Background for selecting LandXML as the preferred format for Infra in Finland

Nordic openINFRA Workshop in Oslo focusing on LandXML

7.6.2012

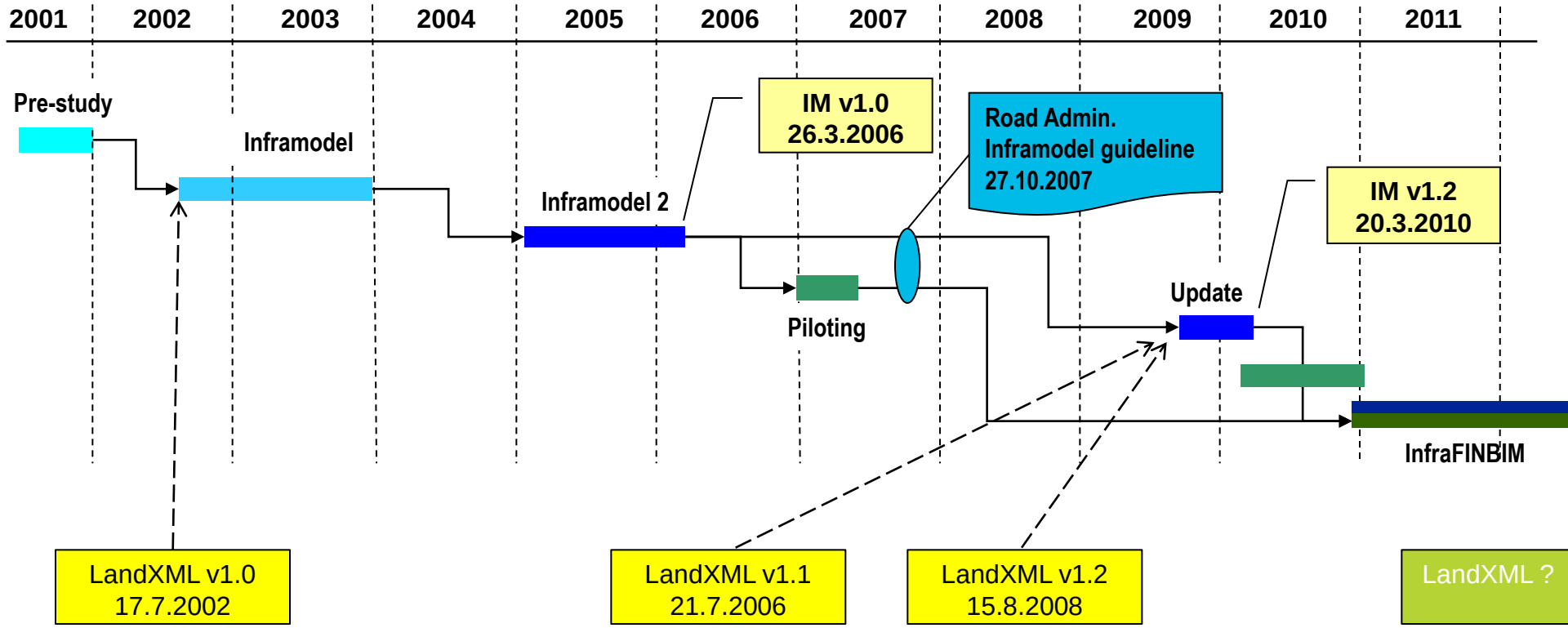
Content

- History – steps
- Pre-study
- Inframodel
- Inframodel2
- Results
- Why LandXML
- Why extensions
- Experiences

JUHA LIUKAS 7.6.2012

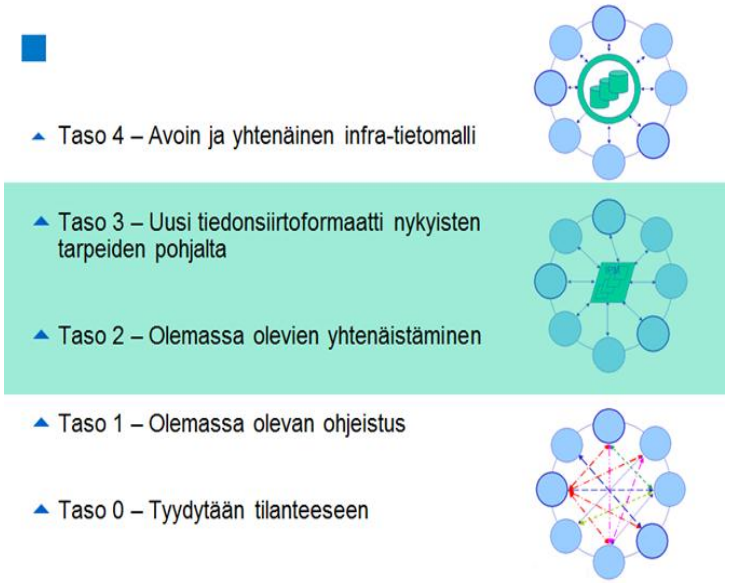
SITO

Inframodel (IM) history

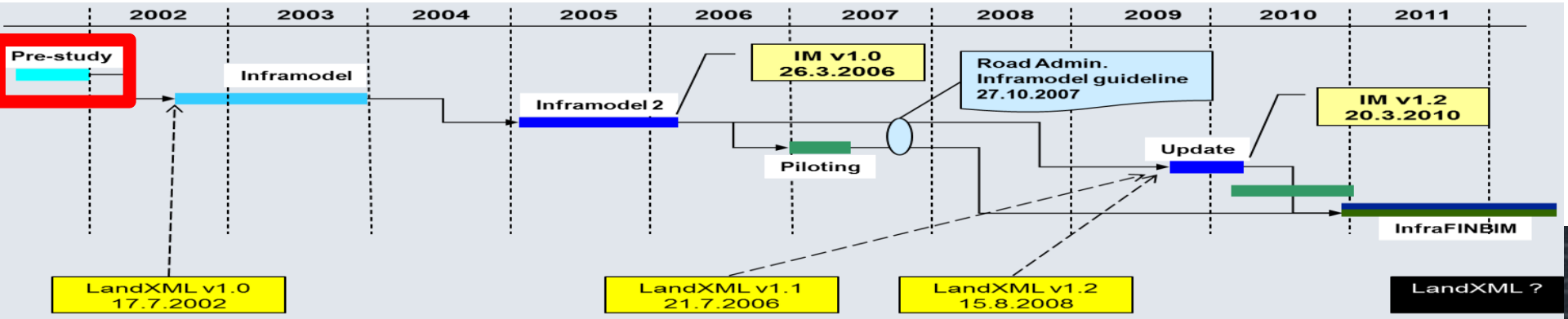


Infra Technology Programme 2001-2006 - Pre-study

- SKOL (The Finnish Association of Consulting Firms) / SITO 2001
- Current situation – standardization projects – development
- De facto formats in Finland
- OGC, OpenGIS, STANLI, GEOSIS, IFC, GDF, CIRC, OSYRIS, OKSTRA, OpenDesign…
- LandXML ?

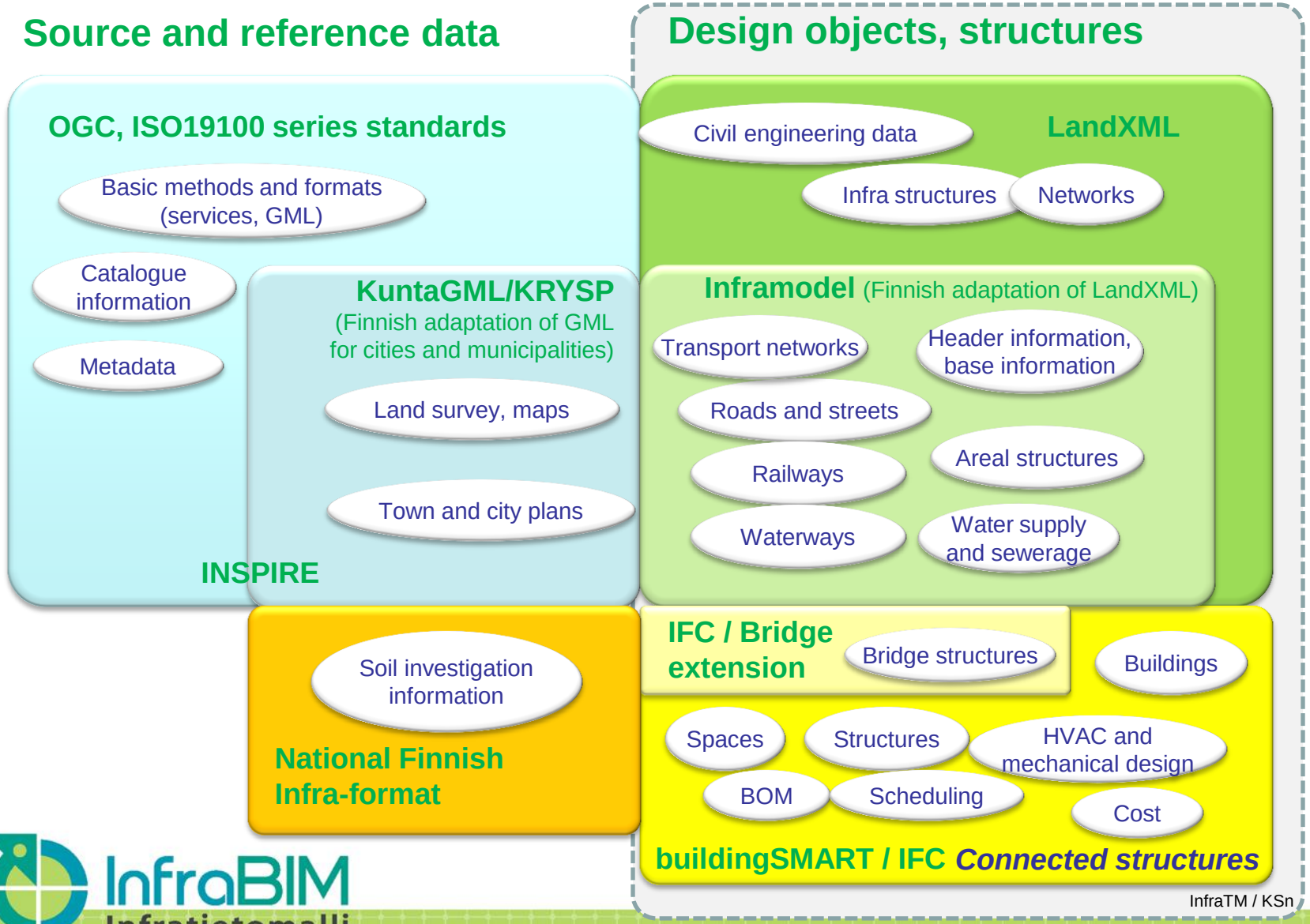


- Significant benefits from the harmonization of data transfer
- An common infra product data model big effort
- Best tool for infrastructure design ?



Infra-related standards – general information map

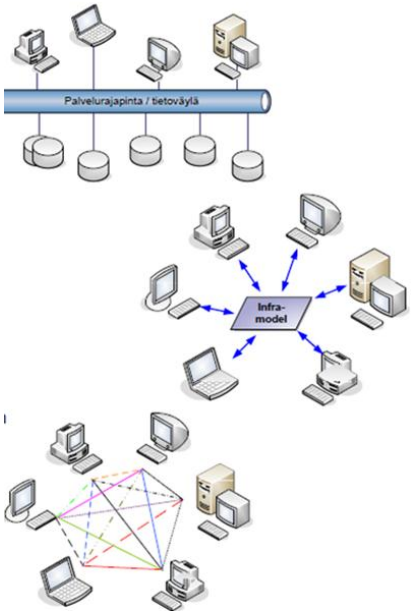
RAKENNUSTIETO



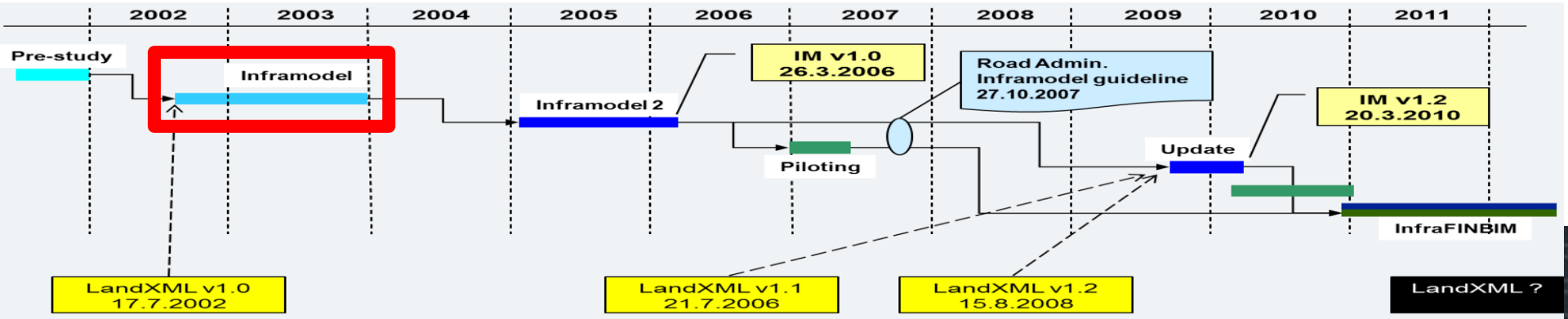
InfraBIM Infratietomalli

Inframodel

- Development of data exchange between sofwares in infra design
- Actors VTT, Sito, Tekla, Viasys(Vianova)



- Harmonization study
  - Map information
  - Soil investigations
  - Terrain and subsoil model
- LandXML 1.0 requirement specifications and feasibily study
  - Metadata
  - Geometry, pipenetworks
  - Road / railway model

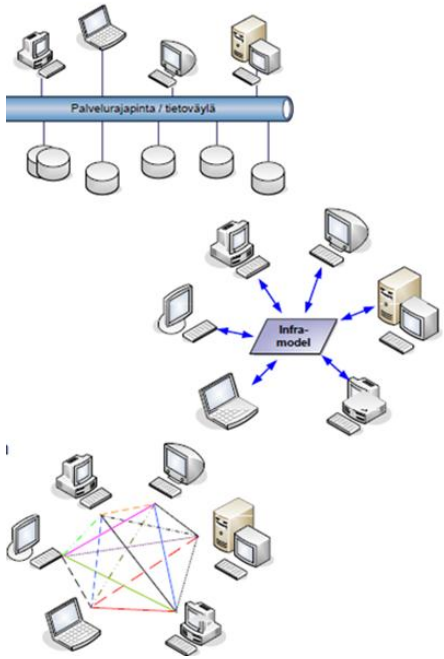


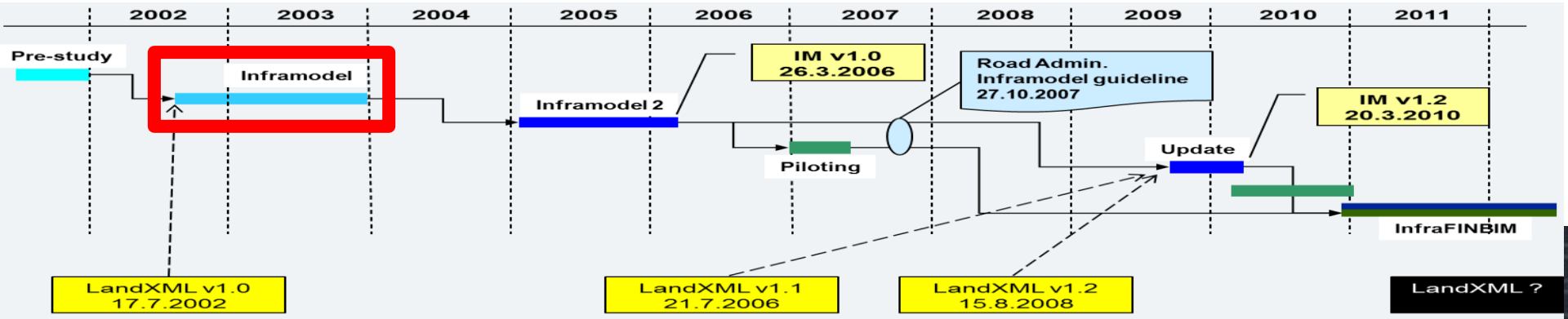
Inframodel - results

- Harmonization
  - Infra-format for soil investigations
  - Some other guidelines

- LandXML recommended to the data exchange format
  - Fullfill partly the demands
  - Possibility to expand (feature)

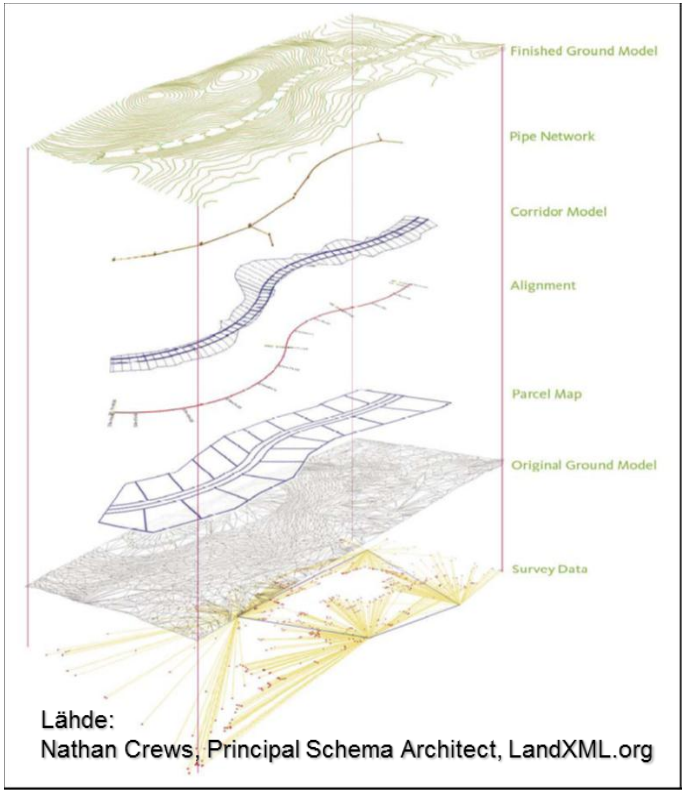
- Postpone the start of the common product data model

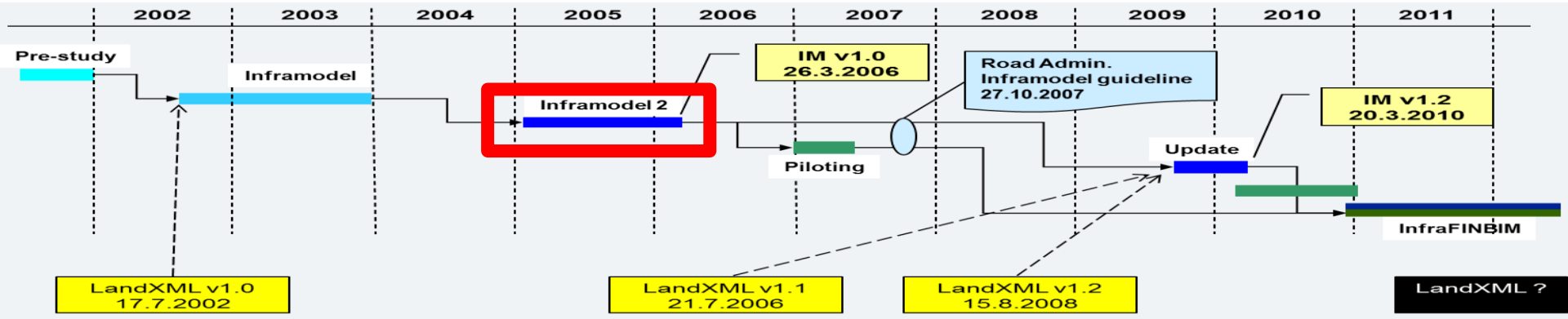




Why LandXML ? (2006)

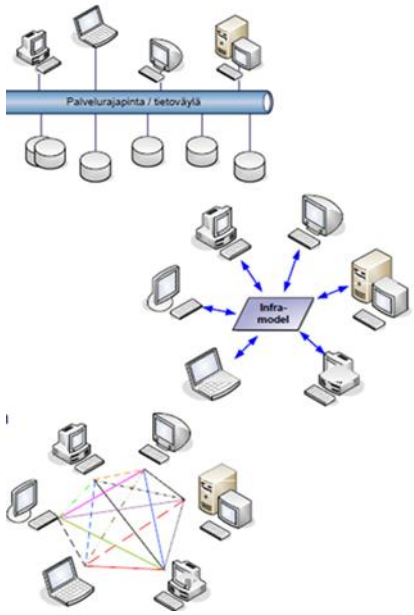
- "A specialized XML data file format containing civil engineering and survey measurement data commonly used in the Land Development and Transportation Industries"
- An existing, worldwide, open organization
- A non-proprietary data standard
- Driven by an industry consortium of partners (Autodesk, Bentley, Trimble, Topcon, Leica…)
- February 2006: 35 countries and **495** representatives from 400 member companies/government agencies
- Active development (www.LandXML.org)
- XML based
- Possibility to expand
- Possibility to influense ?

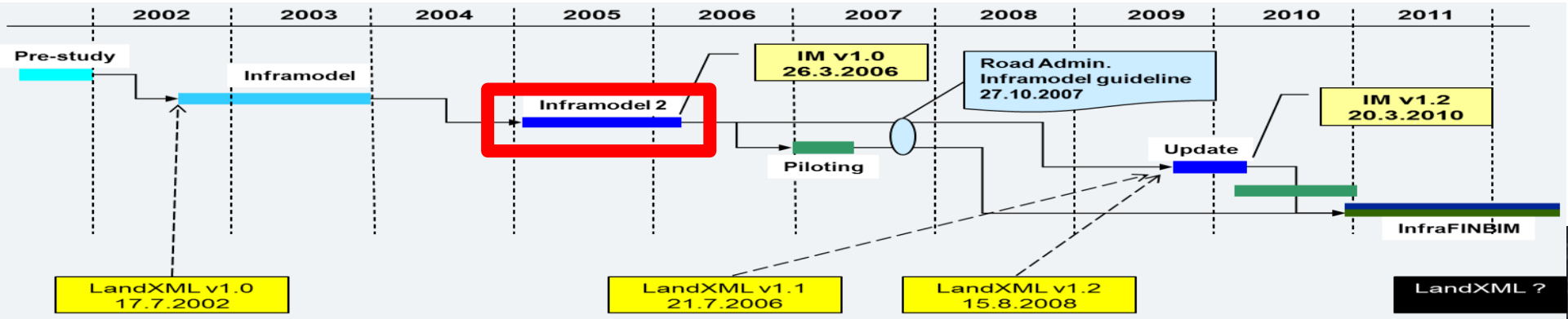




Inframodel2 - goals

- To improve data exchange between design softwares
- To bring LandXML-transfer format in the use
- Open documentation of Finnish practice
- Implementations in three design softwares:
  - Sito/CityCad, Tekla/Civil, Vianova/Novapoint
- A plan for the maintaining and further development
- Common requirements of design
- Definitions by Sito, Tekla, Vianova; documentation by VTT
- Total cost 600 000 € (public/private 50/50% & Tekes)





INFRA MODEL

PÄÄSIVU

LandXML v1.0

Tiedonsiirron sovellusohje LandXML v1.2

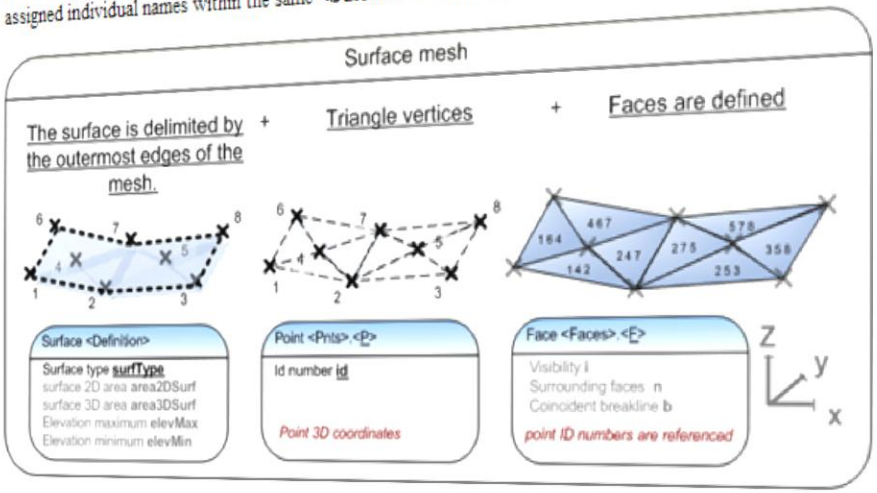
INDEX

http://cic.vtt.fi/projects/inframodel.

2.3 Triangular mesh surface

Surfaces are described as triangular meshes. Each surface is defined in terms of boundaries, exterior features and holes.

The triangular mesh is defined in three parts; first by describing the vertices of the triangular faces, then individual faces and a assigned individual names within the same <**Surface**> element. The mesh description is done by referring to the names of the



The *surface type* **surfType** is set to "TIN" when describing a triangular mesh. The presicion of the mesh model depends on t **area2DSurf**, *3D surface area* **area3DSurf** and the *elevation maximum* **elevMax** and *elevation minimum* **elevMin.**

Attributes of the <**Definition**> header:

@	**surfType**	surface type	[**TIN** | grid]
@	**area2DSurf**	2D surface area	in surface area units, e.g. [2450.510000]
@	**area3DSurf**	3D surface area	in surface area units, e.g. [2450.510000]
@	**elevMax**	elevation maximum	elevation, e.g. [64.372000]
@	**elevMin**	elevation minimum	elevation, e.g. [56.431000]

LandXML <**Definition**> *scheme documentation*

EXAMPLE <**Definition**> *short example*

selaimeesi, sam

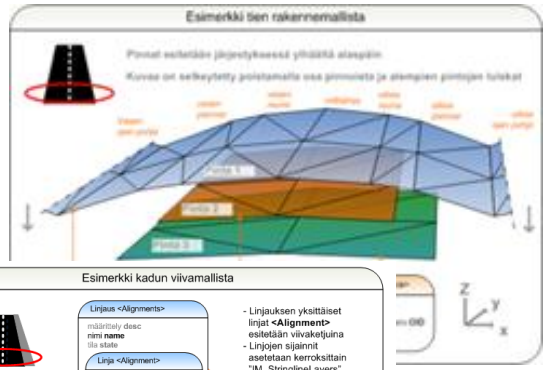
lukuohjeeseen ennen sovellusohje

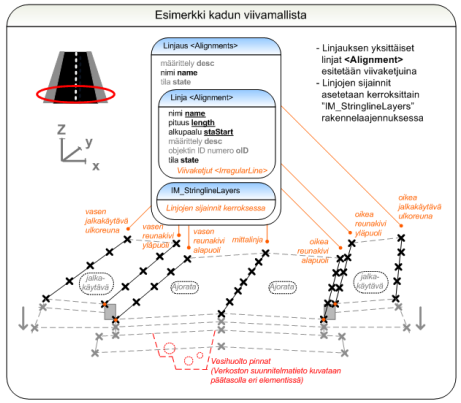
Inframodel – why extensions ?

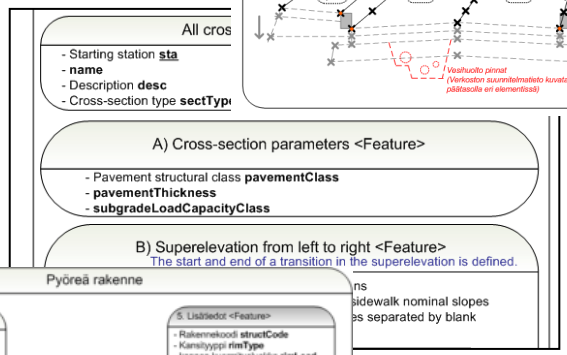
- Mechanism provide by LandXML (Feature)

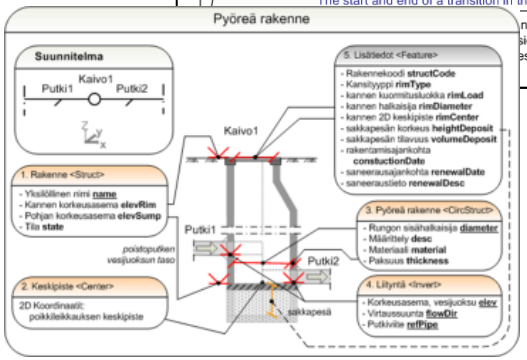
- Type coding system and type coding

- Plan data
  - Phase, subproject
- Stringline model
  - Descriping construction layers
- Crossection parameters
  - Between design - design
- Pipenetworks: struct and pipe properties





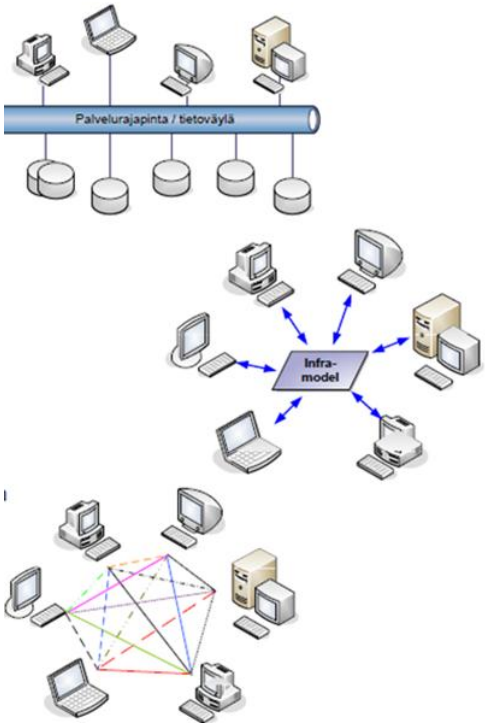


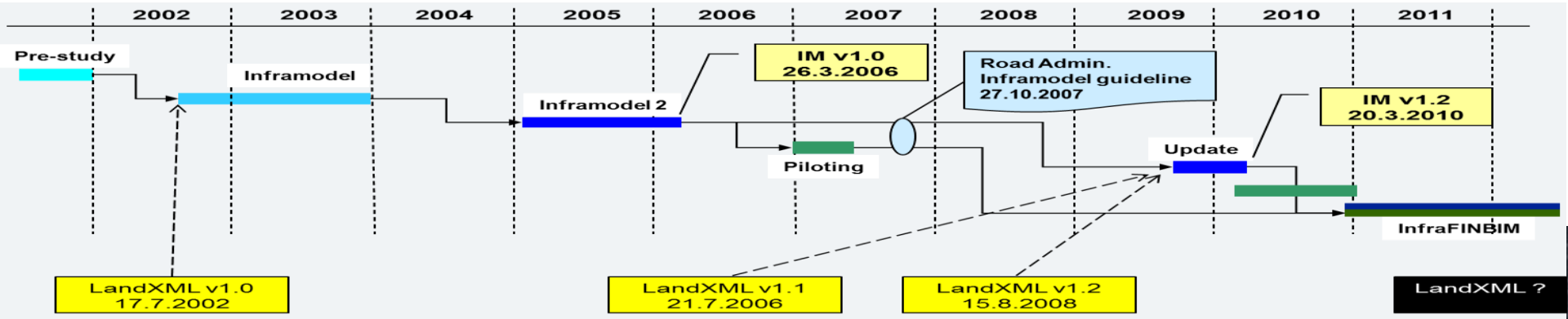


After Inframodel2

- Piloting project
- Inframodel guidelines
- Upgrade to LandXL 1.2 (documentation)

- InfraTM & InfraFINBIM
  - InfraBIM modelling guidelines
  - InfraBIM classifications and coding systems
  - New steps in BIM activation, pilot projects
  - Inframodel3 (LandXML1.2 etc.)
  - buildingSmart

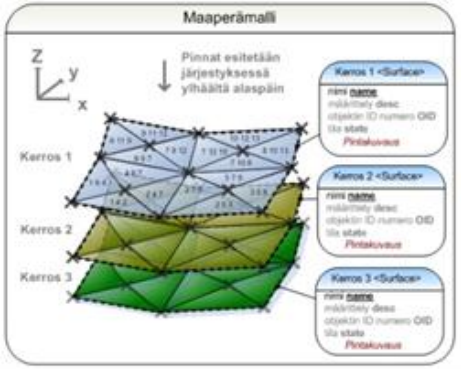


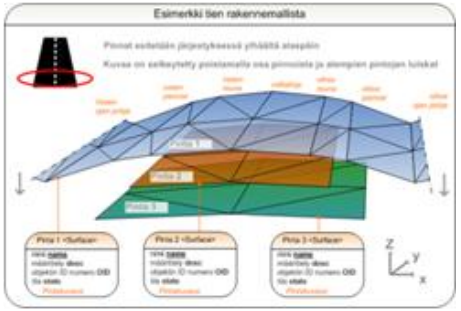


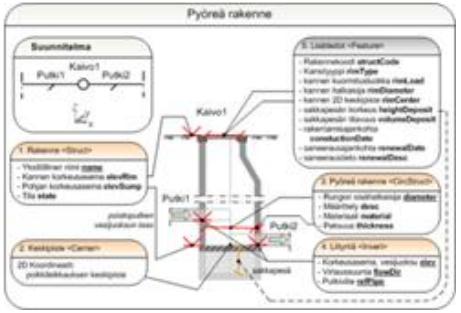
Experiencies

- Benefits
  - Metadata, pipenetworks, surfaces
  - Road model from design to construction
  - Co-operation between different organizations

- Challenges
  - Road model from design to design
  - LandXML <> Inframodel extents (international / national)
  - Active use is the best way to develop
  - Organizing the further development and maintenace
  - Need for InfraBIM guidelines / classification and coding systems







Thank You !

Comments ? Questions ?