Hes·so VALAIS WALLIS
School of Management & Tourism

10 mins about

PROCESS

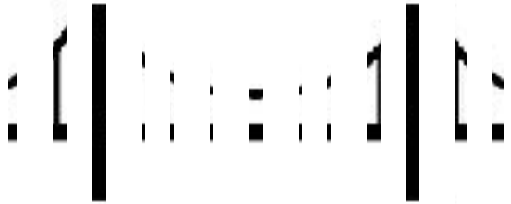
PROviding Computing solutions for ExaScale challengeS

medGIFT

PROCESS aims at creating a shared architectural framework to provide a ***user-friendly*** *service platform for exascale computation and very large datasets analysis (PB).*

Motivation: a mid-level infrastructure is missing

exascale tools



service oriented computing

Scientific communities face:

- prevented data relocation due to dataset sizes
- need for tailored **“expert only”** solutions to access HPC

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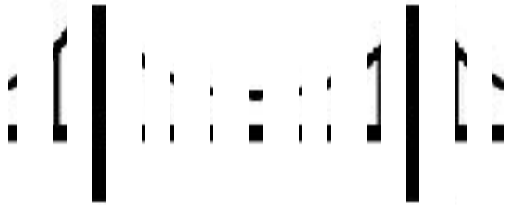

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SUPERMUC JOB COMMAND

```
#!/bin/bash
#
#@ energy_policy_tag = my_tag
#
#@ job_type = MPICH
#@ class = large
#@ node = 1000 #@ island_count=2,4
#@ total_tasks=16000
### other example
##@ tasks_per_node = 16
##@ island_count = 1,18
#@ wall_clock_limit = 1:20:30
#@ job_name = mytest
#@ network.MPI = sn_all,not_shared,us
#@ initialdir = $(home)/mydir
#@ output = job$(jobid).out
#@ error = job$(jobid).err
#@ notification=always
#@ notify_user=erika.mustermann@xyz.de
#@ queue
. /etc/profile
. /etc/profile.d/modules.sh
#setup of environment
module unload mpi.ibm
module load mpi.intel
36Best Practice Guide SuperMUC v1.0
export OMP_NUM_THREADS=2
#optional:
#module load mpi_pinning/hybrid_blocked
mpiexec -n 16000 ./myprog.exe
```

Objective: building a bridge

exascale tools

service oriented computing

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Such infrastructure will:

- absorb the **needs** in terms of **data** and **computing** intensive science
- soften the learning curve for scientific communities using the service

Service prototypes: representing user needs

5 different use cases:

#1- Exascale learning of medical image data

#2 - Square Kilometre Array SKA

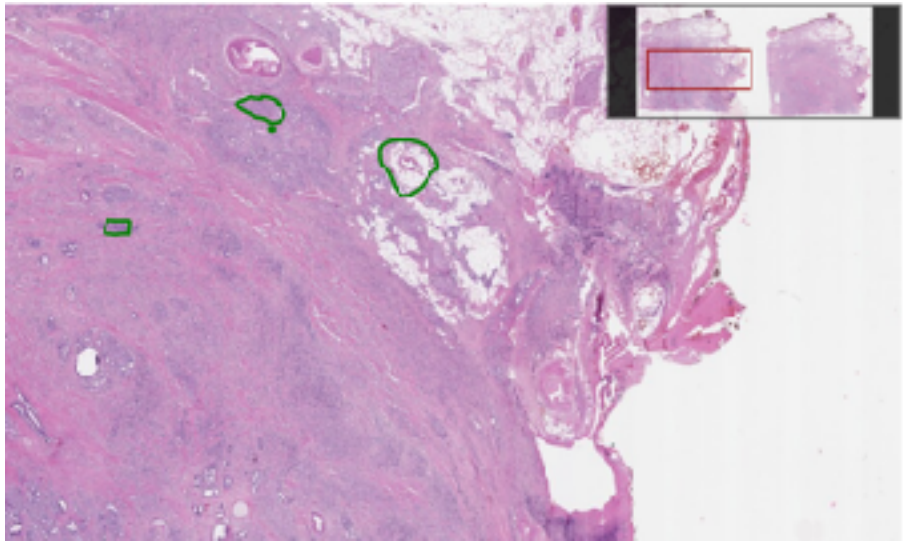
#3 - Supporting innovation based on global disaster risk data

#4 - Ancillary pricing for airline revenue management

#5 - Agro-Copernicus

Medical Imaging

#1 Exascale learning on medical images



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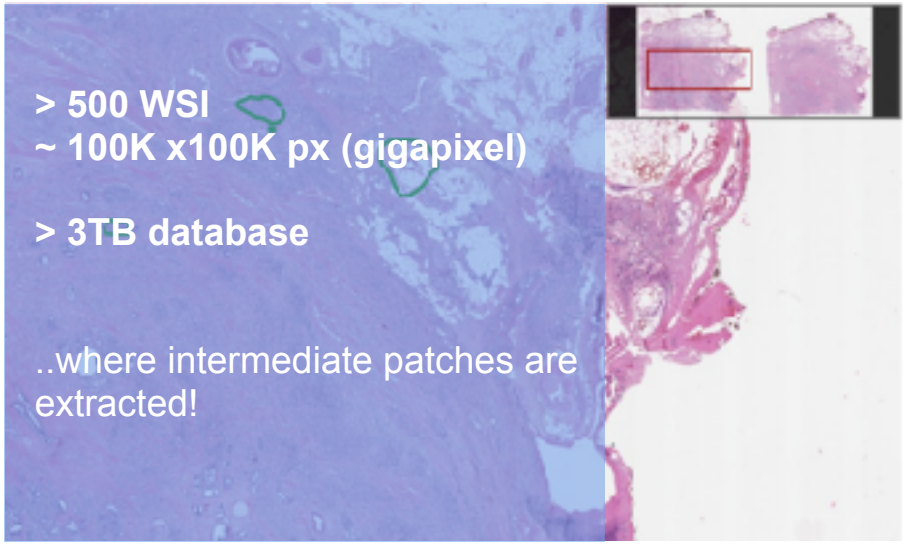

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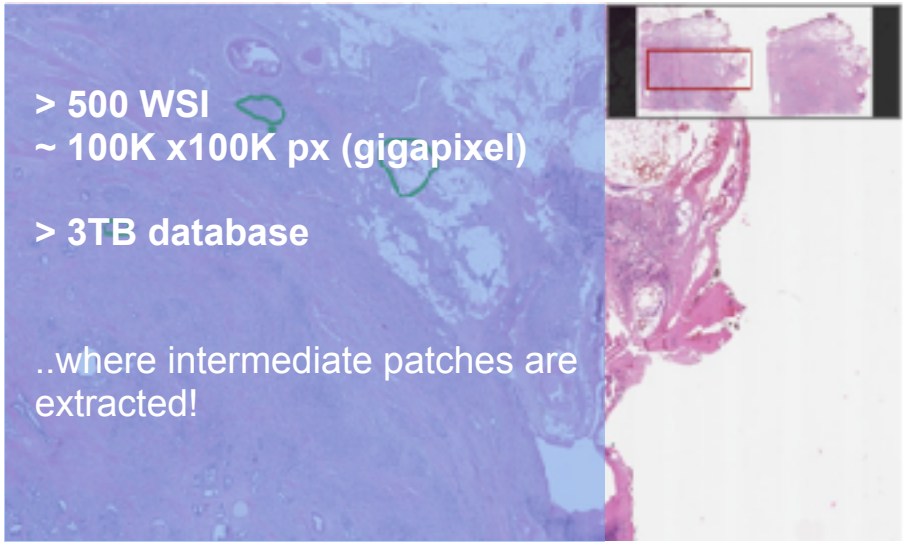

Possible applications:

- content-based search

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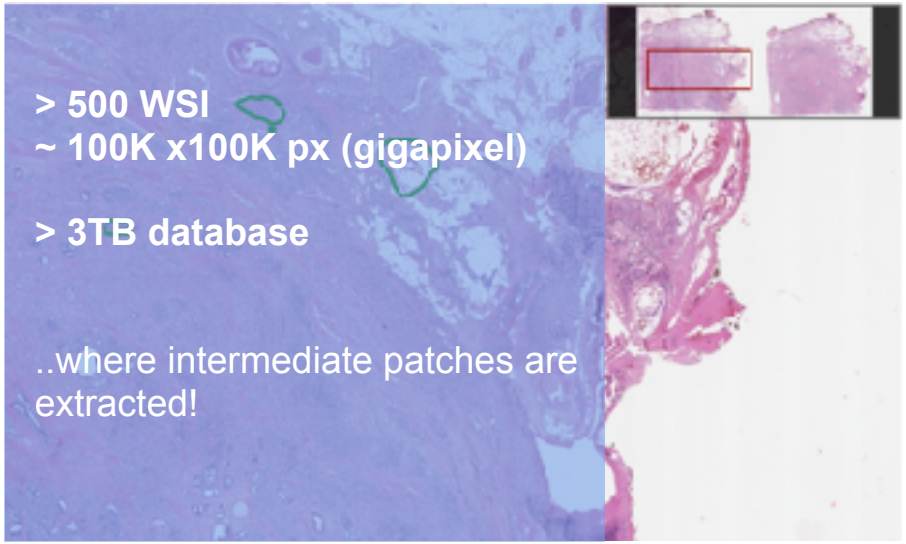

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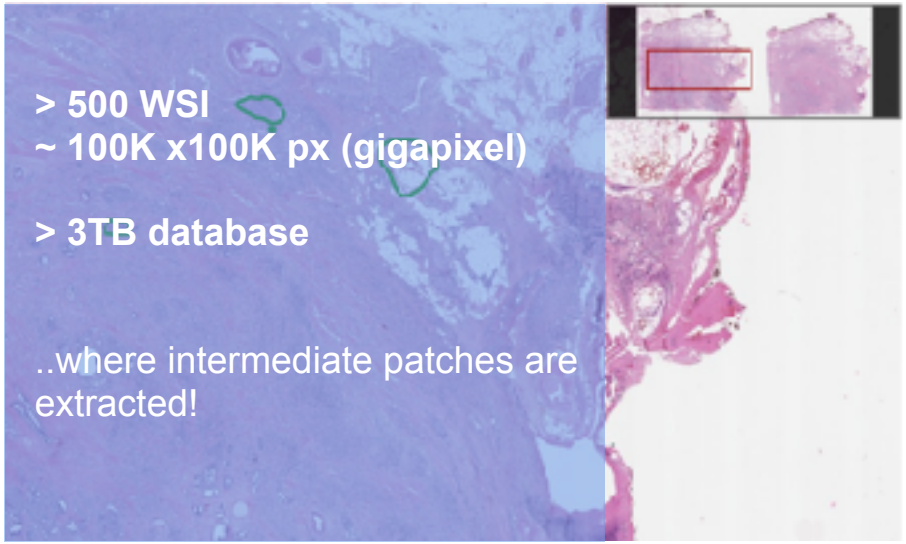

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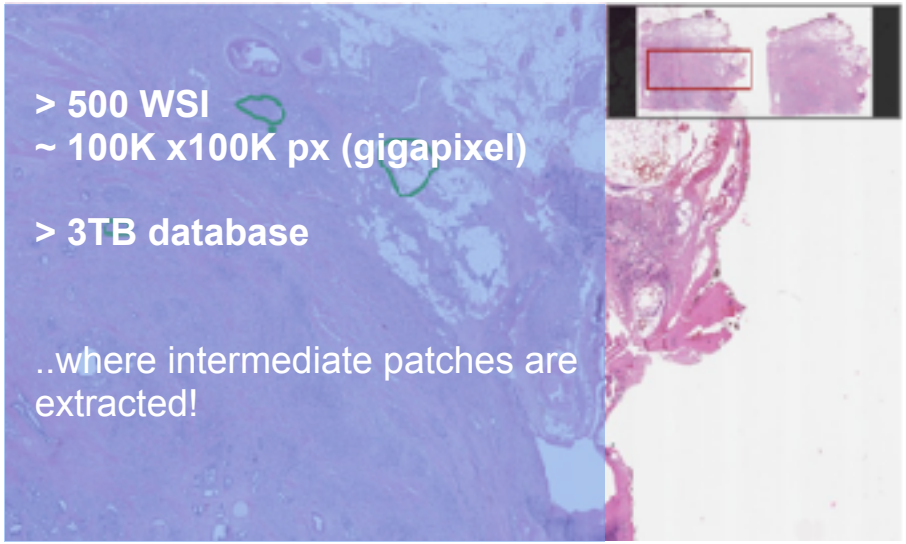

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Brainstorming ....

other suggestions?

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0. development in Sierre, port to LRZ

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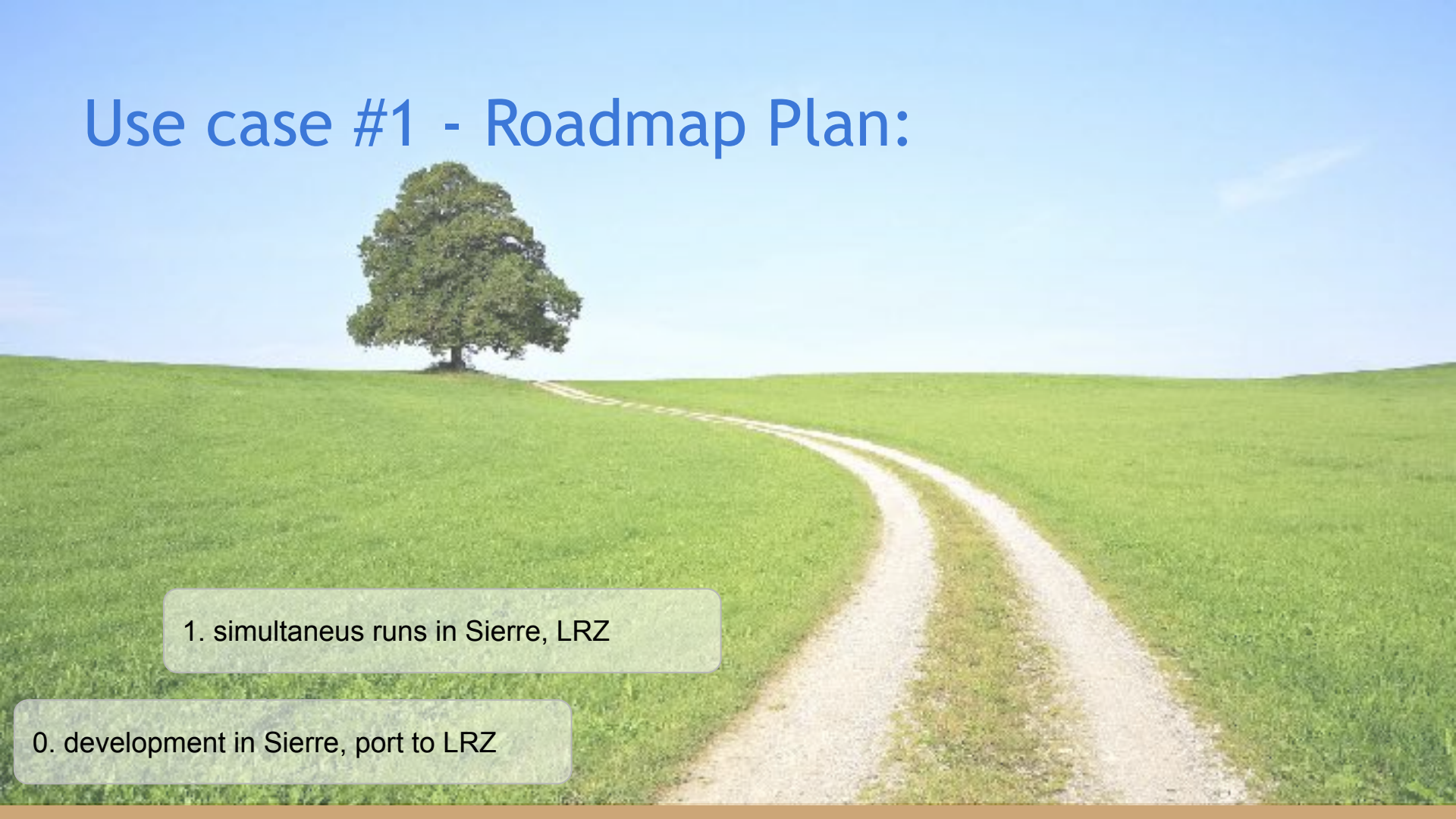

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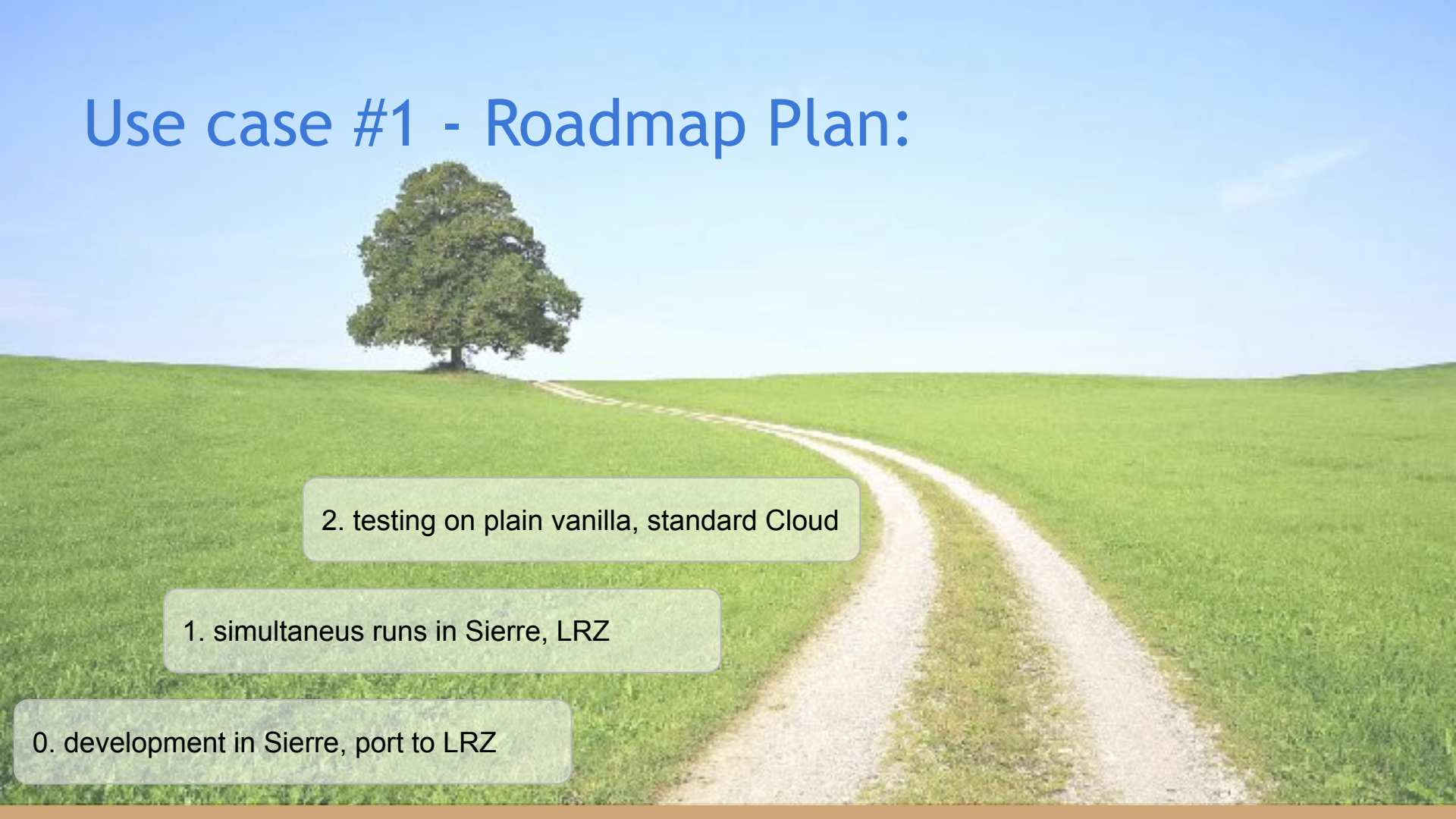

2. testing on plain vanilla, standard Cloud

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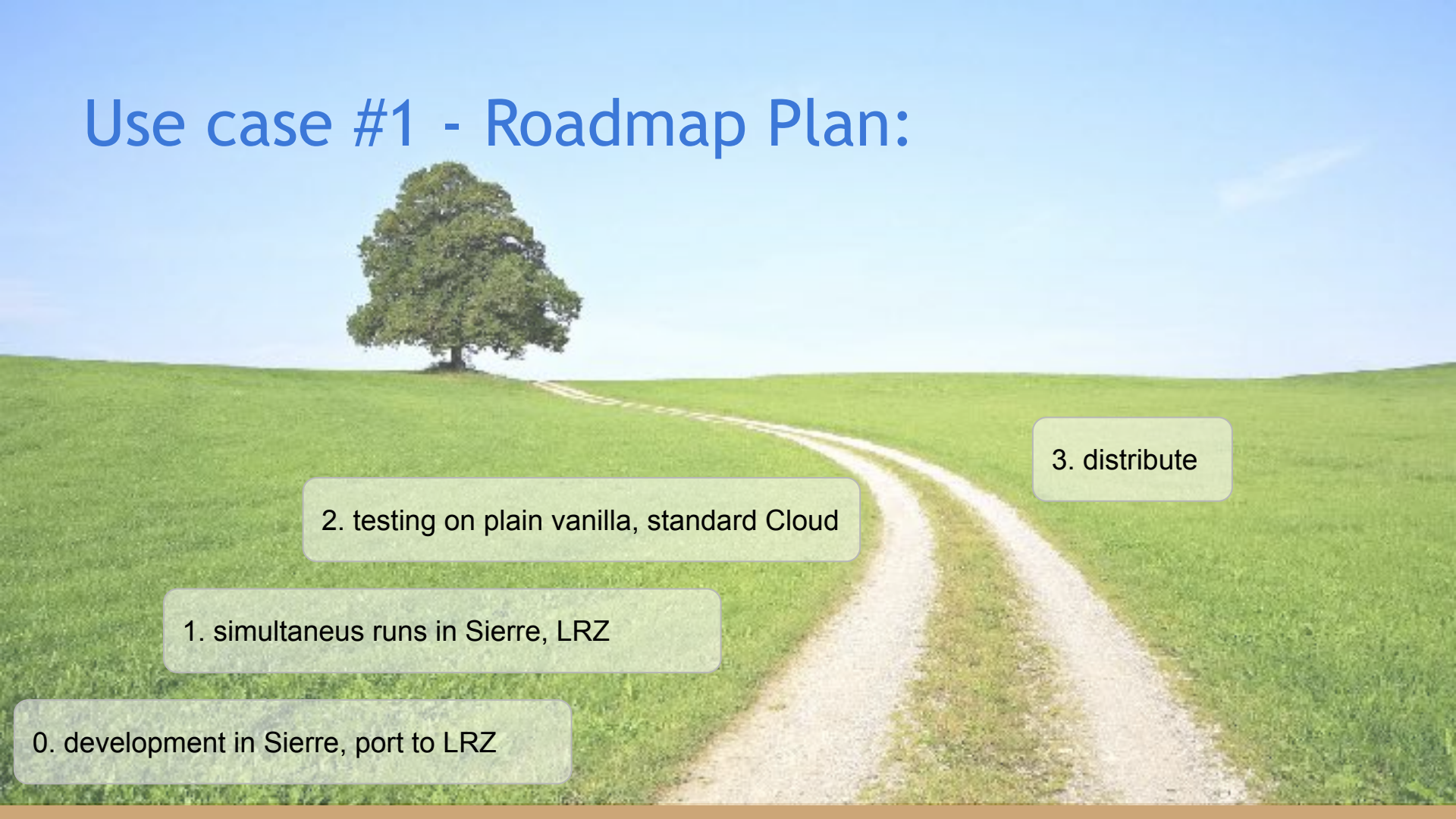

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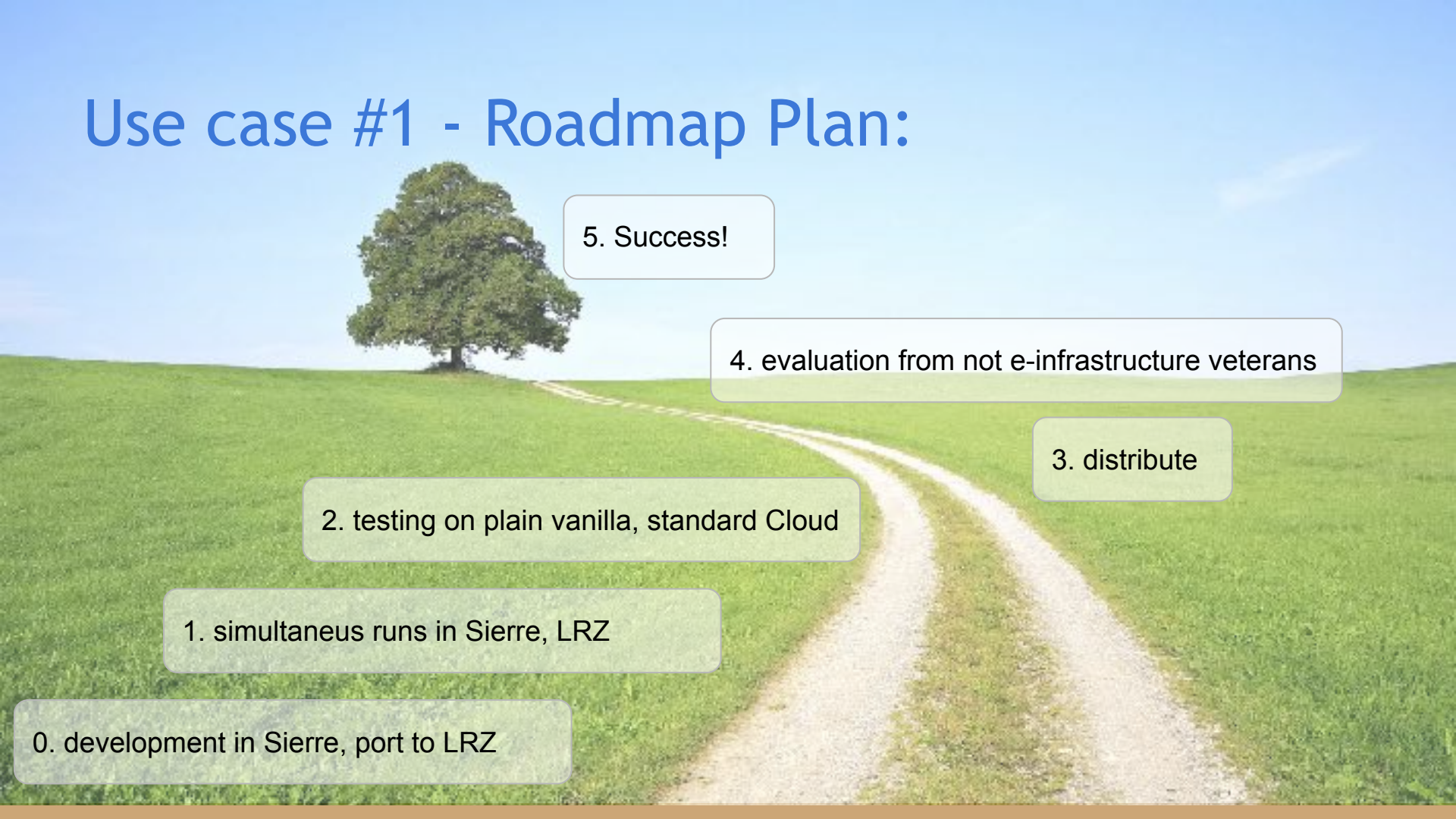

Use case #1 - Tech details:

Starting dataset: **Camelyon 17 (testing still in download,** 500 WSI, slide, patient and lesion annotations)**,**
Camelyon 16 (400 WSI, lesion annotations)
Further datasets: Pubmed, TUPAC16, TCGA, SKIPOGH

Patch-extraction module based on the Camelyon17 challenge best results (Lunit).
Intermediate computation results storage in hierarchical format h5ds
Basic set of Deep Learning Models in development
Monitoring of validation accuracy and loss during training

Official Data infrastructure: tbd (meeting in Amsterdam early February)
Key Performance Indicators: Data volume, performance increase

Tools used so far: Python 2.7, Tensorflow 1.4.0, Keras 2.1.2
Computing infrastructure: CPU for patch extraction, GPU #2 on desuto for network training

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Questions?

Thanks!