The NIX Project

Comprehensive Storage of Neuroscience Data and Metadata

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G-Node www.g-node.org

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Outline

- Project Background
- Model features
- Examples
- Feature summary
- Successfully used
- A question for YOU

Project Background

INCF[1] Taskforce

Standards for Data Sharing

" … aims to develop generic standards and tools to facilitate the recording, sharing, and reporting of neuroscience metadata ..."

[1] https://www.incf.org/
International Neuroinformatics Coordinating Facility

Project Background

INCF Hackathon 2012, NIX started by A. Stoewer, J. Grewe

Develop a flexible data model with an associated IO API to store:

- raw scientific data
- derived data
- data about experimental context ... metadata
- data relations
  - raw ... derived
  - data ... metadata

Model features

Models and the implementing API are designed for easy IO data access

- well defined data model[1]
- flexible metadata model: odML[2]

[1] https://github.com/G-Node/nix/wiki/The-Model
[2] Grewe et al (2011) Frontiers in Neuroinformatics 5:16

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Model features

Models and the implementing API are designed for easy IO data access

- well defined data model[1]
  - store n-dimensional data
  - store points/regions of interest
  - link P/ROIs to data
  - access metadata from data
- flexible metadata model: odML[2]

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Model features

Models and the implementing API are designed for easy IO data access

- well defined data model[1]
  - store n-dimensional data
  - store points/regions of interest
  - link P/ROIs to data
  - access metadata from data
- flexible metadata model: odML[2]
  - hierarchical model grouped in Sections
  - user definable key-value pairs
  - provides optional terminology

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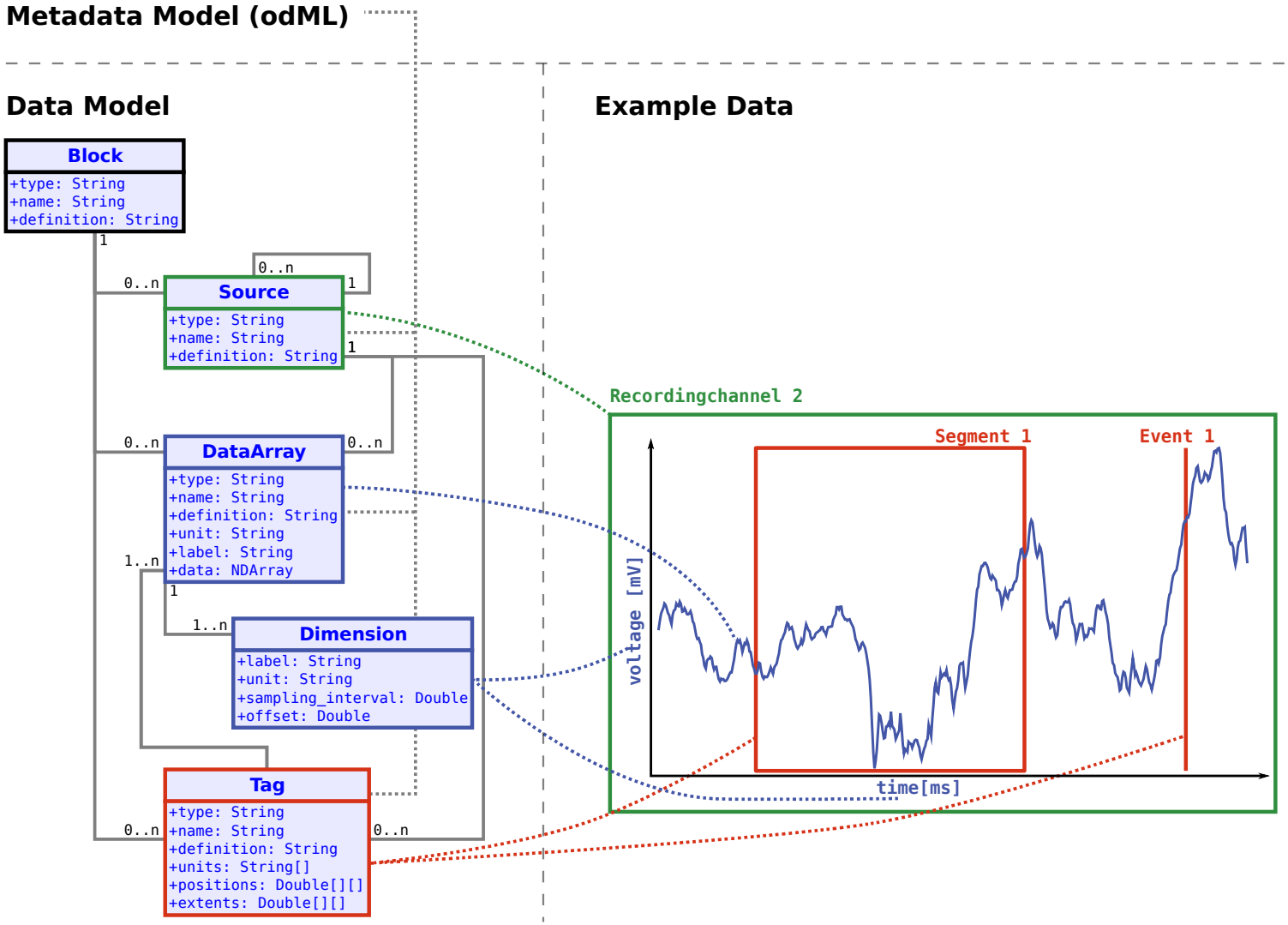
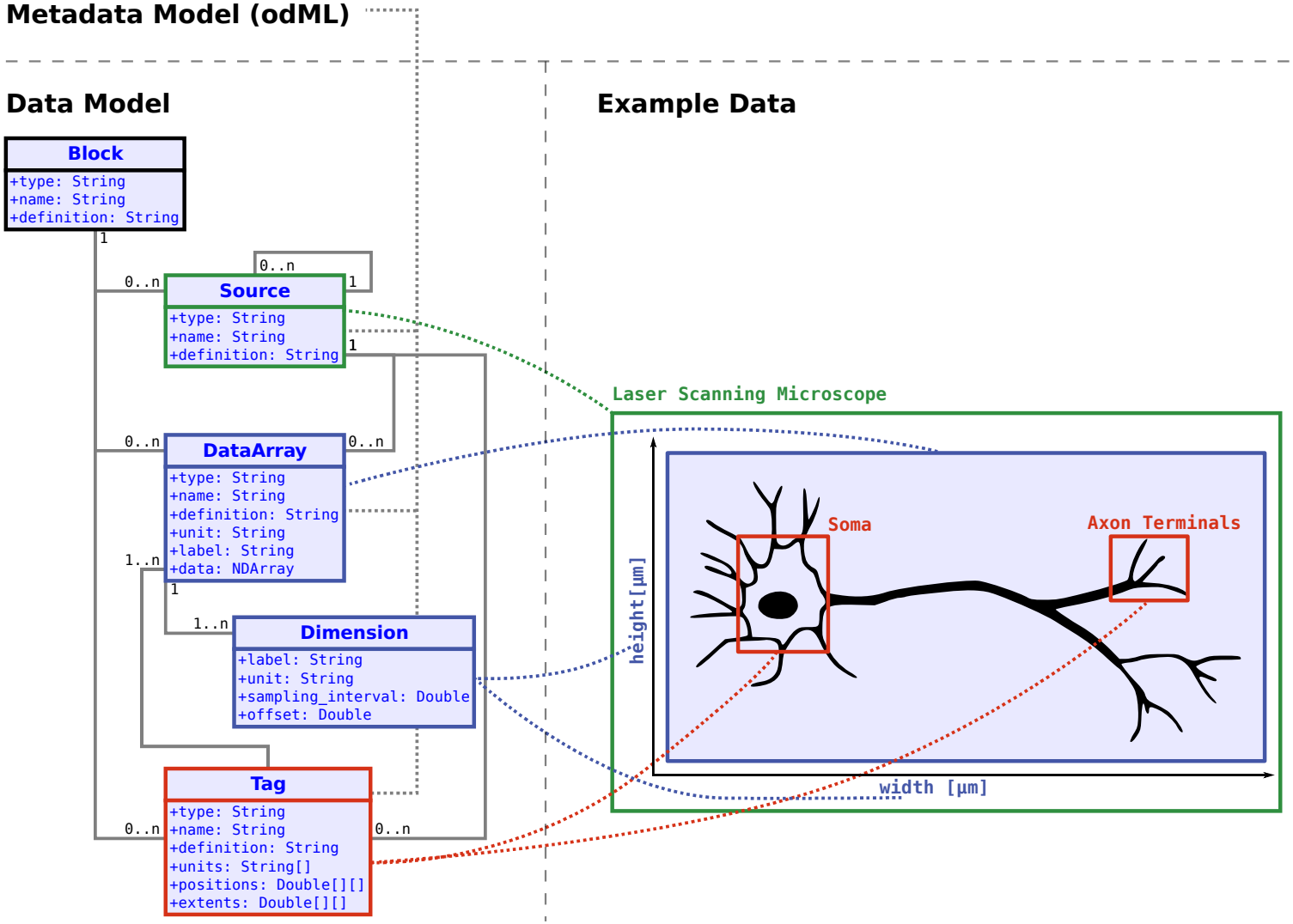
Example Analog Signal + Spikes



Example Image data



NIX main feature summary

- Store raw, derived data with their metadata in one file
- Applicable to a broad range of use cases
- Easy data access for pipelines / analysis / reports:

  C++11 API / Python / Matlab* / Java*

- Extensive documentation and tutorials (handouts)
- HDF5 as file format back-end
- Open Source (BSD-4 license)

Successfully used

- RELACS[1], Benda Lab, University Tübingen
  Ephys (sharp electrodes, extracellular), Metadata
- Benda Lab, University Tübingen
  Ephys (Field Potentials, Spike data), Video tracking
- Felmy lab, LMU Munich
  Ephys (Patch clamp), Ca-imaging
- Wachtler lab, LMU Munich
  Ephys (Electroretinogram, HD-Multi Electrode Array)
- Leibold lab, LMU Munich
  Ephys (Tetrode)

[1] http://relacs.sourceforge.net/

A question for YOU

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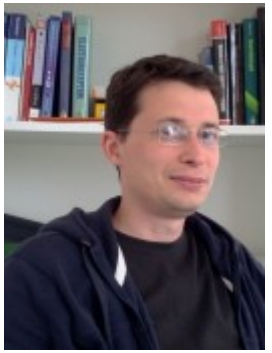
Acknowledgements



Adrian Stoewer,
Main developer,
Model design

Jan Grewe,
Main developer,
Model design

Christian Kellner,
Main developer,
API design

Thomas Wachtler,
Project lead

Andrey Sobolev
Sujith Vadakkepat

Balint Morvai
Michael Sonntag

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Bundesministerium
für Bildung
und Forschung

Handout

Contact

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Linklist

NIX API
https://github.com/G-Node/nix

NIX Documentation
https://github.com/G-Node/nix/wiki

NIX Python bindings – NixPy
https://github.com/G-Node/nixpy

NixPy tutorial
http://g-node.github.io/nixpy/tutorial.html

NIX Matlab bindings – nix-mx
https://github.com/G-Node/nix-mx

NIX Java bindings (alpha stage)
https://github.com/G-Node/nix-java

odML (open metadata markup language)
Grewe et al (2011) Frontiers in Neuroinformatics 5:16
http://www.g-node.org/projects/odml

RELACS
http://relacs.sourceforge.net

INCF Datasharing Taskforce
https://www.incf.org/activities/our-programs/datasharing

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Handout

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