

IT Forum - Feb. 3rd, 2015

Storage Management at EPFL

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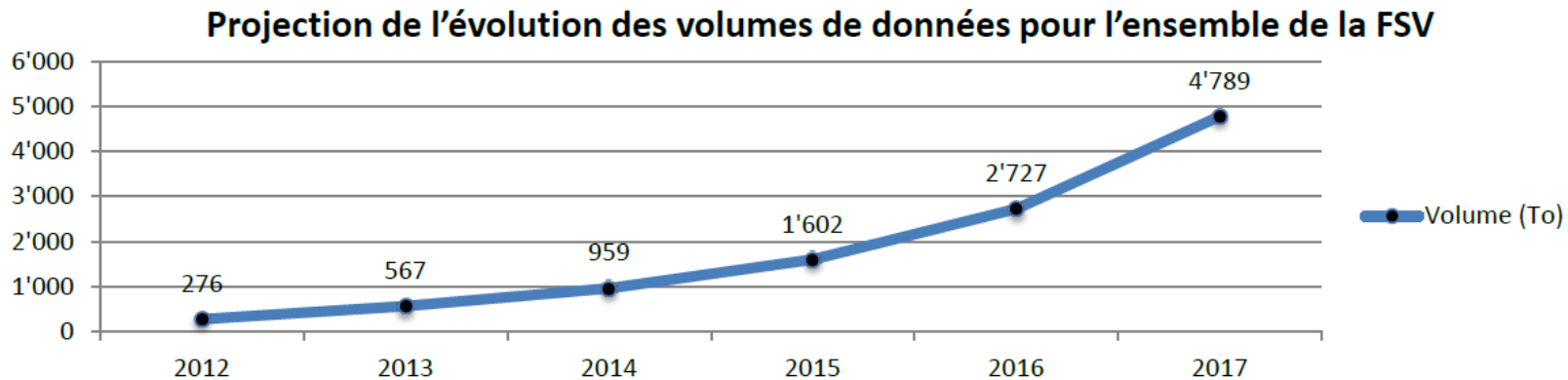
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Outline

- Background
- Objectives
- Approach
- Findings
- Proposed services
- Transition to new services

Background

- NAS-2 end-of-life Q4-2014
 - Needs replacement
- Explosion of produced data
 - More space needed, increasing costs
- New needs appeared
 - LIMS, Research data archival, etc



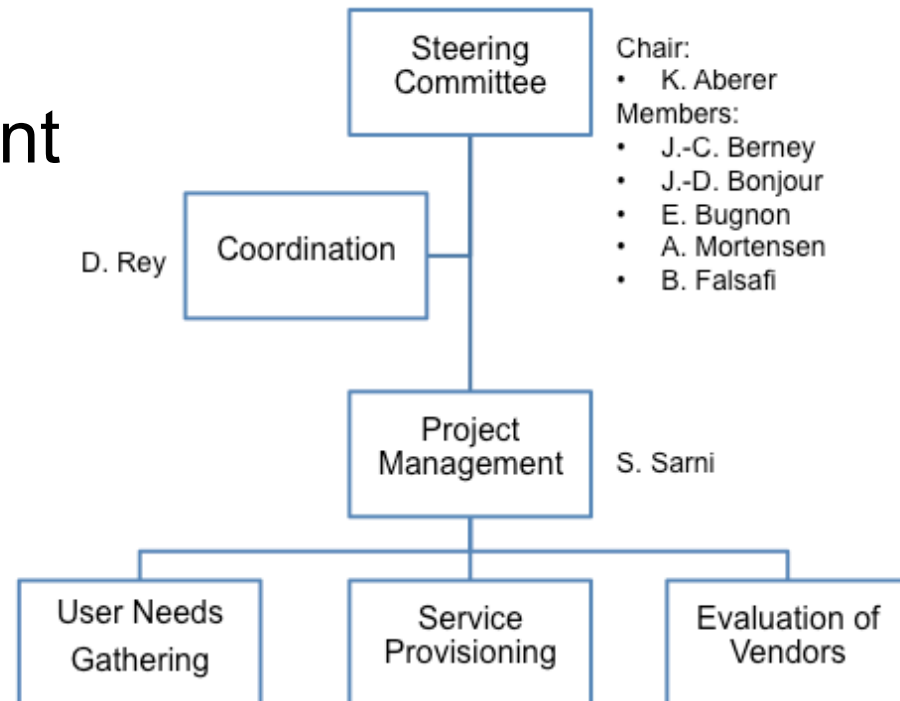
Source : Gael Anex, "Présentation Projet Données Recherche", COSIB, 20.03.2013

Objectives

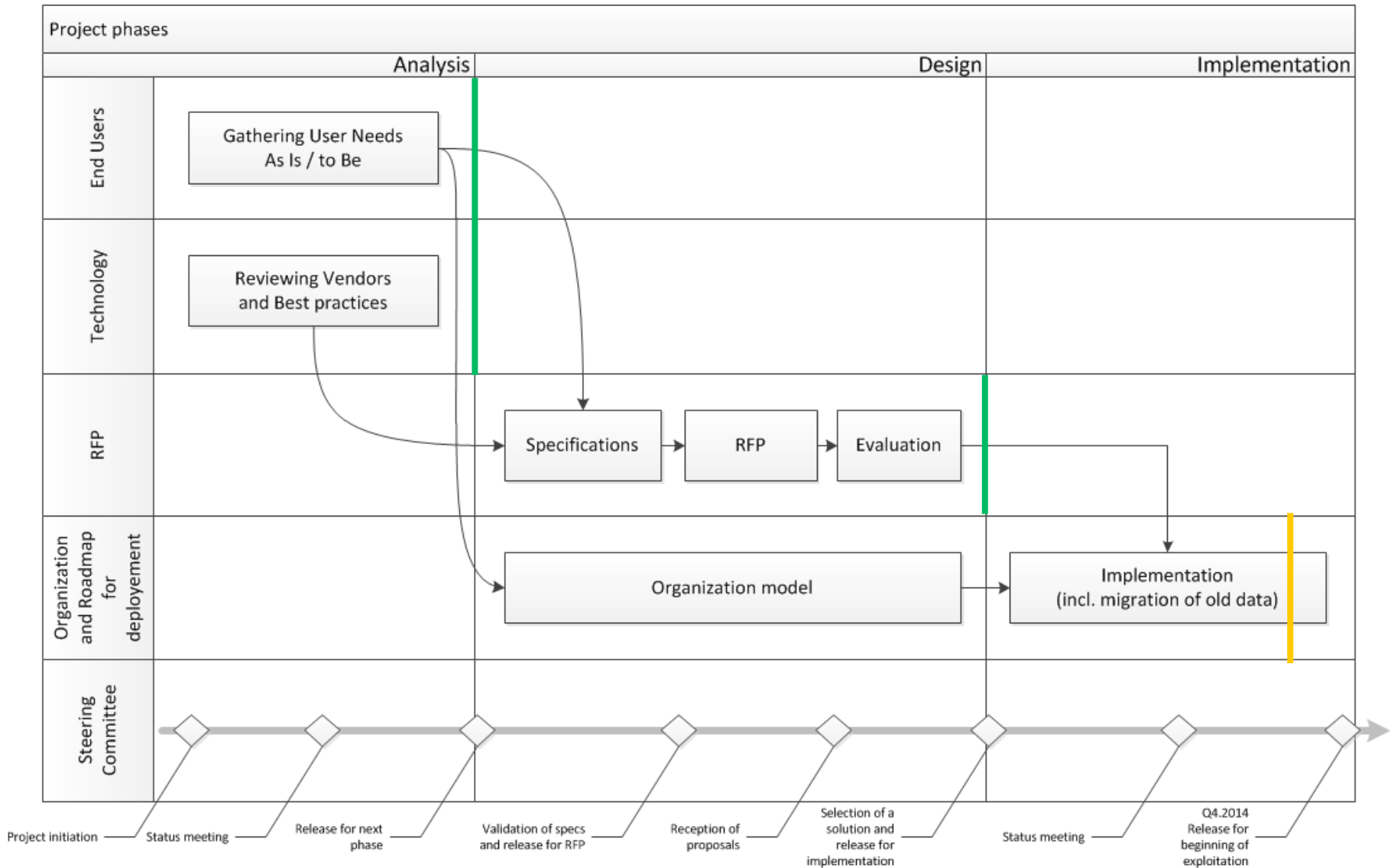
- Offer a shared storage service for EPFL users at an affordable cost, which considers current and foreseen needs
- Develop an organizational and a financing model for the service

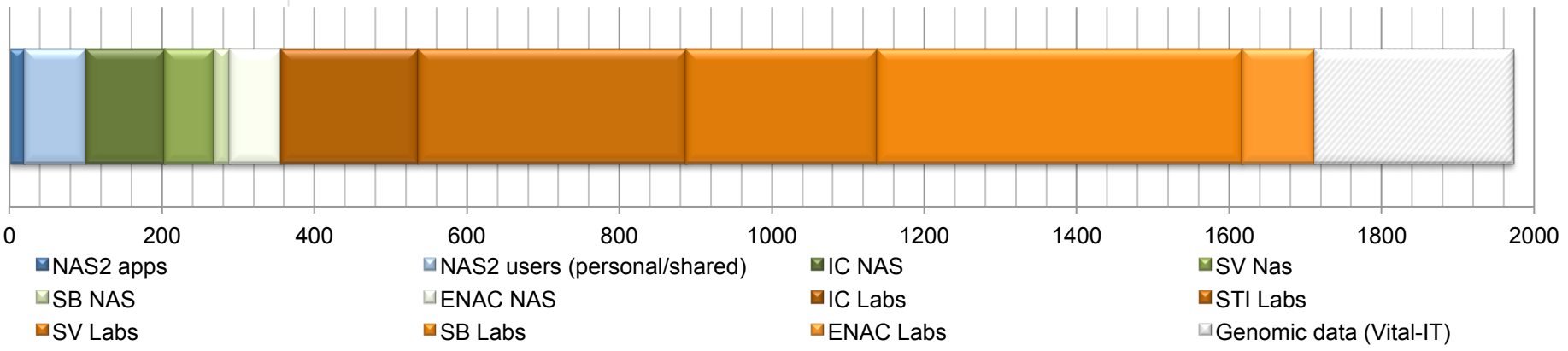
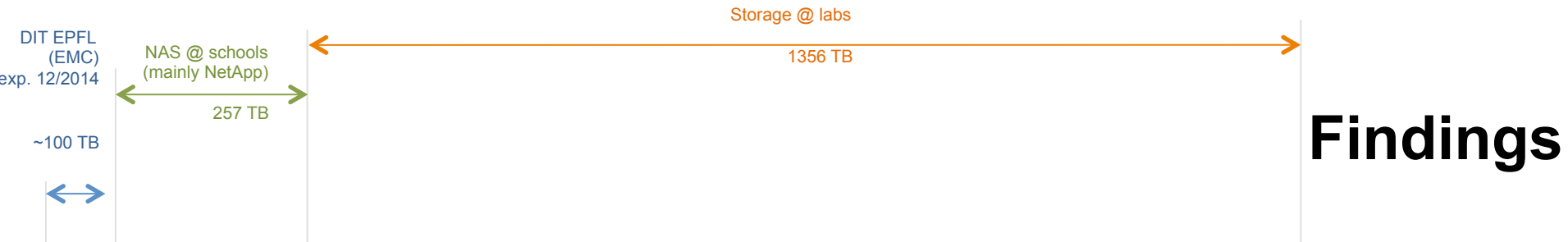
Approach

- Gathering user needs
- Reviewing vendors and best practices
- Procurement of solution (RFP)
- Organizing the service
- Migration and deployment



Timeline

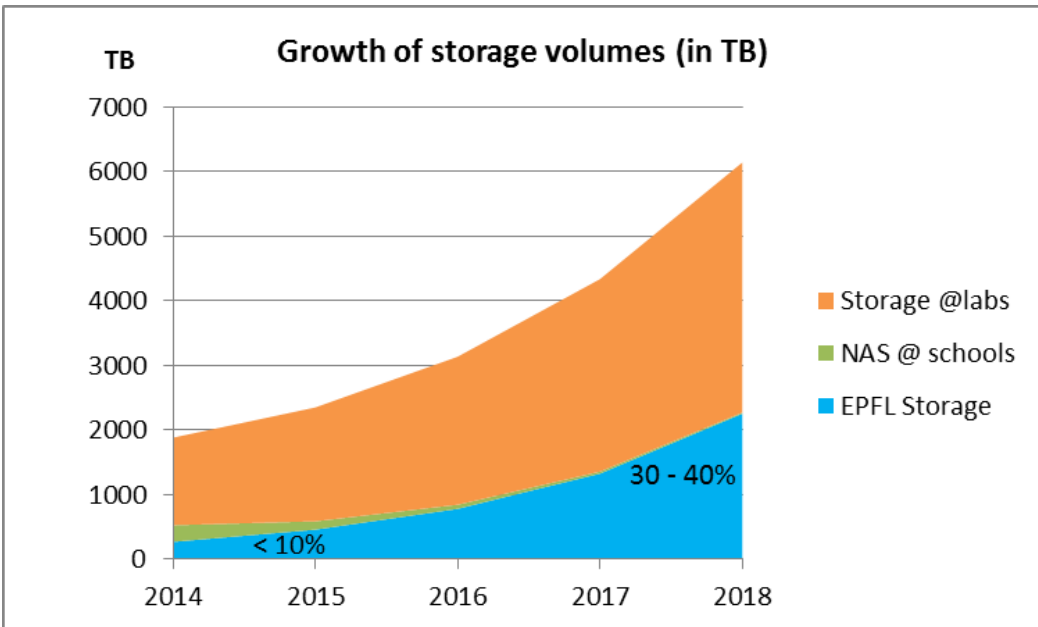
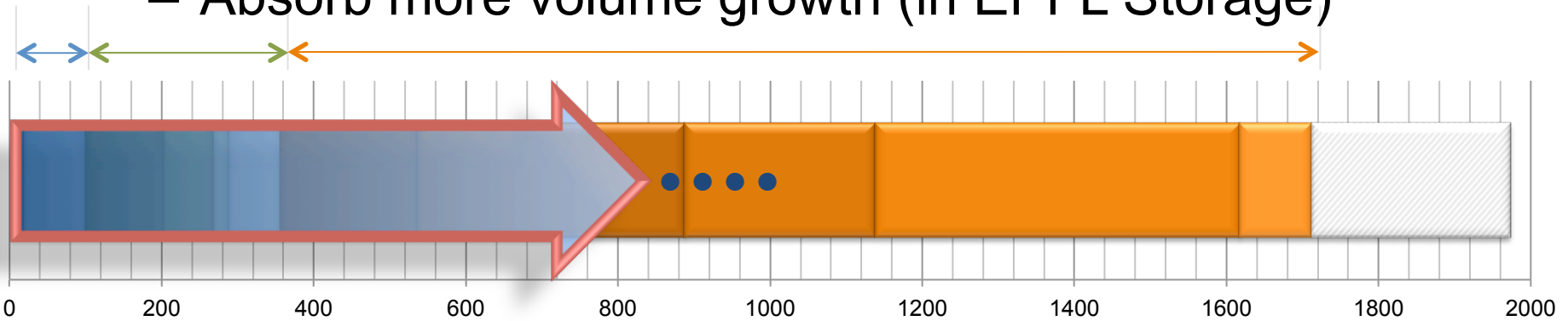




	NAS EPFL	NAS schools	Storage @ labs
Backup / snapshots	●	●	○
Mirroring	●	-	-
IO performance	+++	+++	○
Homogeneity	●	●	-
Redundancy (e.g. RAID)	●	●	○
Shareability	●	●	○
External access	-	-	-
Cost	\$\$\$\$	\$\$	\$
Physical security (data center)	●	●	○
Access control	●	●	○

Storage: target

- Bring data to higher quality storage
 - Absorb more volume growth (in EPFL Storage)

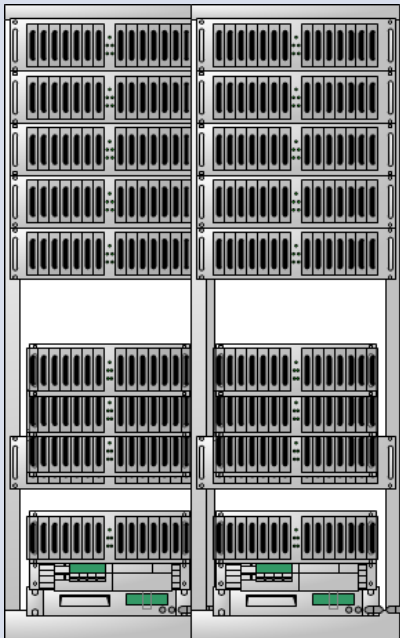


- Assumption
 - Yearly net growths
 - Storage @labs +30%
 - NAS @ schools -50%
 - EPFL Storage +70%

Acquired Infrastructure (RFP)

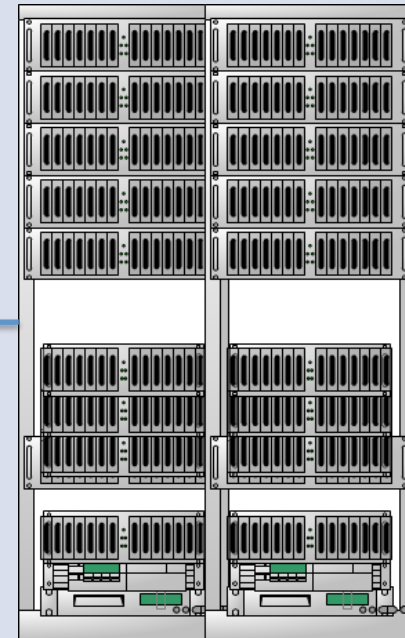
MA

NetApp FAS 8040 HA Pair
Flash cache
9 shelves (DS4246-24x4TB)
usable ~600 TB (864 TB raw)



INJ

NetApp FAS 8040 HA Pair
Flash cache
9 shelves (DS4246-24x4TB)
usable ~600 TB (864 TB raw)



Async replication =>



*Additional FAS 2254 (2x) acquired under same RFP, used for applications

Proposed storage services methodology

- In addition to user requirements
- Performed extensive modeling / simulations
 - Growth, TCO, cost splitting, risk exposure, ...
 - Evaluated different hypotheses, scenarios and models
- Aim: reduce costs and limit financial risks (subsidies)
- Assessed technical feasibility

Proposed storage services

Features	Collaborative Storage	Home Directories	Online Archive	Raw Storage	SwitchDrive	Switch FileSender
Replication	●	●	●	-	-	N/A
Snapshots	●	●	limited	-	-	N/A
Performance	++++	++++	++	++	+	N/A
Protocols	CIFS, NFS	CIFS, NFS, WebDAV	CIFS, NFS	CIFS, NFS	HTTP, Client, WebDAV	HTTP
Offered quota	1 TB per lab*	20 GB staff 5 GB students 5 GB hosts	-	-	25 GB per user	N/A
Price (CHF/TB/year)	300.-	Free	200.-	100.-	Free	Free
Typical use	Collaboration, Active projects	Home directories	Rarely modified data Reference data	Scratch Backup target	Sync and share across devices	Send large files

 Operated by EPFL
 Operated by Switch

* Other units can get up to 1TB with a cap at 20 TB

Proposed storage services

Service	Disks	Performance	Snapshots	Replication	Backup	Price CHF / TB.yr
Tier 1	FC 15K	High	●	●	●	4'178
Tier 2	FC 10K	High	●		●	2'773
Tier 3	FC 10K	High				764
Tier 4	SATA 5K	Low			●	2271
Tier 5	SATA 5K	Low				294

NAS 2

Flat rates for 2013-2014

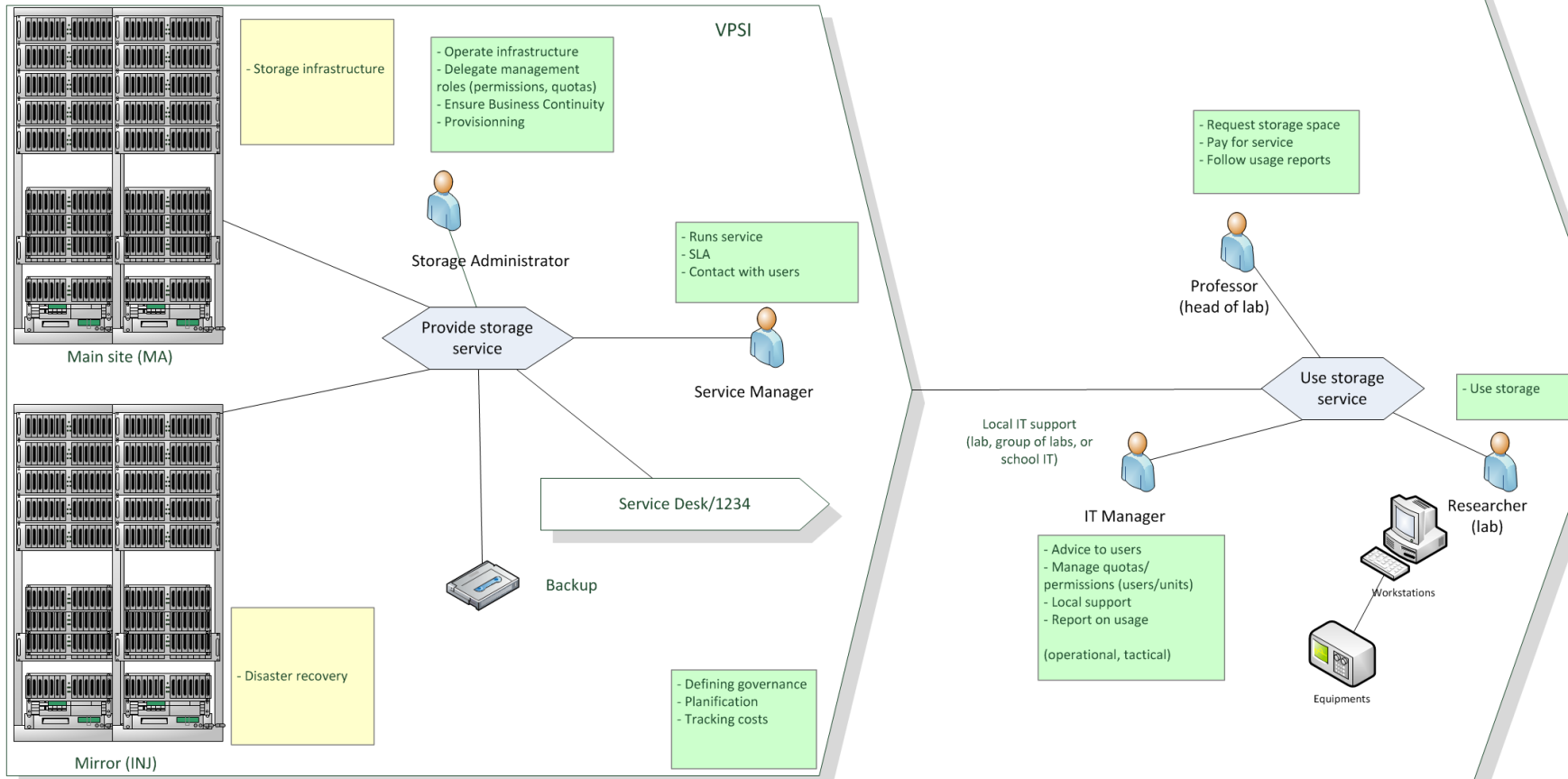
Tier1 : 8'355 CHF/TB
 Tier2 : 5'547 CHF/TB
 Tier3 : 1'527 CHF/TB
 Tier4 : 4'542 CHF/TB
 Tier5 : 588 CHF/TB

Proposed Services

annual rates

Service	Disks	Performance	Snapshots	Replication	Backup	Price CHF / TB.yr
Collaborative NAS	SATA 7K + SSD cache	High	●	●	○	300
Online Archive	SATA 7K + SSD cache	Bounded through QoS		●	○	200
Raw	SATA 7K + SSD cache	Bounded through QoS				100

Storage Service Organization



Transition to new services

Migration

- In 2-steps
 - From NAS-2 to NAS-3
 - One-to-one
 - Objective: decommissioning NAS2
 - Finished (except mynas => feb'15)
 - Within NAS3
 - Reorganization into new services (decision by owners)
 - With help of IT managers
 - 2Q15 ~ 3Q15

Transition to new services

Operation

- Beta version of storage with select labs (feb-mar'15)
- Finalize services for mar-apr'15
 - New service manager and operation team
 - Provisioning portal (to be integrated in ServiceNow)

Future

- Archive
- Backup of individual machines

Questions

