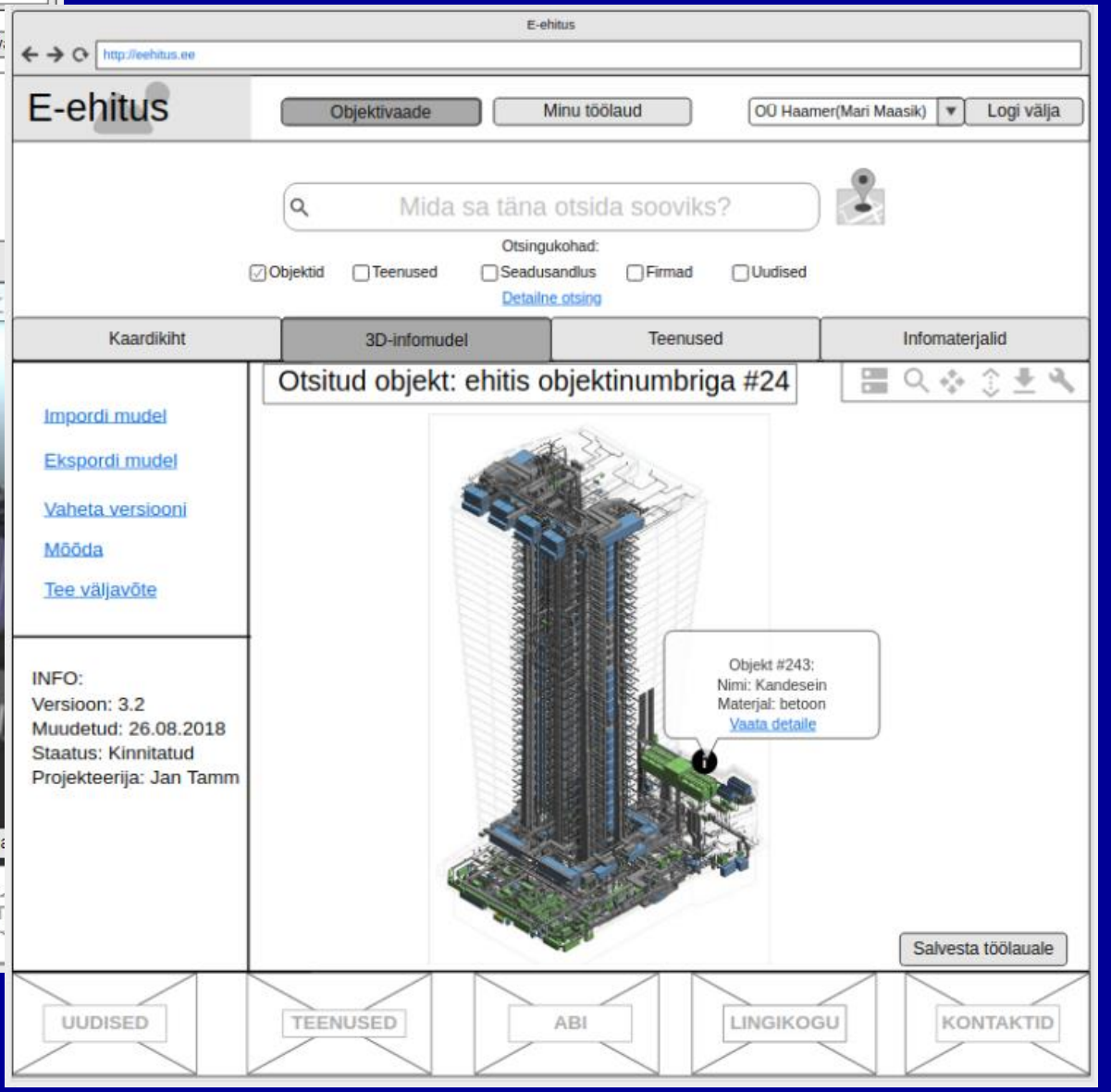
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Staatus: Kinnitatud
Projekteerija: Jan Tamm
Otsitud objekt: ehitis objektinumbriga #24
Objekt #243:
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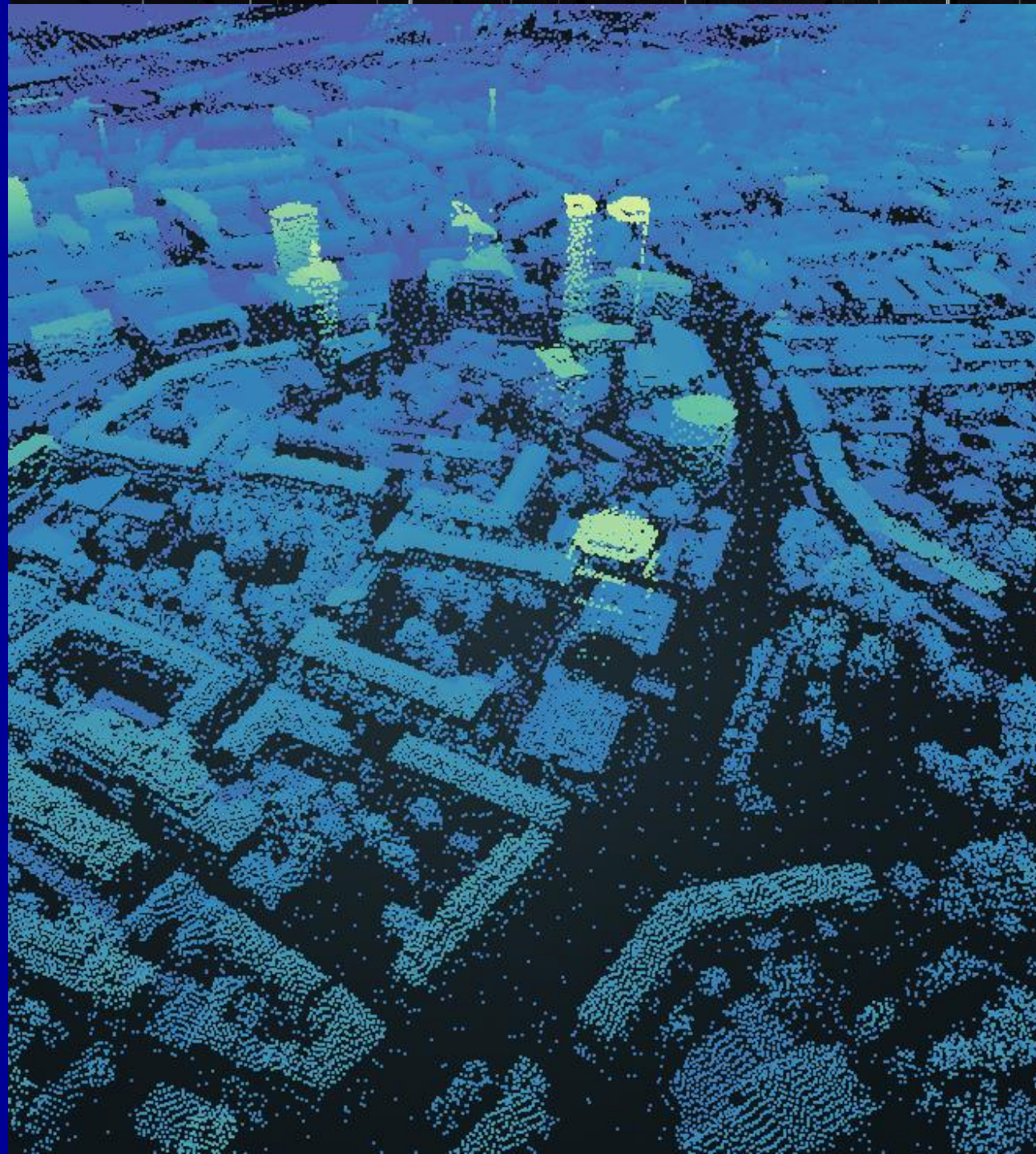
what is a digital twin?

+ “a digital replica of a living or non-living physical entity”
+ Digital mirror of the physical world
+ Information = data + context
+ Visualization helps to improve readability - adds context

3D digital twin

Phase I, Nov 2018 — March 2019

+ Visualize built environment data from different public and private sources, integrate GIS and BIM
+ Integral part of e-construction platform
+ Define use cases and benefit
+ Technical solution analysis, cost estimates, scalability
+ Joint project with other ministries and public institutions
+ Practical applications for planning
+ Proof-of-Concept:



best of breed

+ We looked at the following examples:
  + Berlin
  + Singapore
  + Helsinki
  + New York
  + Hamburg
  + Toronto
  + Rotterdam

+ Standard technologies:
  + CityGML
  + CesiumJS and 3D Tiles
  + 3D City Database

use cases

+ 88 use cases were mapped during workshops and interviews

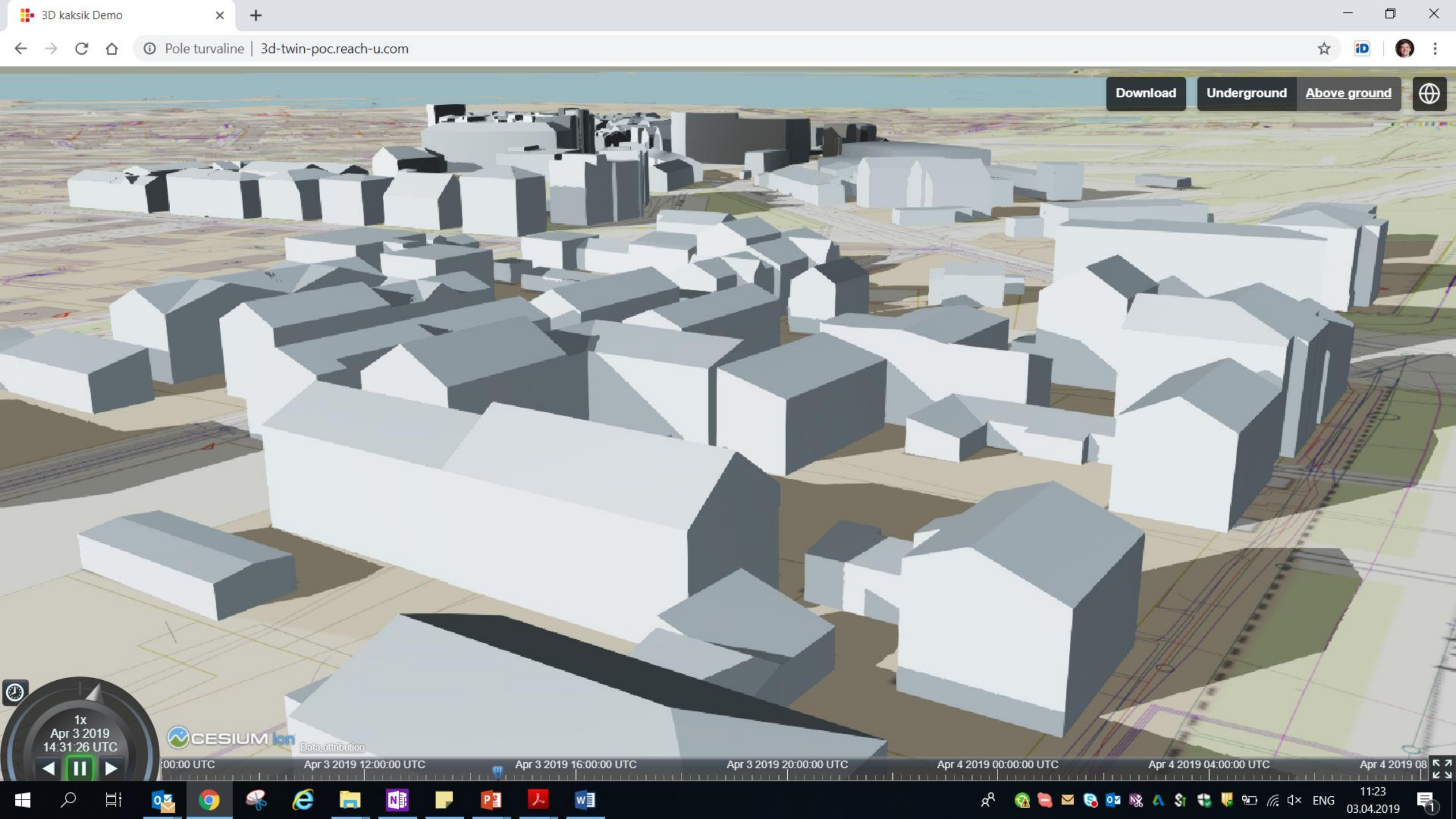
+ Main scope use cases focused on
  + planning (e.g. zoning restrictions, simulations)
  + design (e.g. input data for design)
  + construction (e.g. site planning and logistics)

+ Additonal use cases and applications in various fields (e.g. rescue services, forestry, risk migitation etc.)

proof of concept

- Proof-of-concept solution showing small part of Tallinn
- ~240 buildings in LOD2
- Connecting data from 8 different sources
  - Vector maps
  - Point clouds
  - 3D models (BIM)
  - Mesh modesl
  - Metadata
- http://3dkaksik.eehitus.ee/

https://www.youtube.com/watch?v=ZO5K2iXRyps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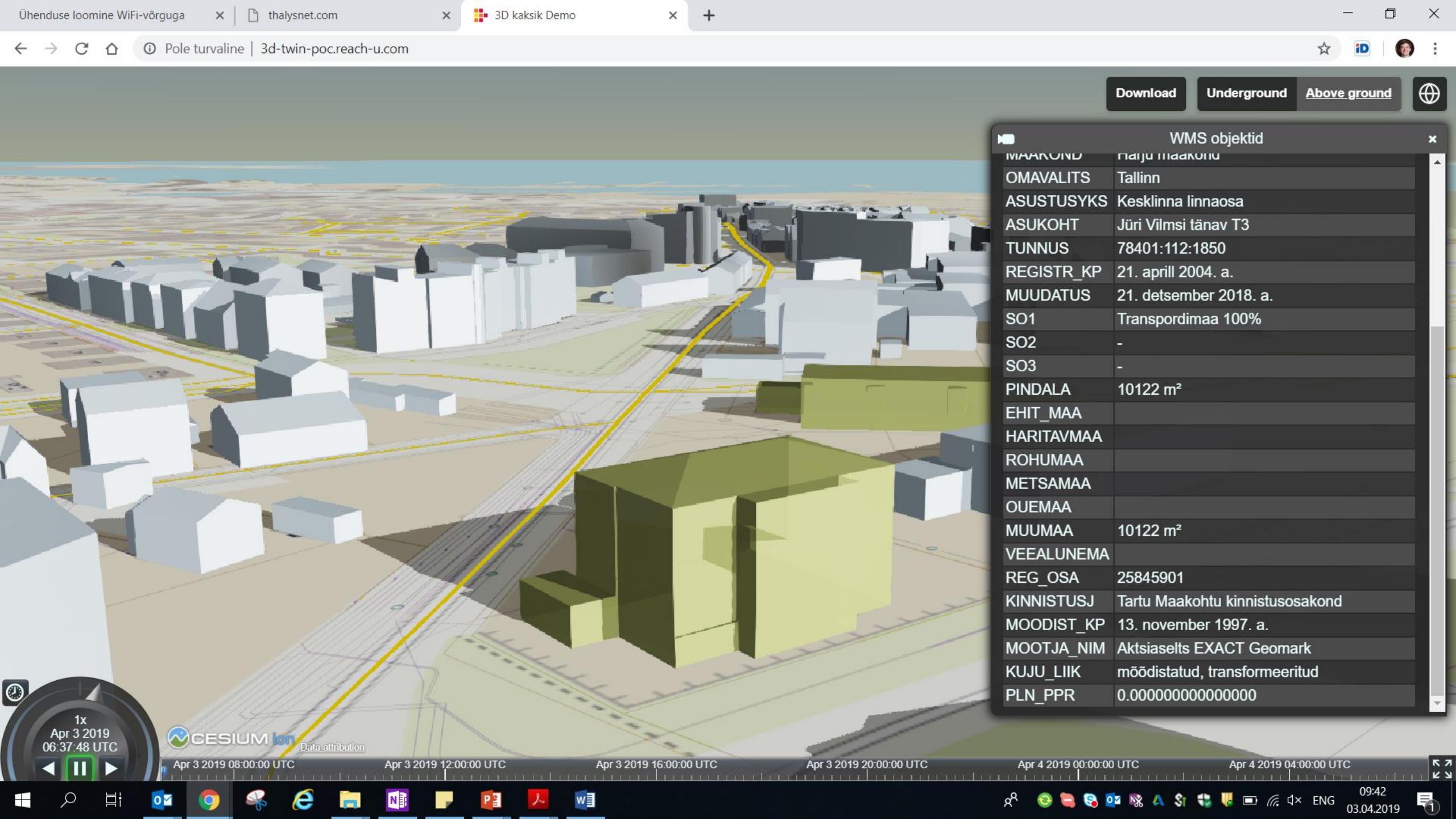
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WMS objektid
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OMAVALITS Tallinn
ASUSTUSYKS Kesklinna linnaosa
ASUKOHT Jüri Vilmsi tänav T3
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MUUDATUS 21. detsember 2018. a.
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SO2 -
SO3 -
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MUUMAA 10122 m²
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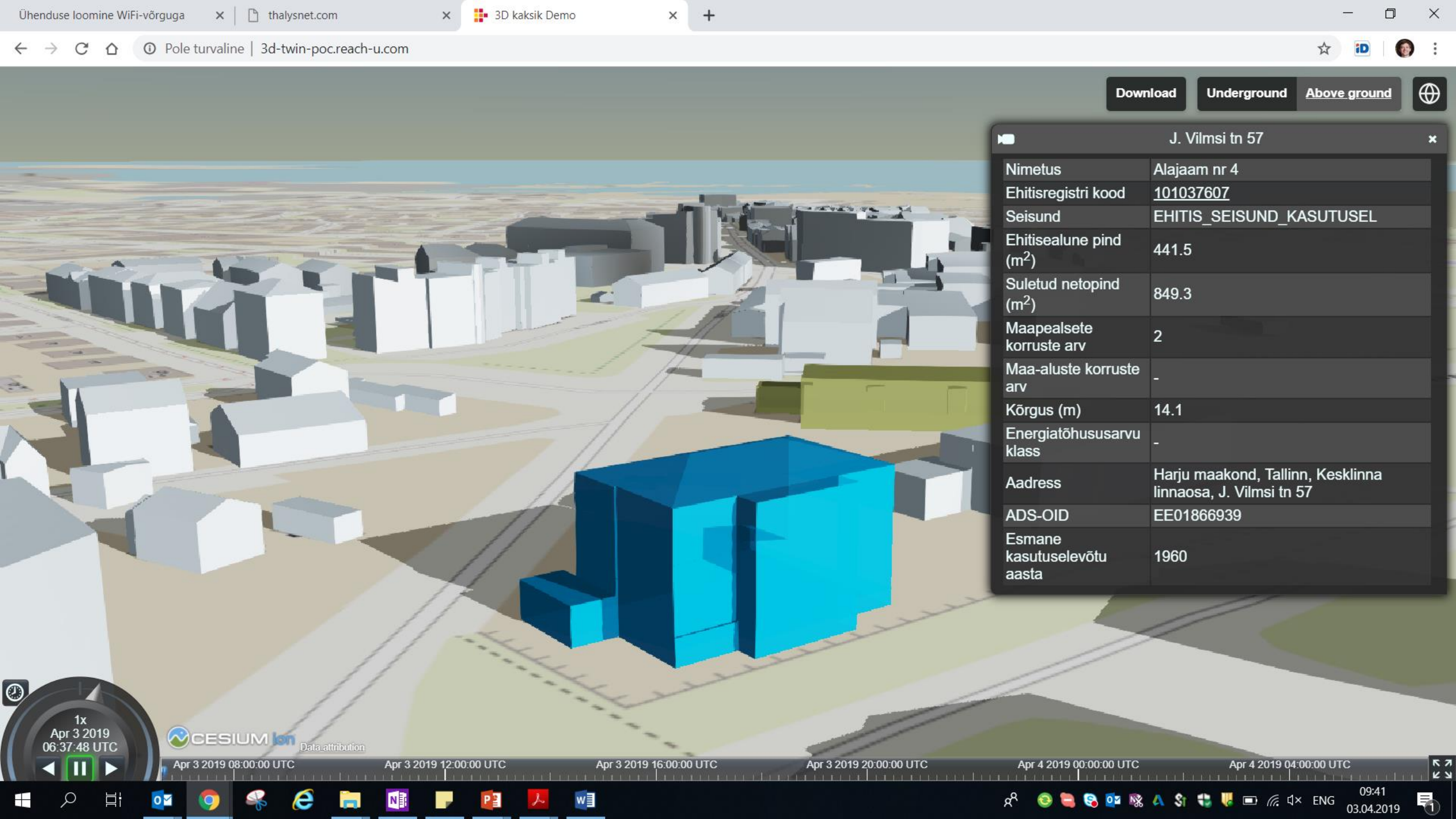
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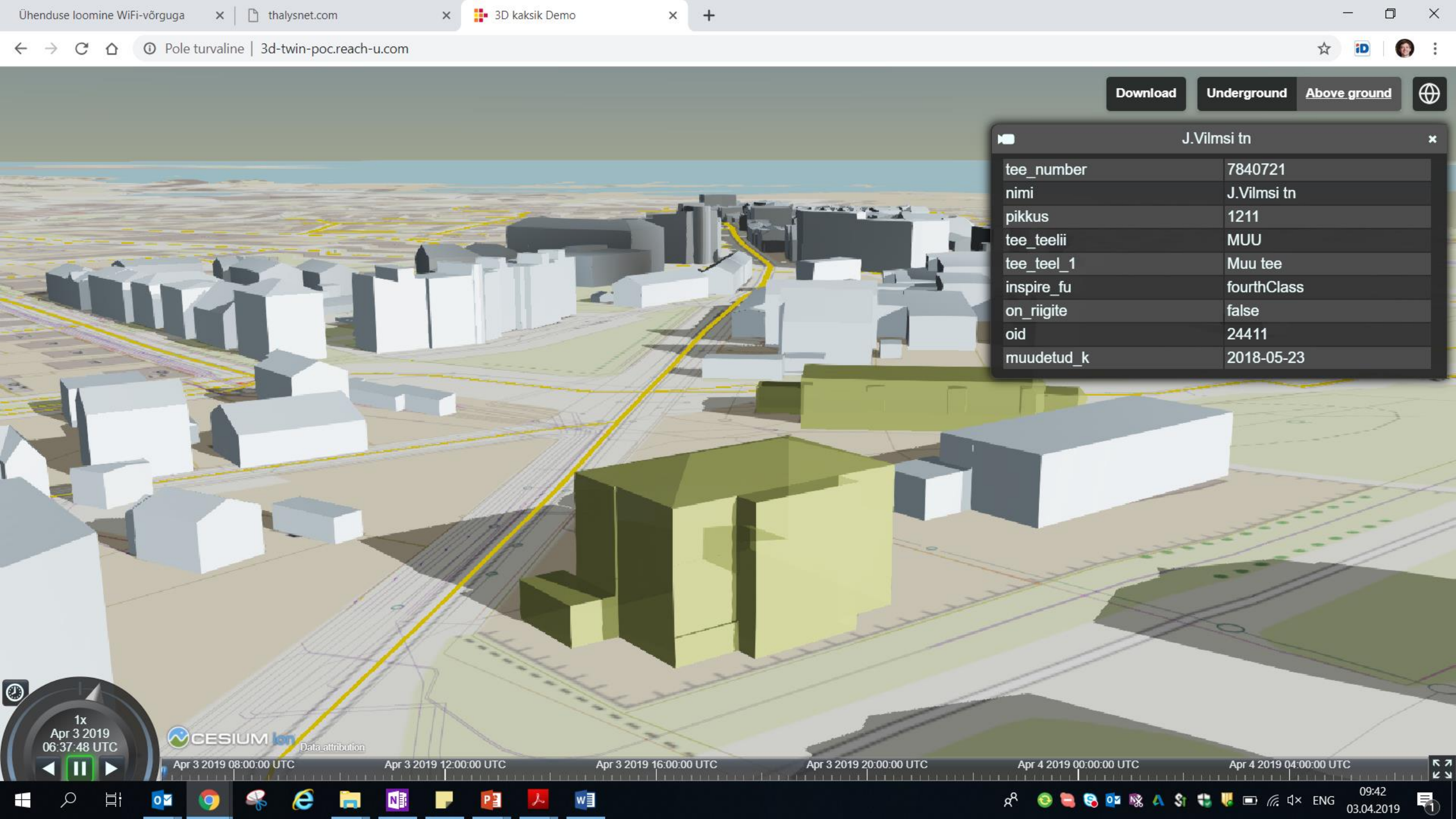
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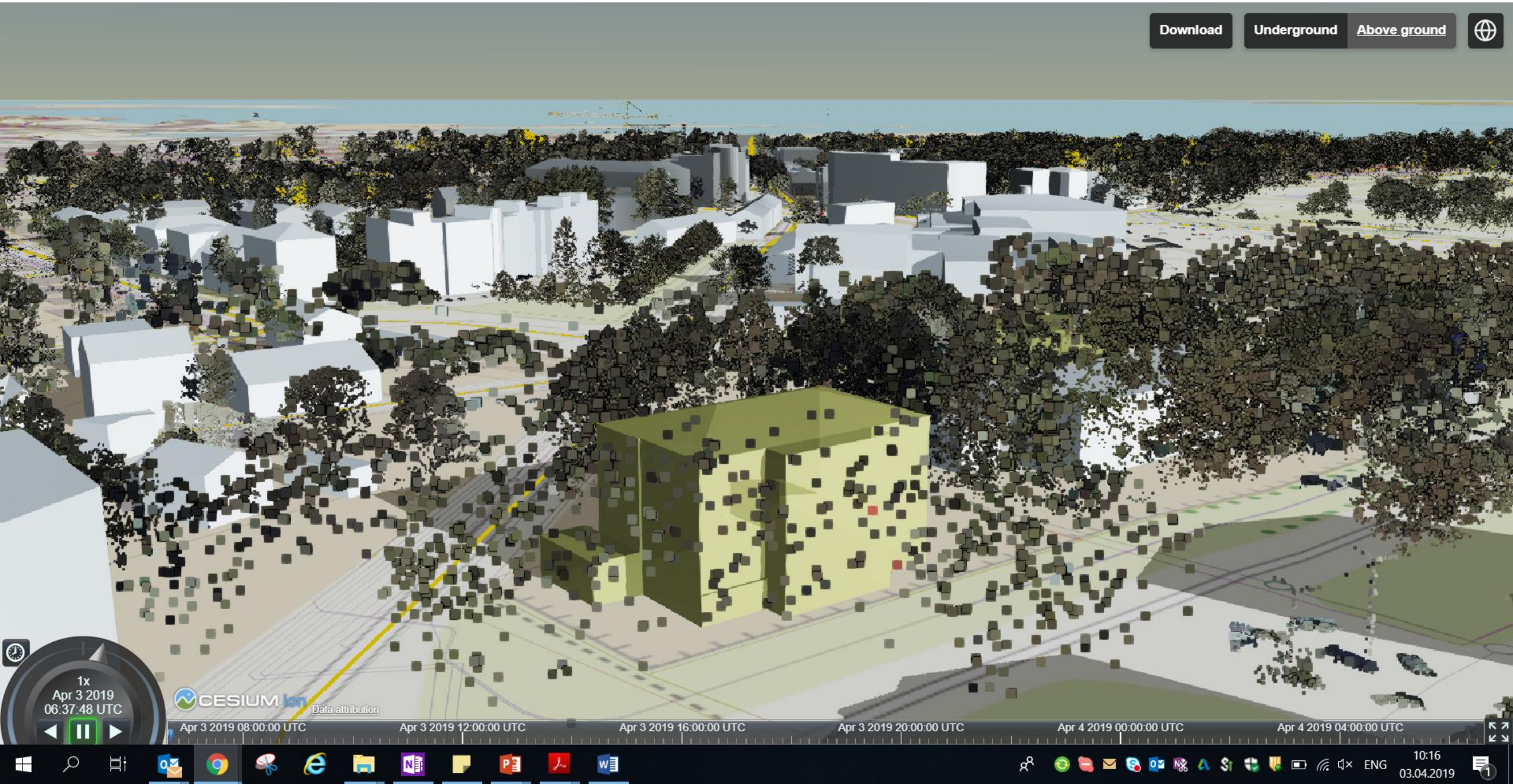
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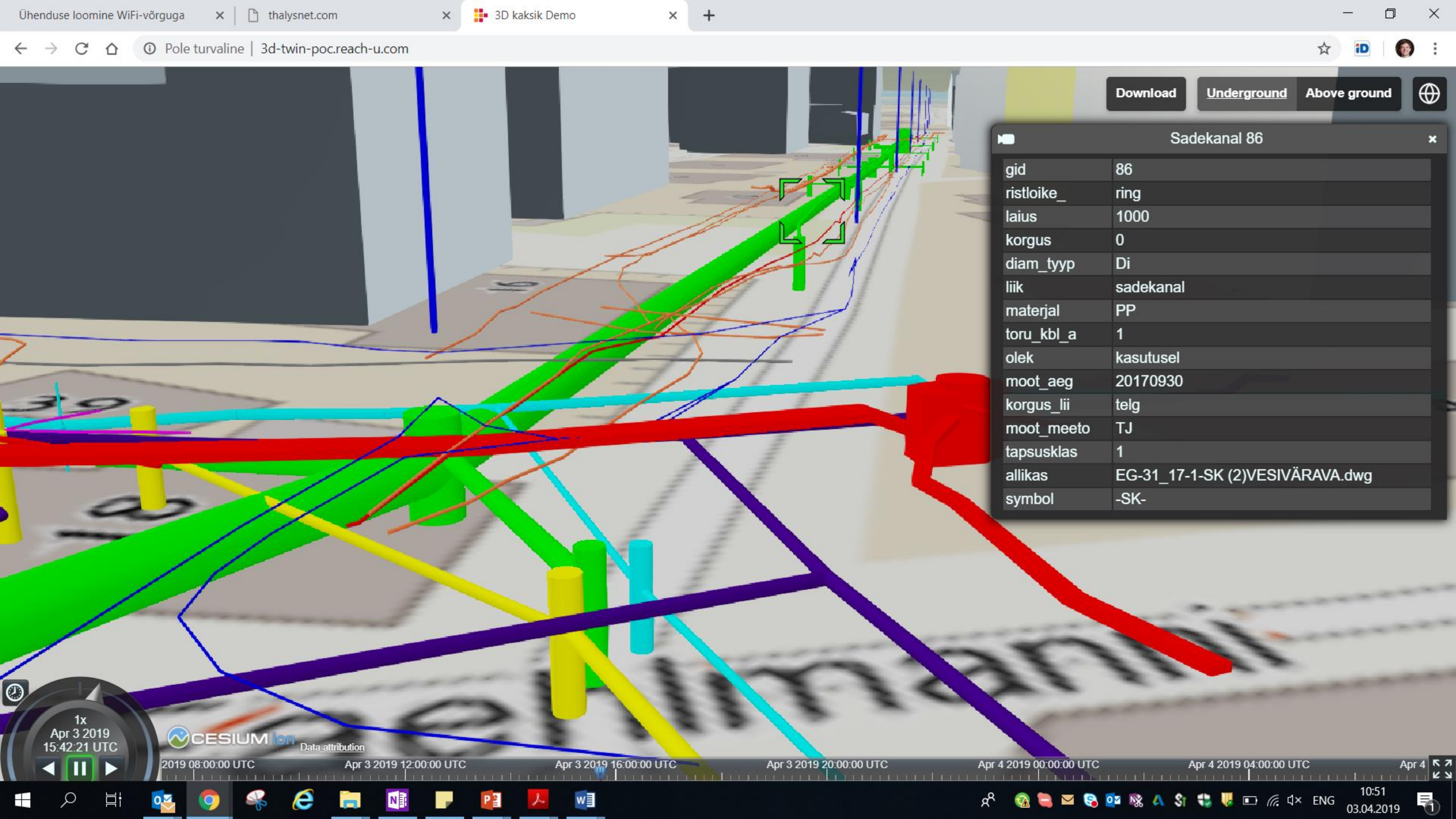
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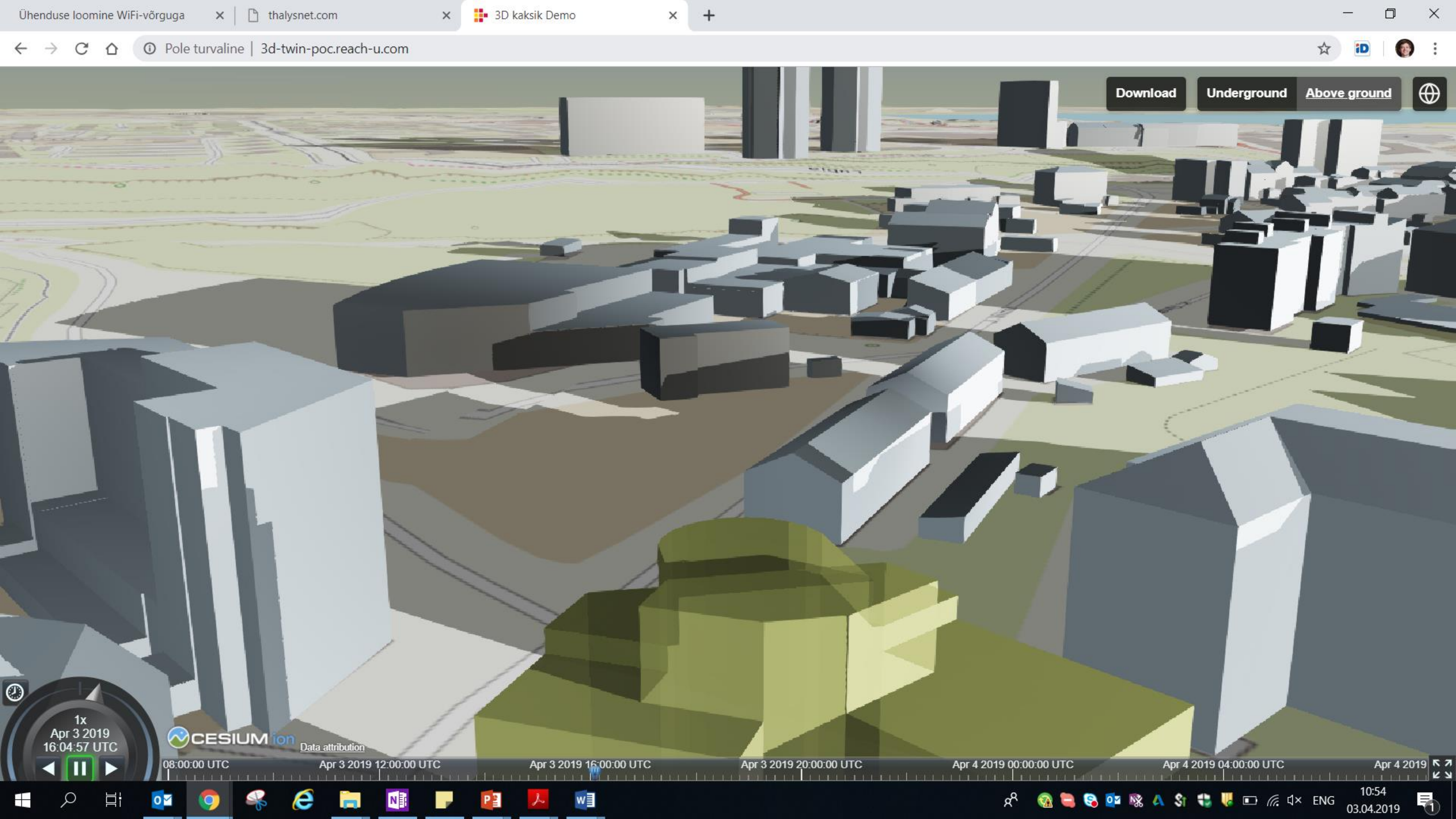
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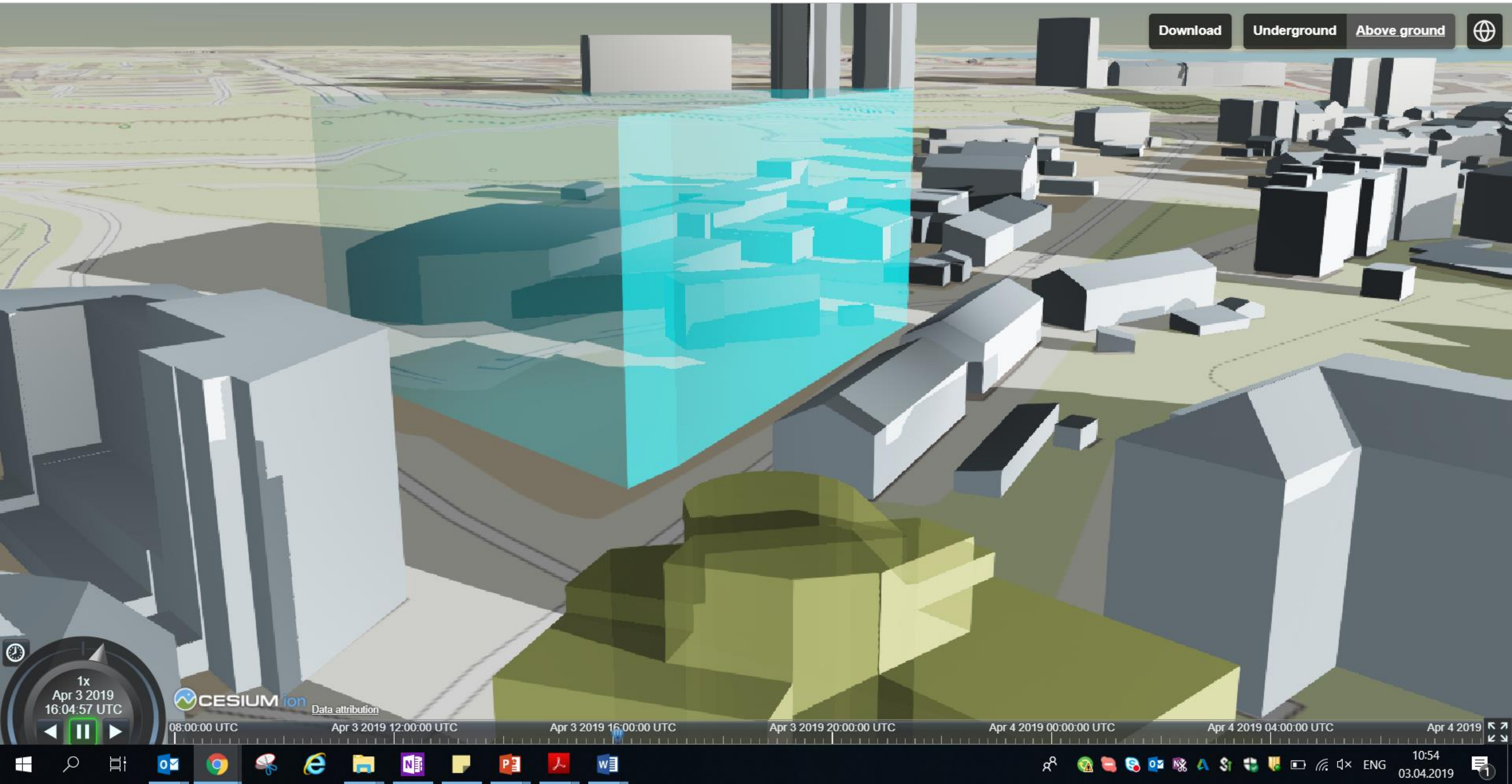
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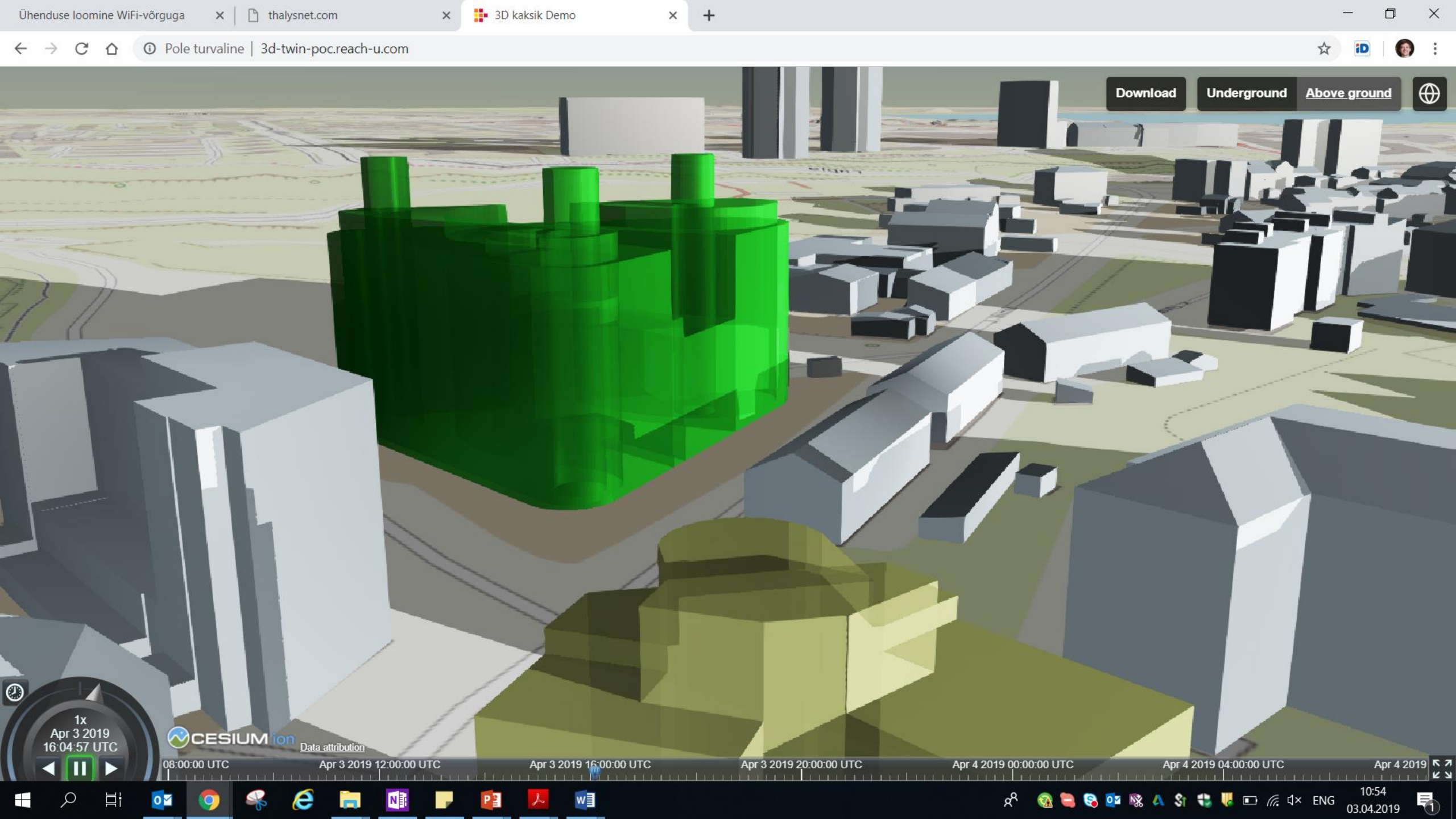
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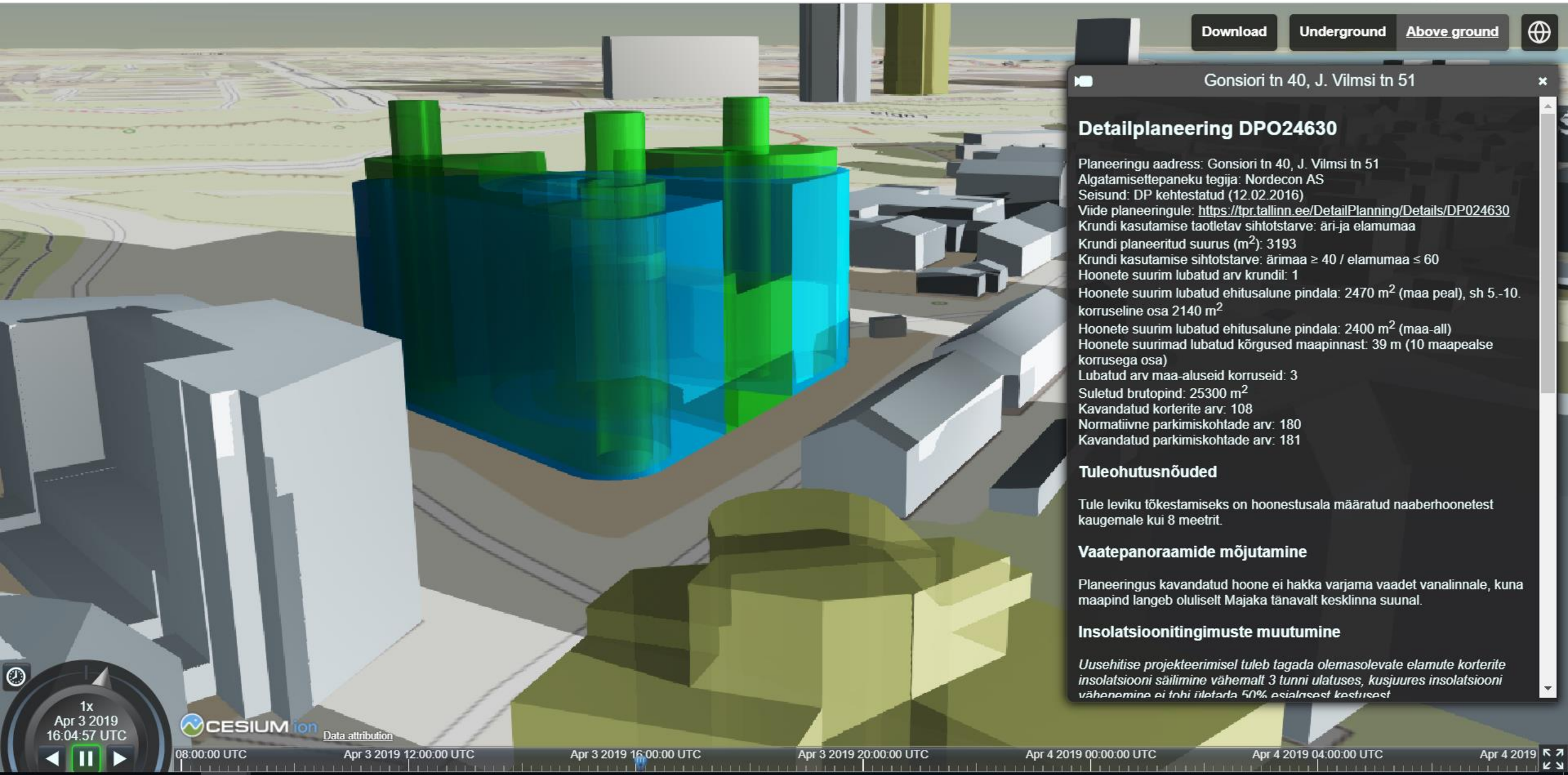
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Algatamisettepaneku tegija: Nordecon AS
Seisund: DP kehtestatud (12.02.2016)
Viide planeeringule: https://tpr.tallinn.ee/DetailPlanning/Details/DP024630
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Krundi planeeritud suurus (m2): 3193
Krundi kasutamise sihtotstarve: ärimaa ≥ 40 / elamumaa ≤ 60
Hoonete suurim lubatud arv krundil: 1
Hoonete suurim lubatud ehitusalune pindala: 2470 m2 (maa peal), sh 5.-10. korruseline osa 2140 m2
Hoonete suurim lubatud ehitusalune pindala: 2400 m2 (maa-all)
Hoonete suurimad lubatud kõrgused maapinnast: 39 m (10 maapealse korrusega osa)
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Suletud brutopind: 25300 m2
Kavandatud korterite arv: 108
Normatiivne parkimiskohtade arv: 180
Kavandatud parkimiskohtade arv: 181
Tuleohutusnõuded
Tule leviku tõkestamiseks on hoonestusala määratud naaberhoonetest kaugemale kui 8 meetrit.
Vaatepanoraamide mõjutamine
Planeeringus kavandatud hoone ei hakka varjama vaadet vanalinnale, kuna maapind langeb oluliselt Majaka tänavalt kesklinna suunal.
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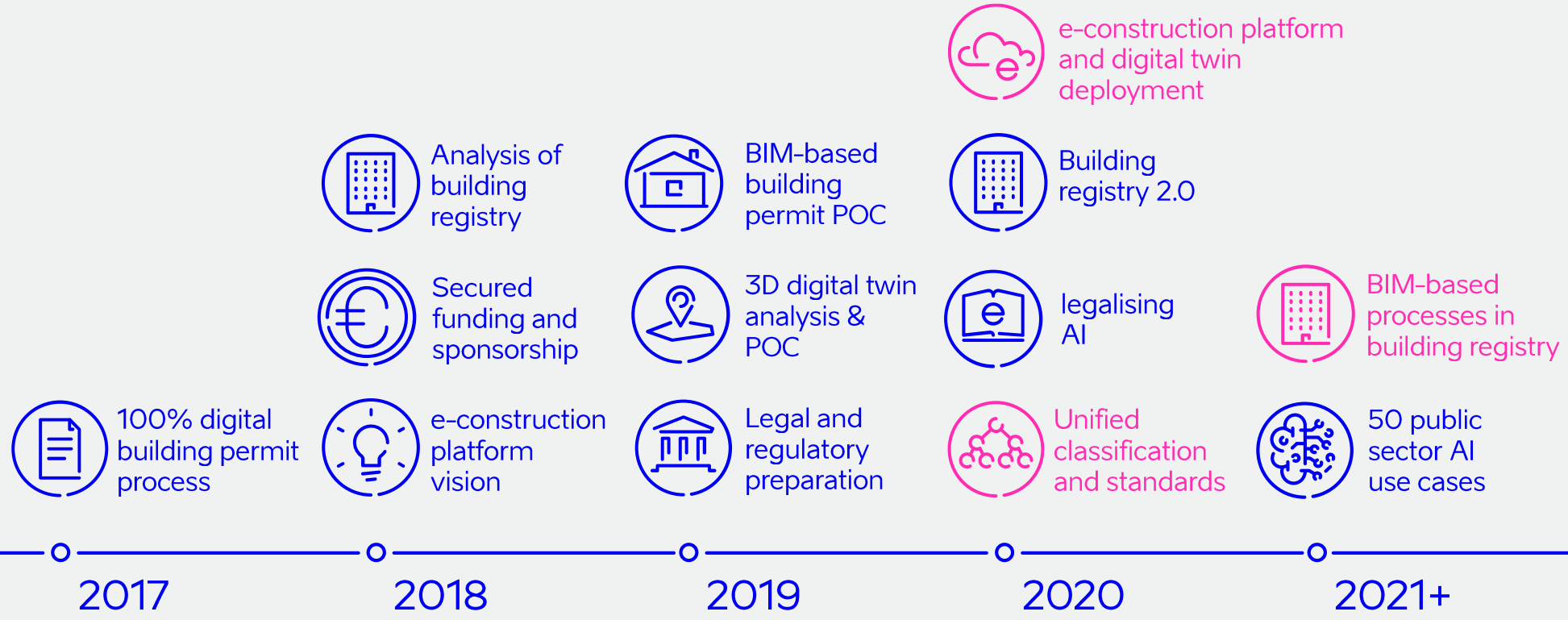
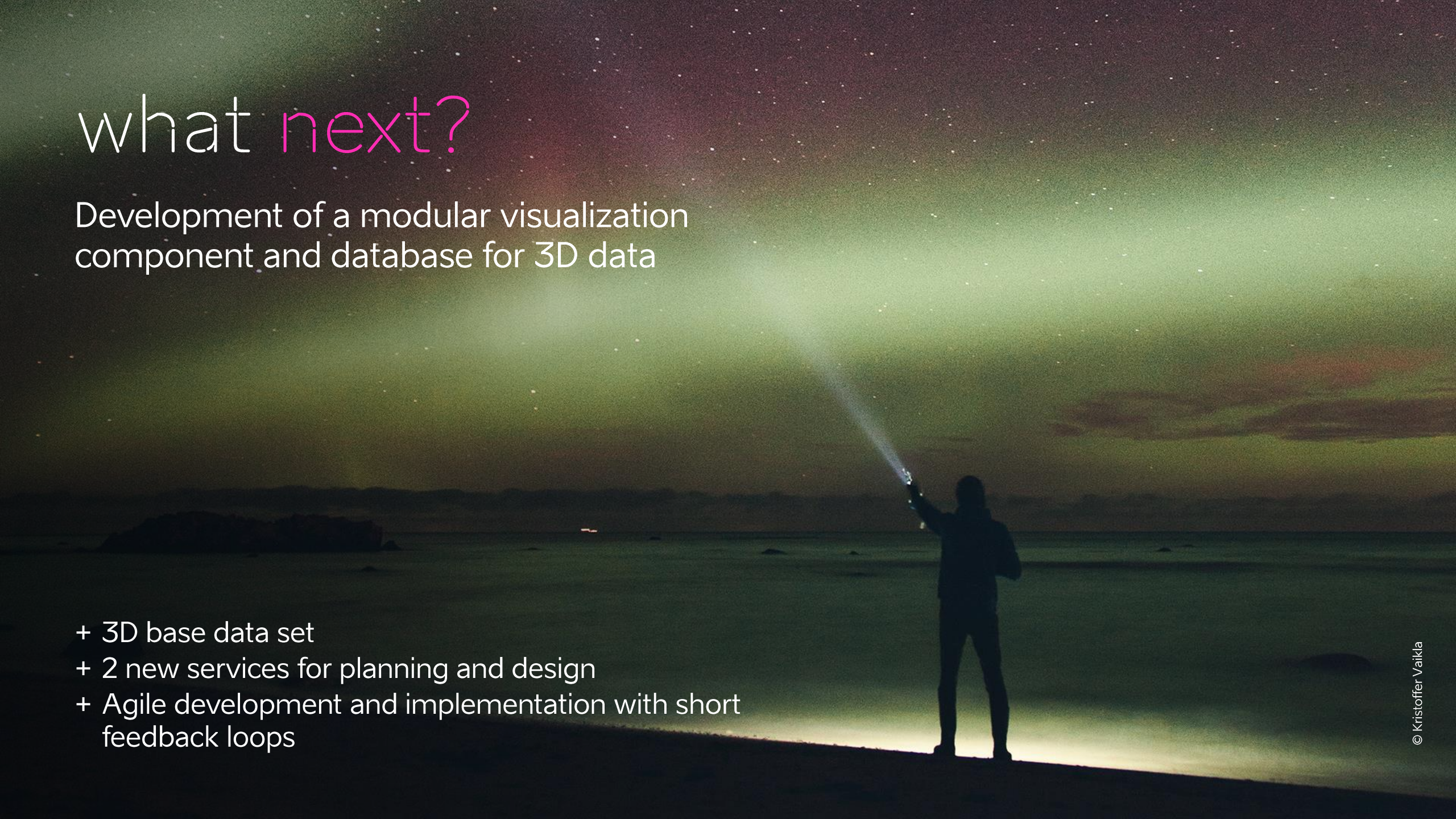
e-construction general roadmap



what next?

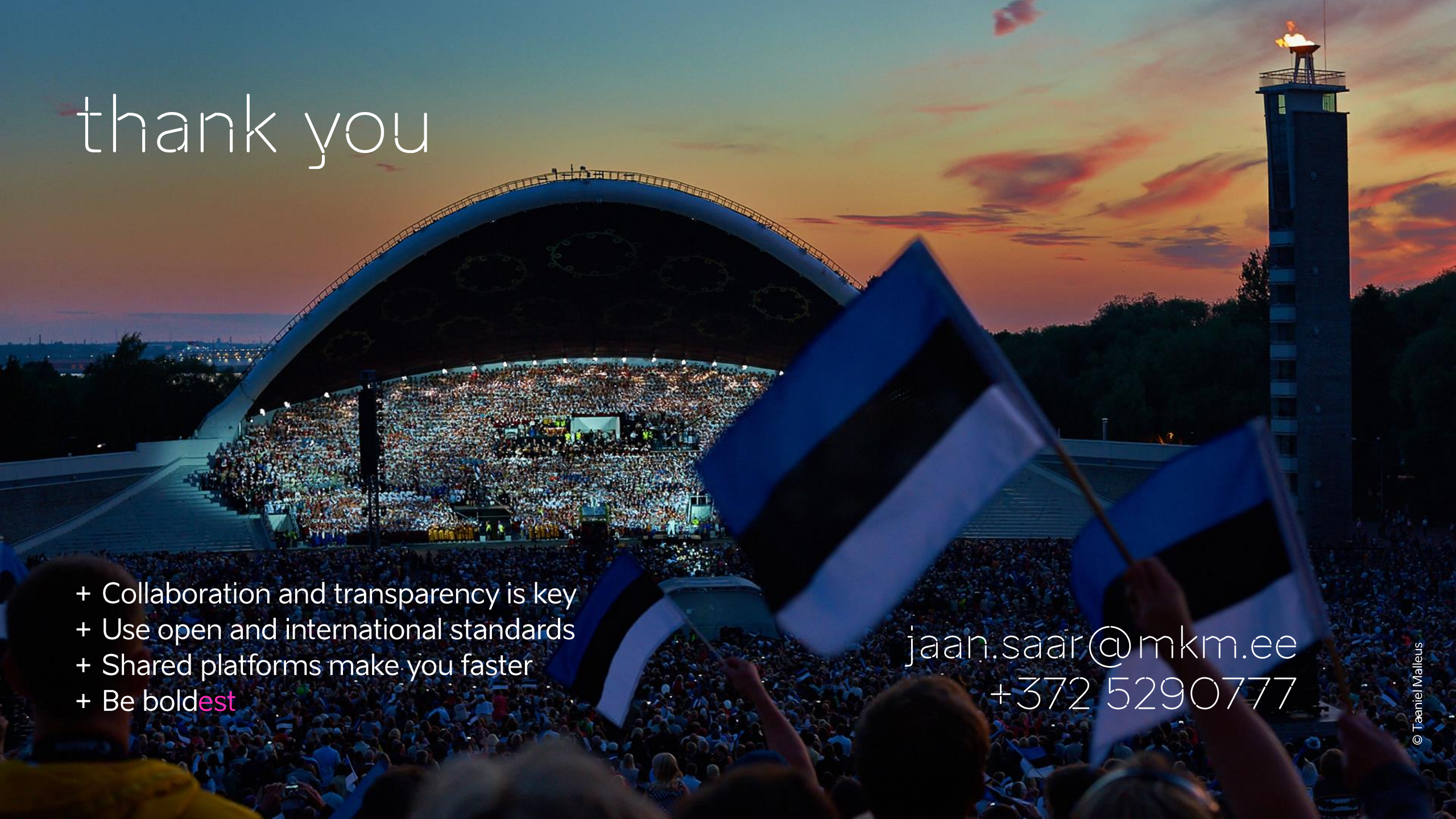
Development of a modular visualization component and database for 3D data



+ 3D base data set
+ 2 new services for planning and design
+ Agile development and implementation with short feedback loops

join 33,000+ e-residents

thank you



+ Collaboration and transparency is key
+ Use open and international standards
+ Shared platforms make you faster
+ Be boldest

jaan.saar@mkm.ee
+372 5290777