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Data management pain points

in building MRV systems and ways to address them with software

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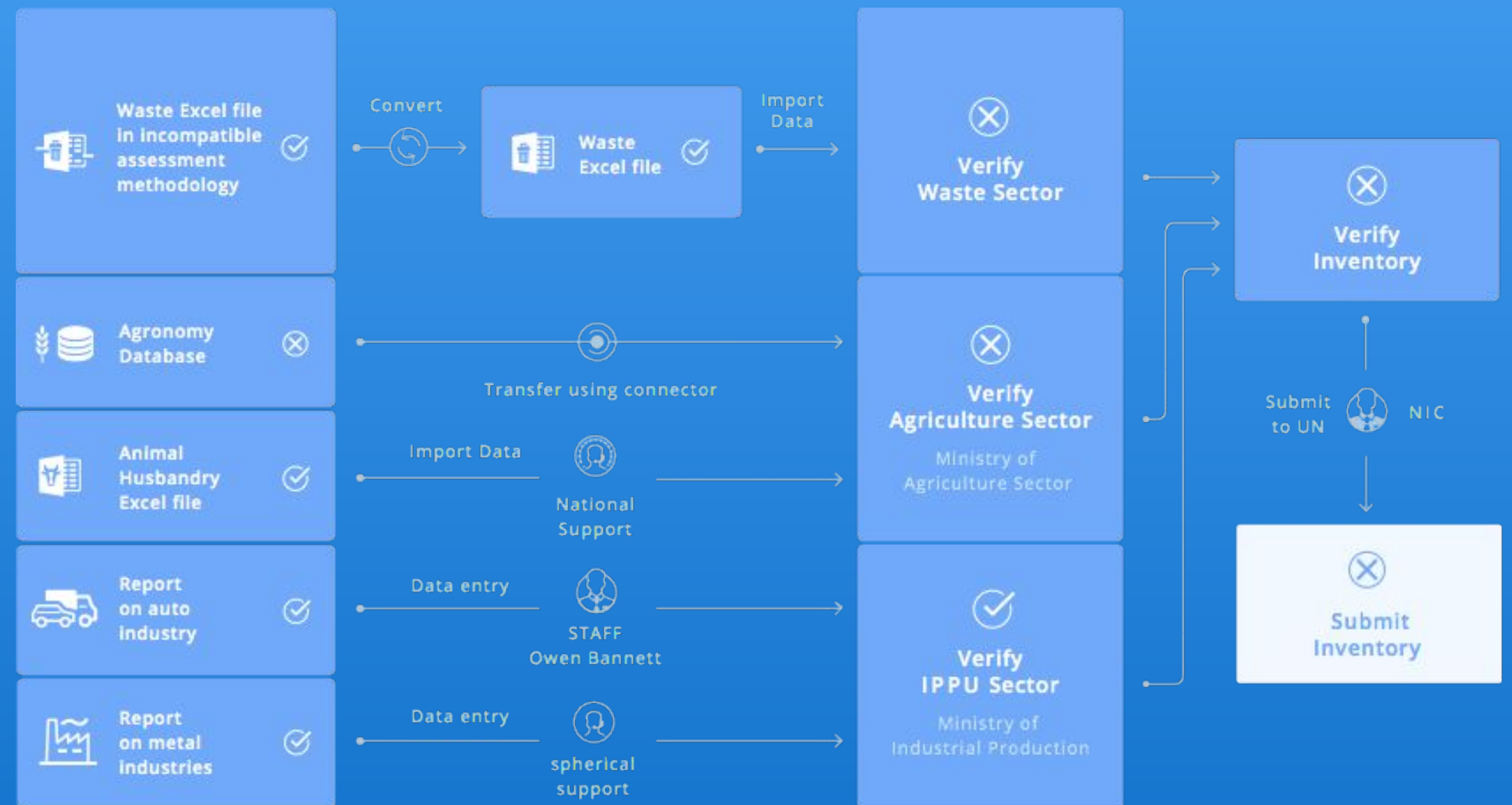
MRV system in seven "easy" steps

- **Involve all people** who have the necessary data

- **Collect data** from them

- **Calculate controlled indicators** based on the data collected

- **Assure quality** of resulting data and calculations

- Put data into a **reporting format** compliant to the applicable reporting regime

- **Keep data** safe and ready for re-use

- Make sure you **know what to do** (better!) next time.

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Challenges involving people

- **MRV Expertise/Capacity**: the majority of custodians of data necessary for MRV do not *need* MRV expertise to participate meaningfully

- **Language**: ditto.

- **Data integrity and access controls**: access to everything the user needs but not more

- **Connectivity**: constant broadband Internet access is not yet a reality in all target groups

- **Usability**: unless you are paid to be expert, your participation should be easy, familiar or intuitive

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Involving people done right - Intuitive workflow

- Take time to define your data collection process

- Reduce manual data entry

- Make write access to data conditional on workflow step

- Think what you will do when things don't go as expected

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Involving people done right - Language & Jargons

ID		Unit	1990	1991	1992	1993	1994
L1	TAKWIMU KUHUSU SHAMBA LAKO						
L2	Ng'ombe	heads	10.00	13.00	15.00	22.00	31.00
L3	Mbuzi	heads	13.00	17.00	24.00	30.00	42.00
L4	Kondo	heads	4.00	5.00	5.00	6.00	8.00
L5	Nguruwe	heads	9.00	17.00	32.00	43.00	51.00
L6	Kuku	heads	40.00	52.00	73.00	85.00	97.00
L7	Sungura	heads	50.00	67.00	80.00	85.00	93.00

- Make simplified entry forms for data providers

- Translate forms into national language

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Involving people done right - Connectivity&Usability

- Work on the user's machine, whatever it is

- Look like Excel but don't *be* Excel

- Be able to work offline

- Make data exchange between users invisible to the user

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Challenges collecting data

- **Data is not available**: physically? legally? economically? If there is activity - there is data, find the provider and make it possible for them to participate!

- **Inappropriately aggregated data**: involve lower level data providers

- **Incomplete and low quality data**: reduce manual entry, enforce automated checks

- **Data is not coming timely**: your workflow system should tell you who is getting late

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Challenges calculating

NO CHALLENGES. JUST DO IT RIGHT*

* Easier said than done

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Challenges assuring quality

- **What to check?**

- **Where is the problem?** Lots of data, complex hierarchies mean that the problem may be hard to find

- **What is the problem?** For a more complex check, even once you've found erroneous value, it may not be apparent what the problem is

- **Who you gonna call?** Many people are involved in data collection, who dealt with this data point and knows how to fix the issue?

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Assuring quality done right - what to check

- Chapter 6 is your friend!

- Basic checks: completeness, data ranges, correct use of notation keys...

- Domain-specific checks: time series and methodological consistency, reasons for recalculation, ...

- Compare your data to your neighbours' or countries with similar circumstances

- A check not automated is a check not performed

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Assuring quality done right - where&what's wrong

- Navigate the user to the error

- Explain the reason your system believes the value(s) are wrong

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Assuring quality done right - who you gonna call?

- Have an audit trail of all entries in your system

- Identify the source of each data point to the user.

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Challenges reporting

- **Complexity of reporting formats.** 90+ CRF tables, where are my entries?

- **Data manipulation.** Uncertainty analysis and KCA in inventories require non-trivial computations.

- **Lack of APIs** The current UNFCCC process is not data-centric and does not avail itself to interoperability, leading to the need of manual operations.

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Reporting done right - cracking complexity

- Link data entry and reporting intuitively

- Identify aggregates and indirectly affected values in reports

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Challenges keeping data

- **Adequate backup and business continuity** may be hard to organize and prohibitively expensive if not done right

- **Outsourcing of data-keeping** typically means trusting the provider with your data

- **Security and access management** become tricky for systems that are not used often.

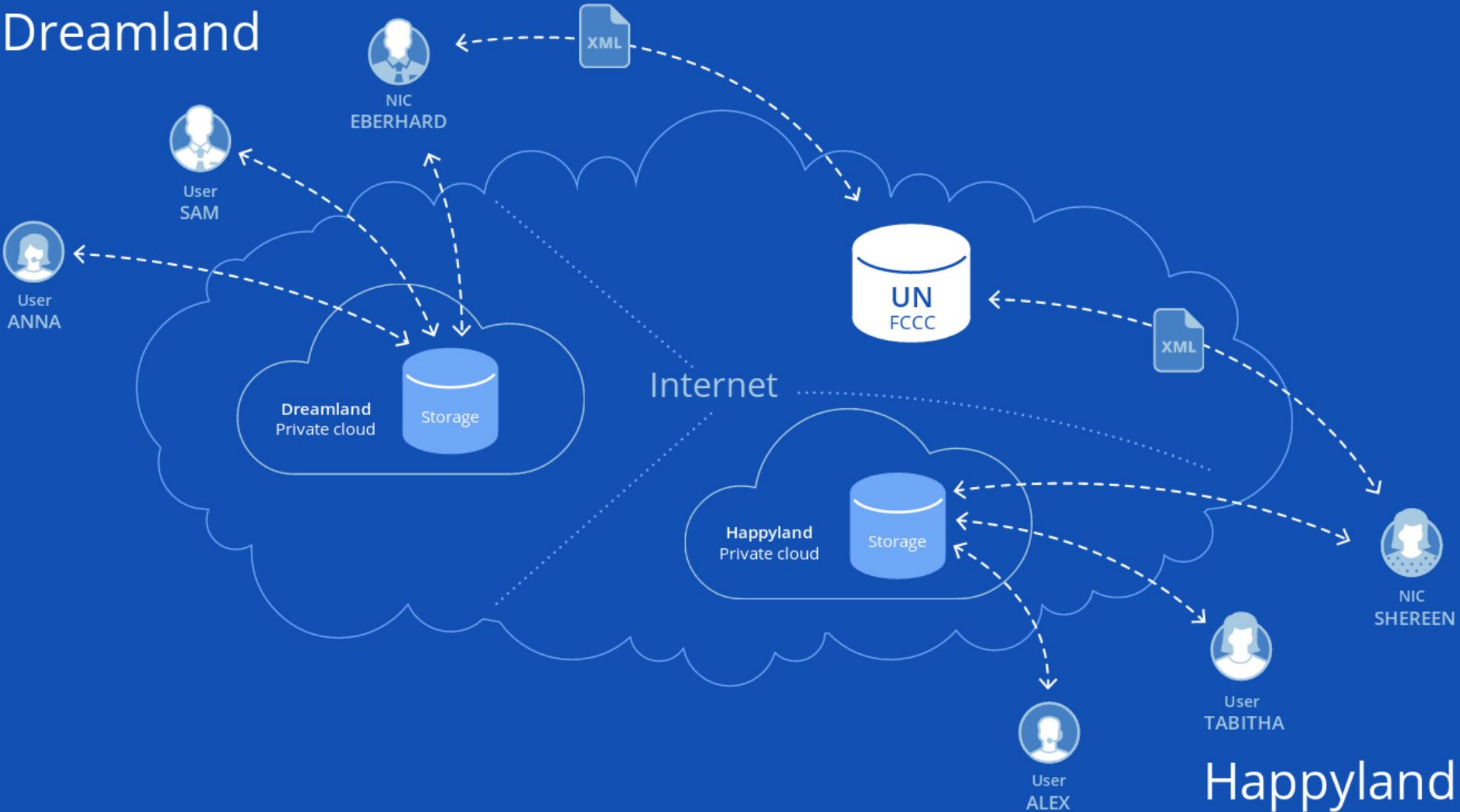- **Knowledge retention** needs to be top notch to withstand staff turnover.

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Keeping data done right - backup and access

- Do offline, off-site, encrypted backups

- End-to-end encrypted data exchange between users

- Keep your access system simple, show it graphically[, block unused credentials]

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Keeping data done right - knowledge retention

- Do self-documenting configuration

- Test disaster recovery!

- Make system recovery secrets easy to keep (recovery envelope)

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Challenges improving the MRV system

- **Analysis:** after collecting 20 000 data points, how do you know what went right and what wrong? Use process reporting.

- **Monitoring:** use automated monitoring of points in the workflow where you experienced difficulties last time

- **Optimization:** adjust your workflow based on experience and evolution of legal and institutional arrangements. Involve higher quality, more agile data providers.

- **Incentives:** reward your data providers

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Final points

- The majority of data management problems **are not unique** to one country, so the solutions are highly reusable

- With good IT tools, **the organizational burden does not grow much when you involve more people** so involve everyone who can be useful

- Better data management and IT tooling means **higher quality submissions, with less effort**

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