Flexpro Technology Services (Pty) Ltd

Challenges faced in developing and maintaining animal identification and traceability information systems

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To Be Covered

- Experience: LITS & related systems
- LITS core functionality
- LITS Information system and some interphases
- Key challenges faced and some solutions
- Key lessons learned
- Recommendations

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Experience - LIT Systems

NamLITS – Namibian Livestock Identification and Traceability system developed and implemented in 2004. The system is hosted by independent hosting partner running in a cloud and is accessible from anywhere by users or clients with the necessary access rights and internet connection. Regular users' interface through a WEB client interface and other users such as farmers and the police access the system through a WEB browser.

SLITS – Eswatini Livestock Identification and Traceability system developed and implemented in 2011. The system is hosted by the Government and is accessible by users with the necessary access rights and connection to the Government network.

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Experience – Related Peripheral Systems

Stock Brand System – A system used to register and manage stock brands register. This system is fully integrated with a LITS system and data for livestock keepers and establishments are shared between these systems.

Animal Health Surveillance System. The system is used to capture surveillance data which are collected by Animal Health Technicians during farm inspections and through farm questionnaires completed periodically by farmers themselves. This system shares data with the LITS system.

Import / Export Permit System – The system is used to issue permits for import/export of animals and animal products. The system shares data with the LITS system for livestock that are imported and exported.

Experience – Related Peripheral Systems

Ear Tag Ordering System – The system is used to order and distribute ear tags and other related items such as applicators etc. This system is implemented in the cloud to allow agents to take orders for these items and to manage the distribution to the customers. This system is fully integrated with the LITS system, tag numbers and tag owners are validated when new animals are registered.

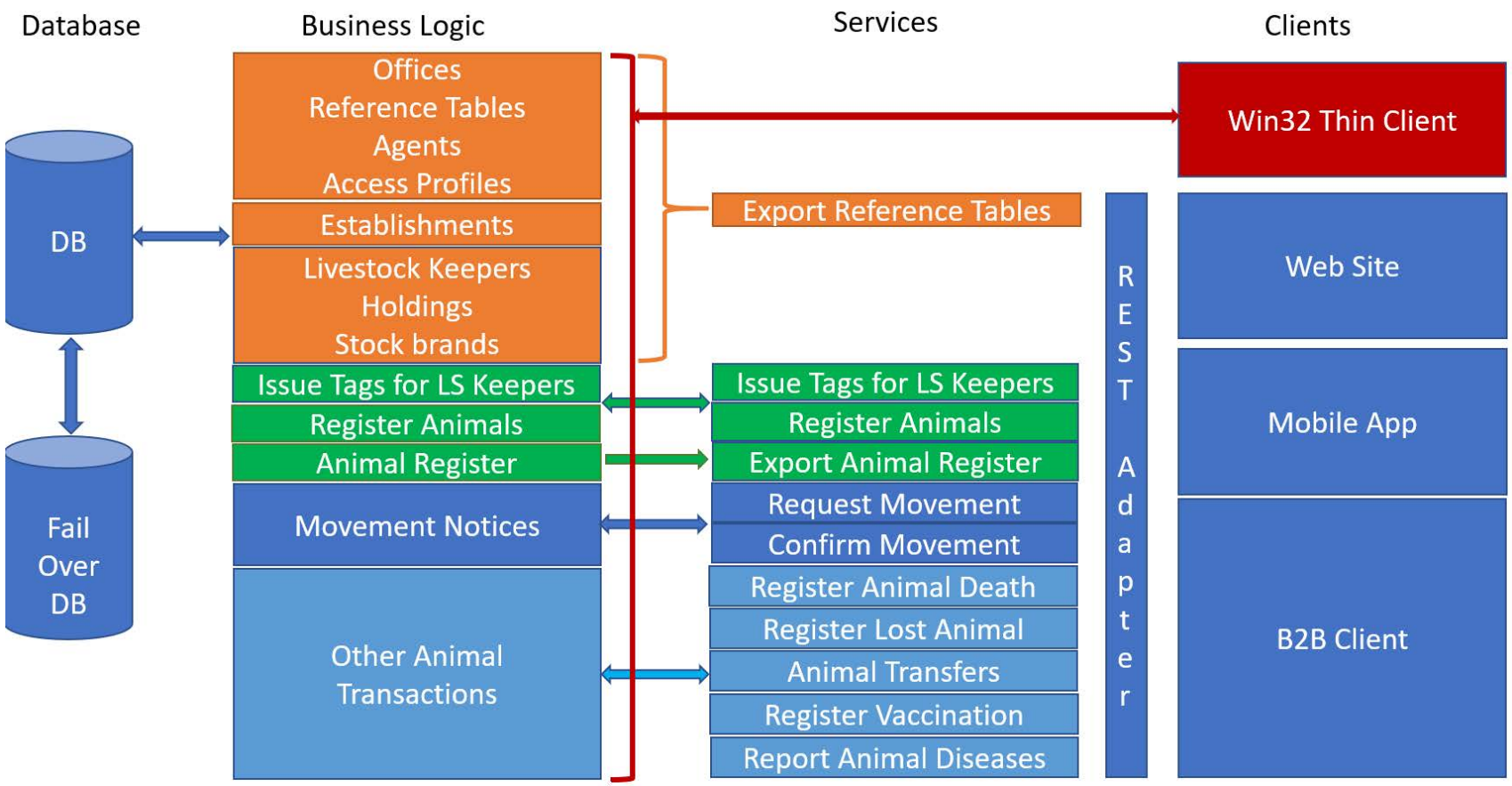
Livestock Auction System – This system was developed to help auctioneers to manage livestock auctions and is used by most of the auctioneers in Namibia. The system exports data from LITS for validation purposes and import animal movements from the auction system into LITS electronically.

Experience – Related Peripheral Systems

Livestock Management System - This system was developed for the livestock division of an agribusiness company and consists of modules for slaughtering, stock, liaison, insurance, accounting (debtors & creditors) and cash book. These modules are fully integrated and are also integrated with the auction system, LITS and abattoir systems.

Livestock Traceability Register – This is a farm management system provided for livestock keepers to maintain their own livestock registers and using a WEB interface to reconcile own register of animals registered in the LITS database.

LITS Database at a Glance



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LITS Core Functionality

System Functions	Description
Registration of offices • Define responsibilities for geographical areas • Define data ownership for geographical areas	• Office hierarchy • SVO Jurisdiction • Assign access rights
Reference tables • Validation • Simplify data capture • Define business rules	• Establishment types • Species • Restriction reasons • Vaccines • Notifiable diseases
Tag agents (vendors) • Authorize tag vendors • Issue tag ranges • Authorize to issue tags to livestock keepers	• Register and maintain tag agent details • Issue tag ranges • Assign access rights to system
Access profiles • System functions • System access profiles • System users	• Maintain system functions • Create access profiles • Maintain system users • Assign access profiles to system users
Establishments • Establishments • Restrictions	• Maintain establishments • Links establishments with SVO offices • Manage Restrictions

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LITS Core Functionality

System Functions	Description
Livestock keepers and owners • Livestock keepers • Owners • WEB access	• Maintain livestock keeper details • Verify ID number • Manage restrictions • Link to one or more establishment • Register for WEB access
Livestock Register • Herds • Additional owners • Register tagged animals • Manage access restrictions	• Register animals – manually or electronical • Verify tag numbers • Export animal register – restricted access
Movement notices / permits • Verify if movement can take place • Verify animals belongs to owner • Access restrictions	• Capture movement notice / permit • Verify establishments / livestock keeper restrictions • Verify if animals belongs to owner • Confirm movement at destination
Animal Transactions • Capture manually or electronically • Access restricted to owner	• Register animal deaths • Register lost animals • Transfer animals (between holdings in the same establishment) • Register vaccinations • Report notifiable diseases • Register replacement tags

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LITS Core Functionality

System Functions	Description
Unused ear tags issued to Livestock Keepers • Cut-off date	To verify that Livestock Keepers register animals in the central database
Outstanding movement notices / permits • Cut-off date • SVO Office • Livestock keeper	Use this report to follow up any movements that was not completed
Interface statistics – list third party interface activities • Date range • Interface User	To determine usage and integrity of third-party software interfaces
Database statistics • Date range	To monitor growth and database activities • Number of establishments • Number of livestock keepers • Number of animals per species • Number of movement notices/permits • Number of other animal transactions by type

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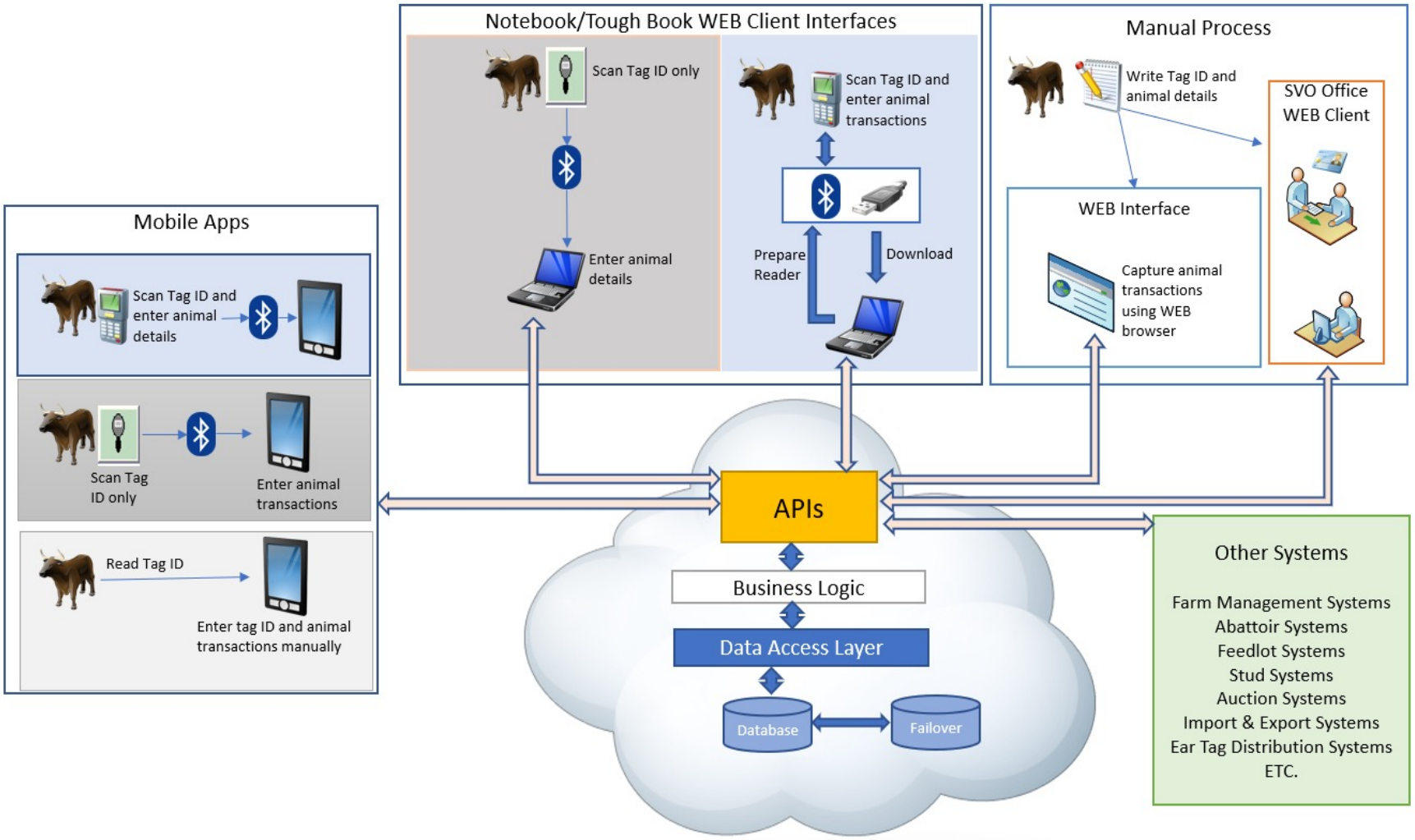
LITS & Peripheral Systems



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Key challenges faced and some solutions

Problems experienced with capturing of data – Incorrect data entered on documents and offline equipment prevent users from entering it into the LITS database, the number of unresolved issues quickly becomes unmanageable, and data will be lost.

The follow actions will minimize this issue:

- **Validation at source** – It becomes nearly impossible to resolve validation issues when away from the source of the data, it is therefore important to make sure that for offline transactions enough static data are available to allow proper validation.
- **Self-service** – Provide online access via WEB or cell phone applications to external partners such as Farmers, Auctioneers, Abattoirs, etc. to capture own documents and make transactions directly on the LITS database.
- **Reference Data** – Make reference data available to external partners to allow them to validate the data before exporting it to the LITS database.
- **Pre-select animals** – When issuing permits, pre-select the animals to validate animal locations, owners, pending transactions and status before issuing the permit.

Key challenges faced and some solutions

Unresolved/Unreconciled permits – The number of incomplete movements in the system caused numerous other problems and must be resolved as quickly as possible.

The follow actions will help to minimize this issue:

- **Implement policies to allow for exceptions** – It is sometimes difficult for users to perform certain tasks due to practical problems, for example, when animals are moved from one livestock keeper to another, and the animals run away before it is endorsed at a diptank.
- **Enforce discipline** – Make an officer responsible for a diptank event and make sure all transactions are entered before the next event can be scheduled.
- **Suspend permits** – Suspend the issuing of new permits to a livestock keeper if outstanding permits are not completed or cancelled within a pre-defined period.

Key challenges faced and some solutions

Remote transactions (no access to LITS database) – Events at crush pens where there is no access to the LITS database is a major challenge to make sure that all transactions are captured in the LITS database.

The follow actions will help to minimize this issue:

- **Reference data** – Provide an offline system for capturing data and provide functionality to synchronise reference tables necessary for validation purposes.

- **Data integrity** – To minimise the loss of data captured on offline computers, provide backup by implementing after image files on memory cards and/or take backup of transactions onto a memory stick to recover the lost data.

Key challenges faced and some solutions

Auctions – Tracking of animals through auctions using visual tags was a time consuming and nearly impossible task, reading tags when animals are received, sorted into lots and dispatched was a mayor challenge.

The follow actions will help to minimize this issue:

- **Introduce RFID tags** – Introduction of RFID tags helped a lot to improve the accuracy in reading of ID tag numbers and handling of animals during the process.

- **Reference data** – Providing an electronic interface between the LITS database and third-party auction systems; allowing for export/import of static data and animal movement transactions. Making it possible for the Auction Systems to validate movement permits and associated ID tags helping to speed up the process and allow for issuing of movement permits from the auction.

Key lessons learned

- **Phased Implementation** – Requirements for functions developed to early in the system lifecycle may cause unnecessary changes before it is implemented.
- **Planning implementation phases** – Planning implementation phases to fast-track implementation by allowing the users to collect and capture static data for Offices, Diptanks/Crush pens, Establishments and Livestock Keepers will help a lot when implementing the next phase for tagging, registering and tracking animal movements.
- **Use standard terminology for data elements** – By using the standard terminology for different elements of the system will make it a lot easier for all people to understand and compare functionality with external partners.
- **Make provision for multiple unique ID's for tagged animals** – This will allow for an animal to be identified by more than one type of ID's were industry already using a unique ID to identify animals in feedlots, on dairy farms, etc.

Recommendations: business analysis up to maintenance

- **System requirements -** System requirements cannot be the sole responsibility of Government. A fully functional national animal identification and traceability system must be built through industry and government partnership, which meets needs of a diverse livestock sector and contributes towards its growth. All parties must understand the benefits and buy into the system, bureaucracy and inefficiency can derail the system.

- **Self-service for third parties -** The design must provide for producers and other third parties to do self-service activities through web services or other electronic interfaces. Areas with mass movements such as auctions, feedlots, abattoirs and so on, must be forced to adhere to electronic data interchange protocols.

- **Confidentiality and privacy –** Access to private and personal information must be protected.

- **Phased approach -** A phased approach for implementation is necessary. It will take years to implement and grow a fully operational LITS system.

Recommendations: business analysis up to maintenance

- **A steering committee -** Representation from all partners will ensure that the effect of changes is thought trough and acknowledged by all partners.
- **Hosting of the LITS system** - Use an independent hosting partner to host the system and to supply network and internet connectivity. Policies and standards for access and connectivity can be set for the LITS system independently from policies and standards associated with other non-related Government systems.
- **Software maintenance** - Appoint a dedicated software team for maintenance of the LITS system. Maintenance and support will be necessary for as long as the system is operational, changes in legislation, software technologies, and other unforeseen changes to business processes will require ongoing maintenance to the system.
- **User coordinators** – Appoint dedicated personnel to support the system users and other external partners. Management of the electronic interfaces must not be underestimated.

Recommendations: technology options

- **Longevity for the database/ software platform**
  - Technology constantly transform and must support development of new and enhanced functionality over the lifetime of the system.
  - Software Vendor (platform/ database):
    - Must frequently issue new releases
    - Must keep up-to-date with technology trends
    - Must have a solid client base
  - The platform must be scalable and robust
  - Future proof of code (minimum rework with new releases)
  - Development/deployment tools
  - Cost of ownership

- **Implication of wrong choices**

  Hampered access to new technologies, redundant platform, no further support, skill shortage and short-term cost savings is just a few serious implication that may shorten the lifetime of a system

Recommendations: technology options

Technical requirements

- Scalability for users
- Scalability for data volumes
- Peak performance
- Simple extensibility and upgradeability
- REST Integration
- Asynchronous processing
- Clean-up of old data
- Encryption of database
- Real-time replication
- Automatic backup
- Reliable platform support

THANK YOU

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