Uniklinikum Würzburg

Digitization and Integration of Reference Sections for Tissue Samples

Michael Neumann

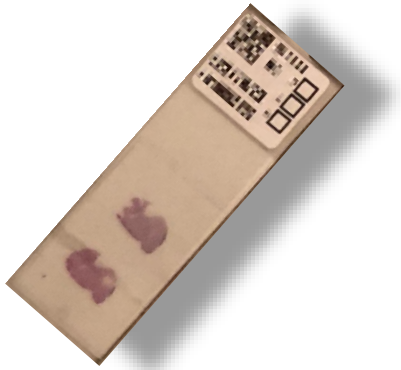
Interdisciplinary Bank of Biomaterials and Data Würzburg (ibdw)
Director: Prof. Dr. R. Jahns

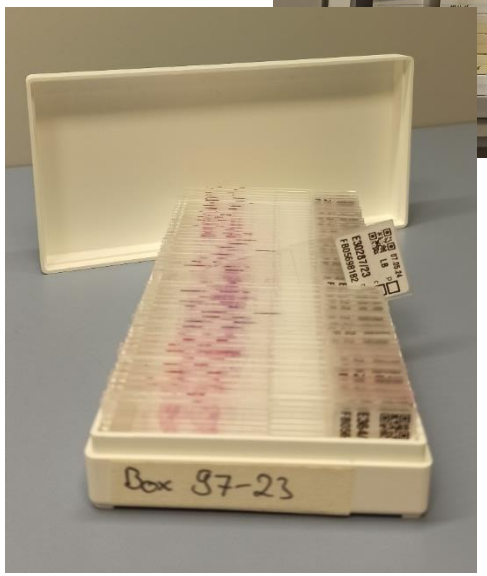
ibdw

The Aim

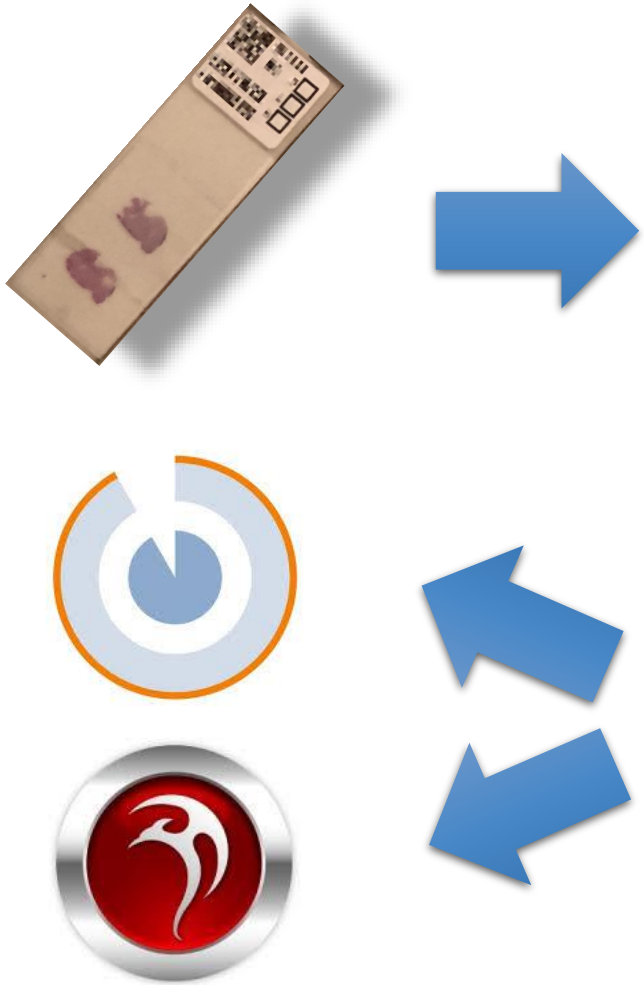
- Document tissue sample status
  - Systematic creation of reference sections
    - at sample reception
    - after each sample release
- Have digital representation of reference section
- Long-term archive image
- Integrate with sample administration (BBMS)
- Support workflow for reference section evaluation

The Challenge

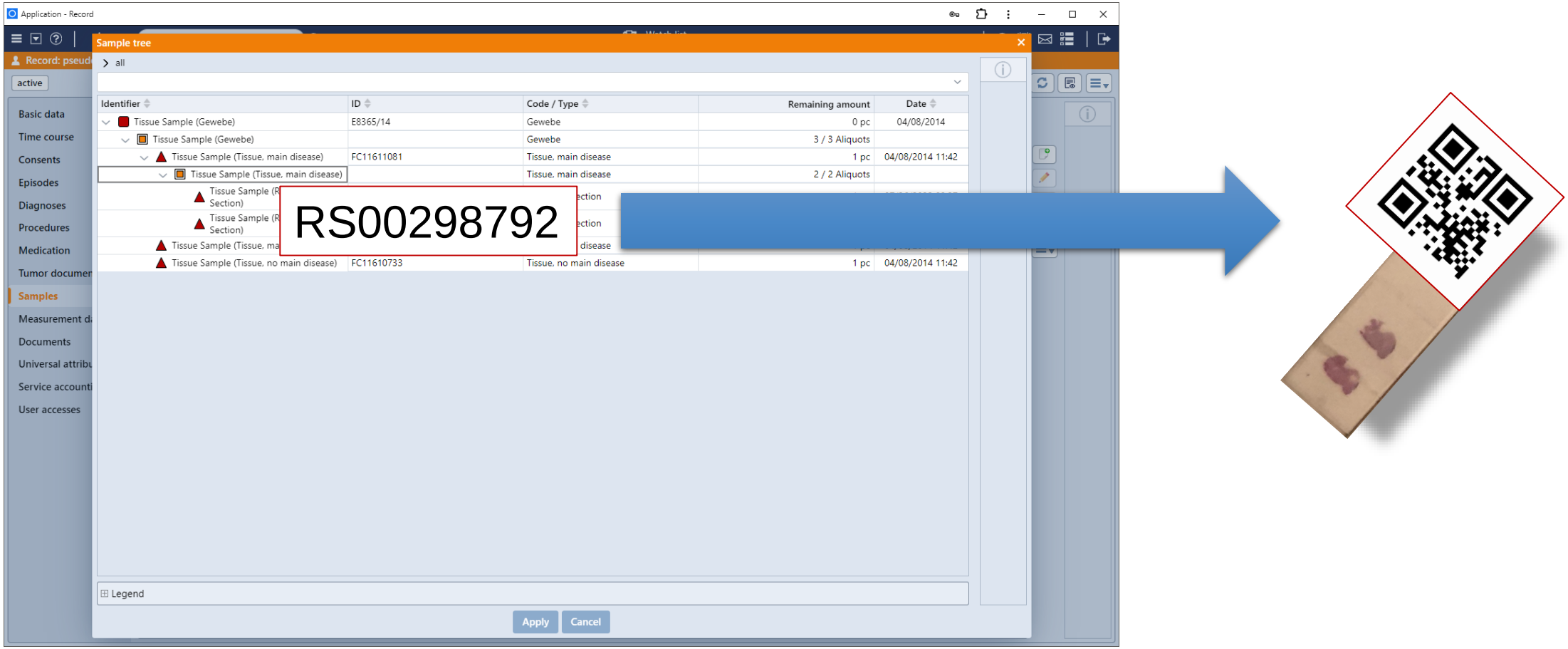




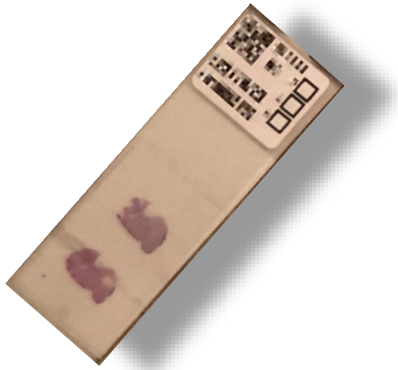
The Challenge

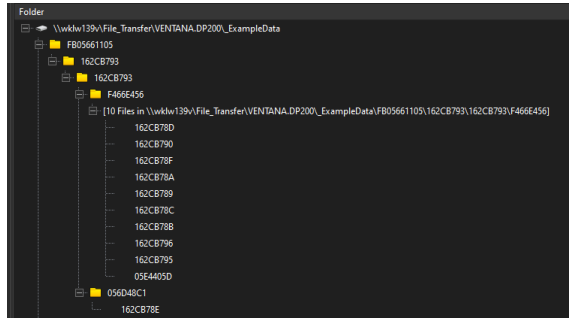


The Solution

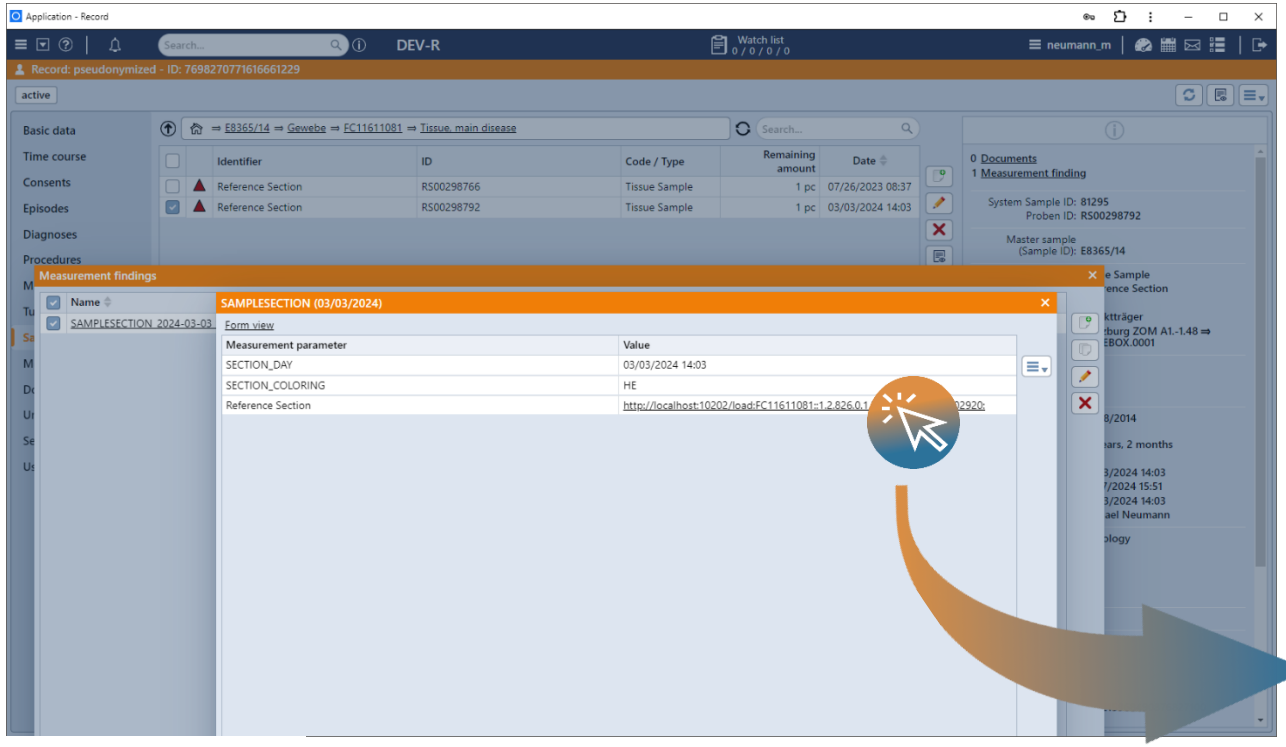


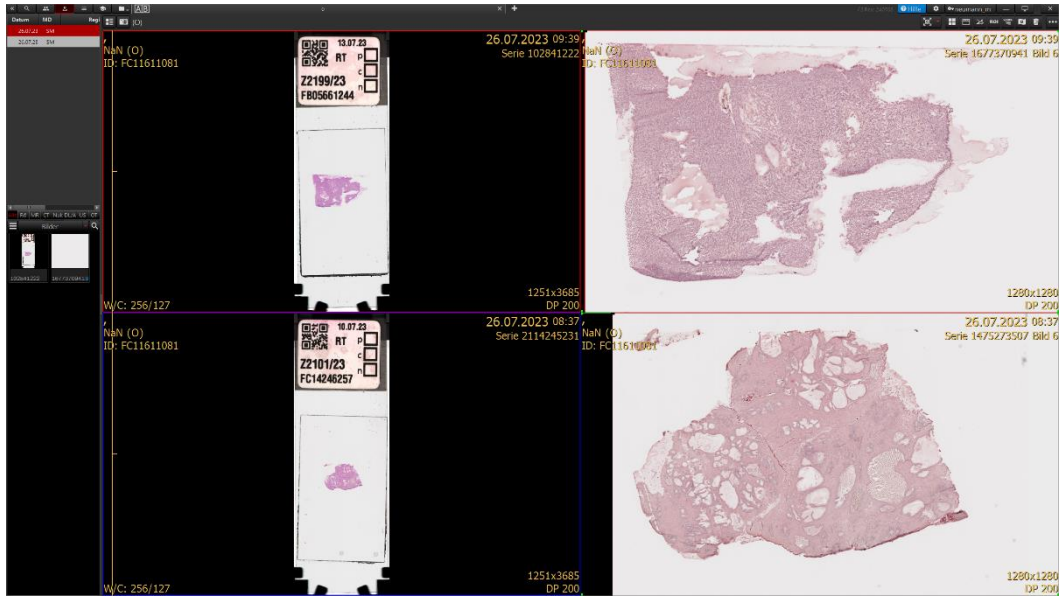
Automated Processing



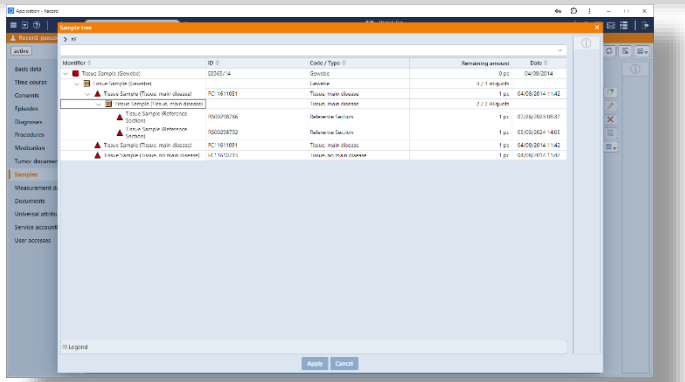


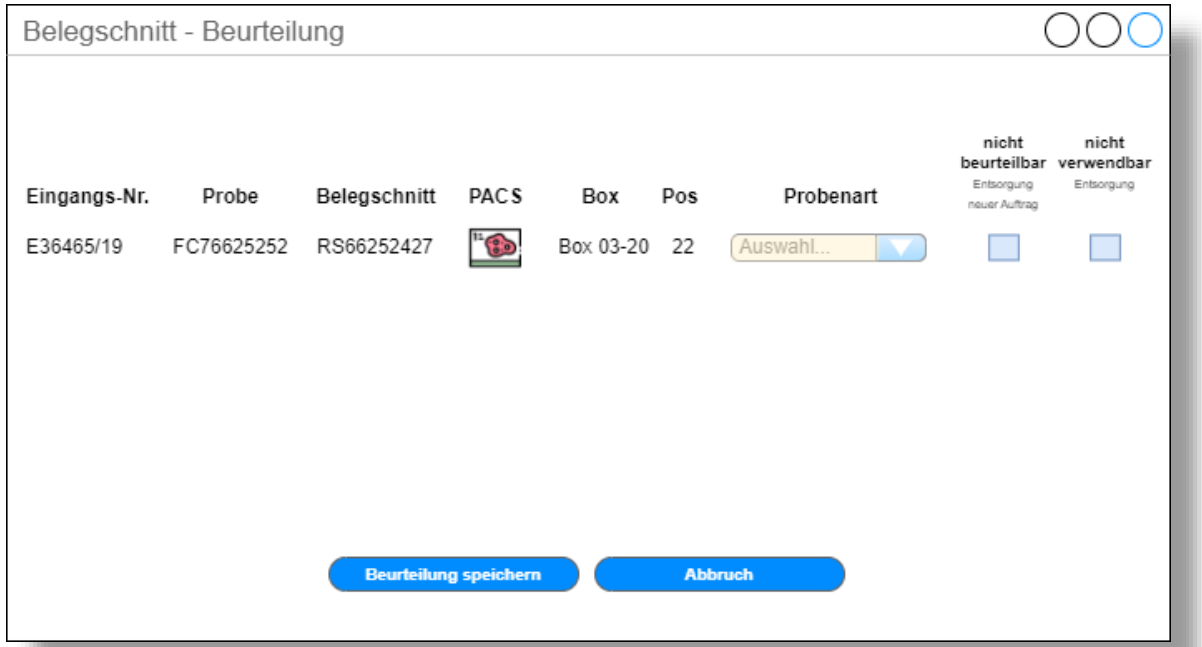
Result


Application - Record
DEV-R
Watch list
0 / 0 / 0 / 0
neumann_m
Record: pseudonymized - ID: 7698270771616661229
active
Basic data
Time course
Consents
Episodes
Diagnoses
Procedures
E8365/14 ⇒ Gewebe ⇒ FC11611081 ⇒ Tissue, main disease
Identifier
ID
Code / Type
Remaining amount
Date
Reference Section
RS00298766
Tissue Sample
1 pc
07/26/2023 08:37
Reference Section
RS00298792
Tissue Sample
1 pc
03/03/2024 14:03
0 Documents
1 Measurement finding
System Sample ID: 81295
Proben ID: RS00298792
Master sample
(Sample ID): E8365/14
Measurement findings
Name
SAMPLESECTION_2024-03-03
SAMPLESECTION (03/03/2024)
Form view
Measurement parameter
Value
SECTION_DAY
03/03/2024 14:03
SECTION_COLORING
HE
Reference Section


NaN (O)
ID: FC11611081
Z2199/23
FB05661244
26.07.2023 09:39
Serie 102841222
W/C: 256/127
1251x3685
DP 200
Z2101/23
FC14246257
26.07.2023 08:37
Serie 2114245231

Next Step – CentraXX Workflow



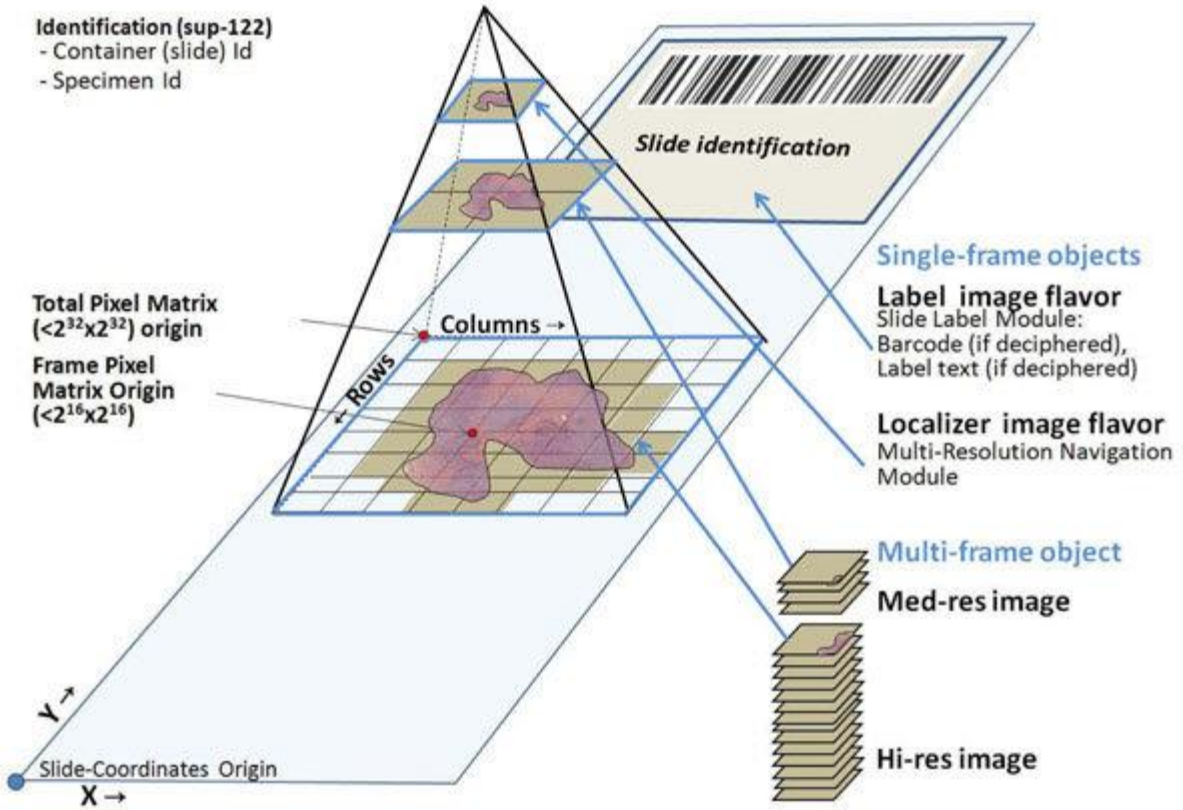


Uniklinikum Würzburg

- Good to know…

DICOM Structure of a Whole Slide Image

- Pyramid of layers
  - resolution layers
  - zoom level
- Tiled Images at every layer
- 'Conventional' DICOM Viewer display tiled images sequentially
- 'WSI'-capable DICOM Viewer QuPath
  https://qupath.github.io/



Daniel et al. (2011). Recent advances in standards for Collaborative Digital Anatomic Pathology. Diagnostic pathology. 6 Suppl 1. S17. 10.1186/1746-1596-6-S1-S17.

Data Generated

Uniklinikum Würzburg

- Whole Slide Imaging
  - 6.500 Tissue Samples
  - ca. 500 MB per Reference Section Scan

=> 3,25 TB

- Radiology
  - 90.000 CT / MR Studies per year
  - ca. 700 MB (CT) / 200 MB (MR) per Study

=> 35 – 40 TB

Conclusion

Uniklinikum Würzburg

- Robust, convenient, and safe way to
  - digitize, archive, and link reference sections to corresponding tissue samples
- Remaining risk
  - manual labelling of section slides

- Documented status of tissue samples
- Digitized reference sections
- Long term archival of digitized reference sections
- Support of (digitized) reference section evaluation

Uniklinikum Würzburg

- Thank you for your attention