



Australian Government

Department of the Environment and Energy

National Waste Data & Tracking System Requirements and Development Study

Executive Presentation and Summary Report

Executive

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- Options compared
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- Next steps

Complimentary work

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- Trial support
- Feasibility assessment

SECTION

Background

Oakton and the national hazardous waste reform program

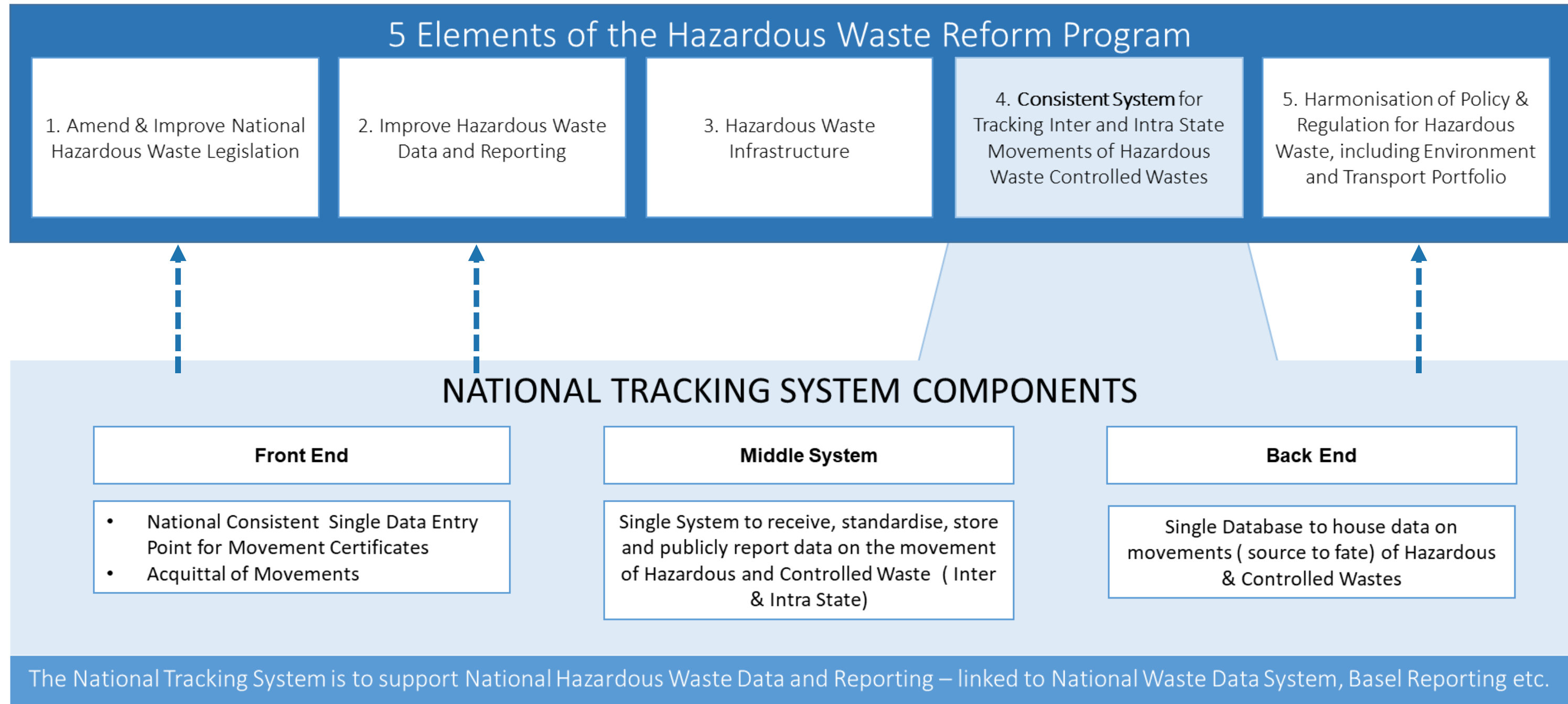
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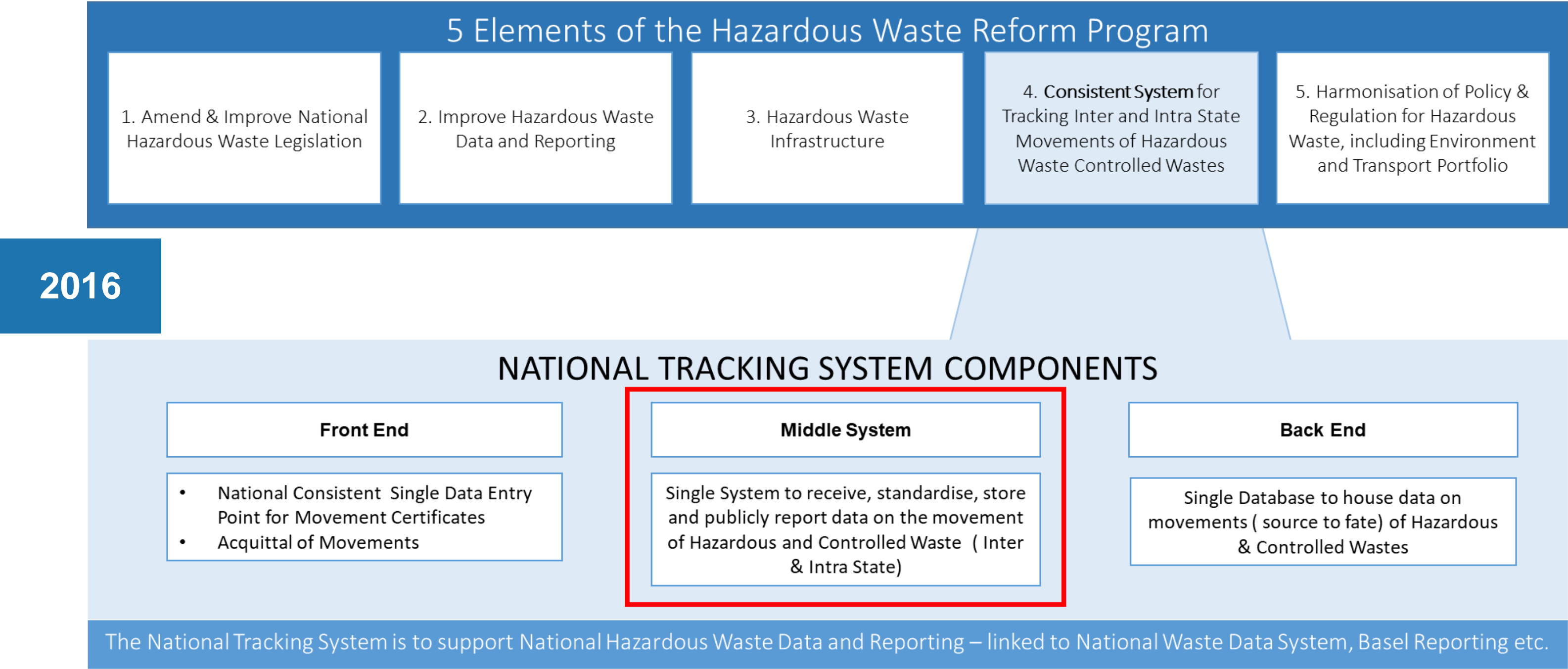
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The National Hazardous Waste Reform Program



The Middle System



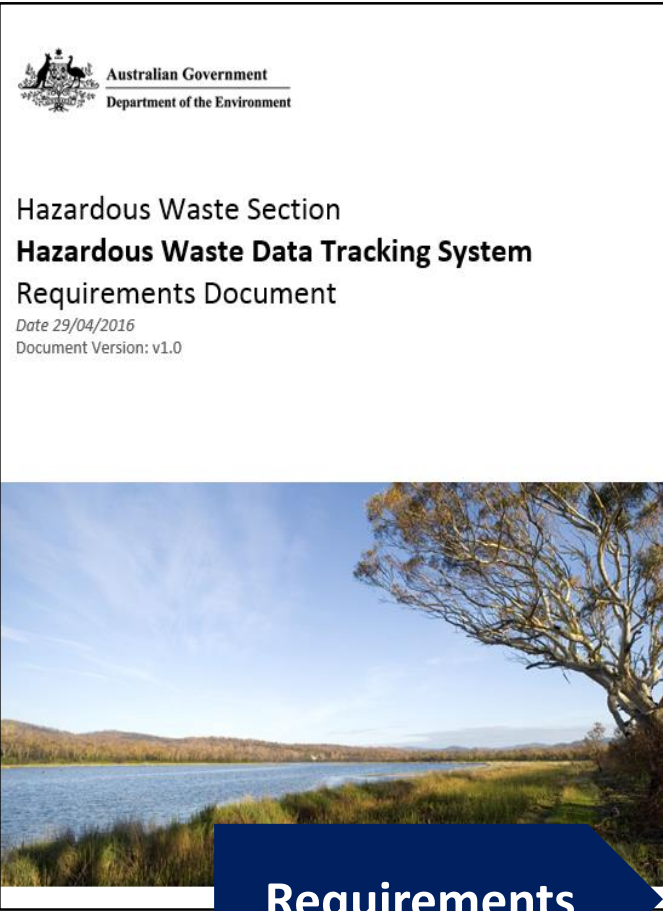
Oakton's previous work

2016

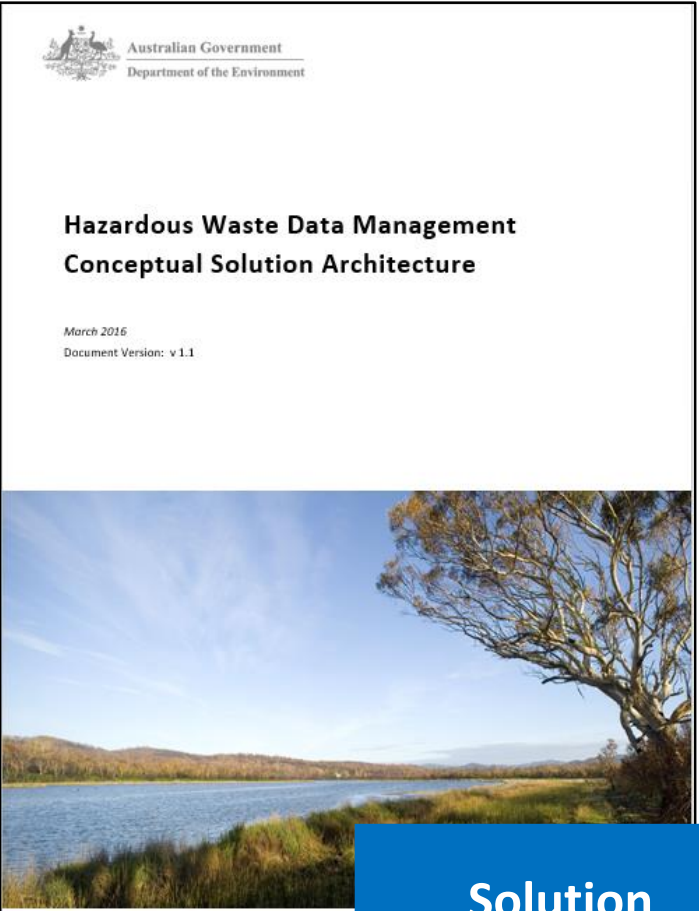
Middle system the Hazardous Waste Data Management Tracking System (HWDTS)

The Hazardous Waste Section were looking for a solution to support accurate, timely and accessible data on the interstate and intrastate movement of controlled and hazardous waste. This solution should receive, store, standardise and publically report state and territory data.

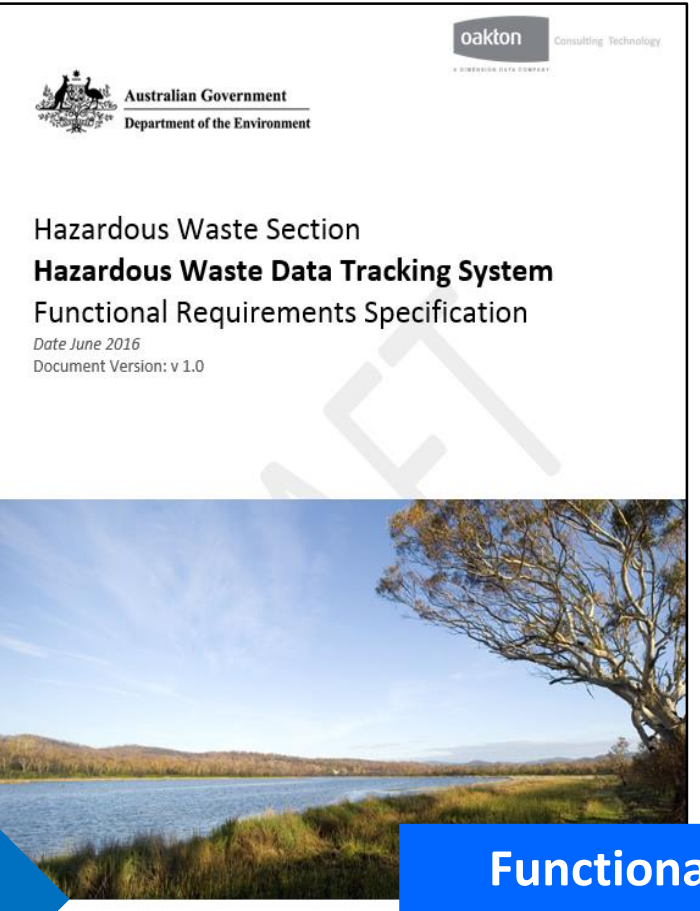
This engagement developed and delivered three (3) key outputs to meet the brief.



Requirements



Solution



Functional Requirements

The National Hazardous Waste Reform Program

5 Elements of the Hazardous Waste Reform Program

1. Amend & Improve National Hazardous Waste Legislation

2. Improve Hazardous Waste Data and Reporting

3. Hazardous Waste Infrastructure

4. **Consistent System** for Tracking Inter and Intra State Movements of Hazardous Waste Controlled Wastes

5. Harmonisation of Policy & Regulation for Hazardous Waste, including Environment and Transport Portfolio

2017

NATIONAL TRACKING SYSTEM COMPONENTS

Front End

- National Consistent Single Data Entry Point for Movement Certificates
- Acquittal of Movements

Middle System

Single System to receive, standardise, store and publicly report data on the movement of Hazardous and Controlled Waste (Inter & Intra State)

Back End

Single Database to house data on movements (source to fate) of Hazardous & Controlled Wastes

The National Tracking System is to support National Hazardous Waste Data and Reporting – linked to National Waste Data System, Basel Reporting etc.

Oakton's recent work

2017

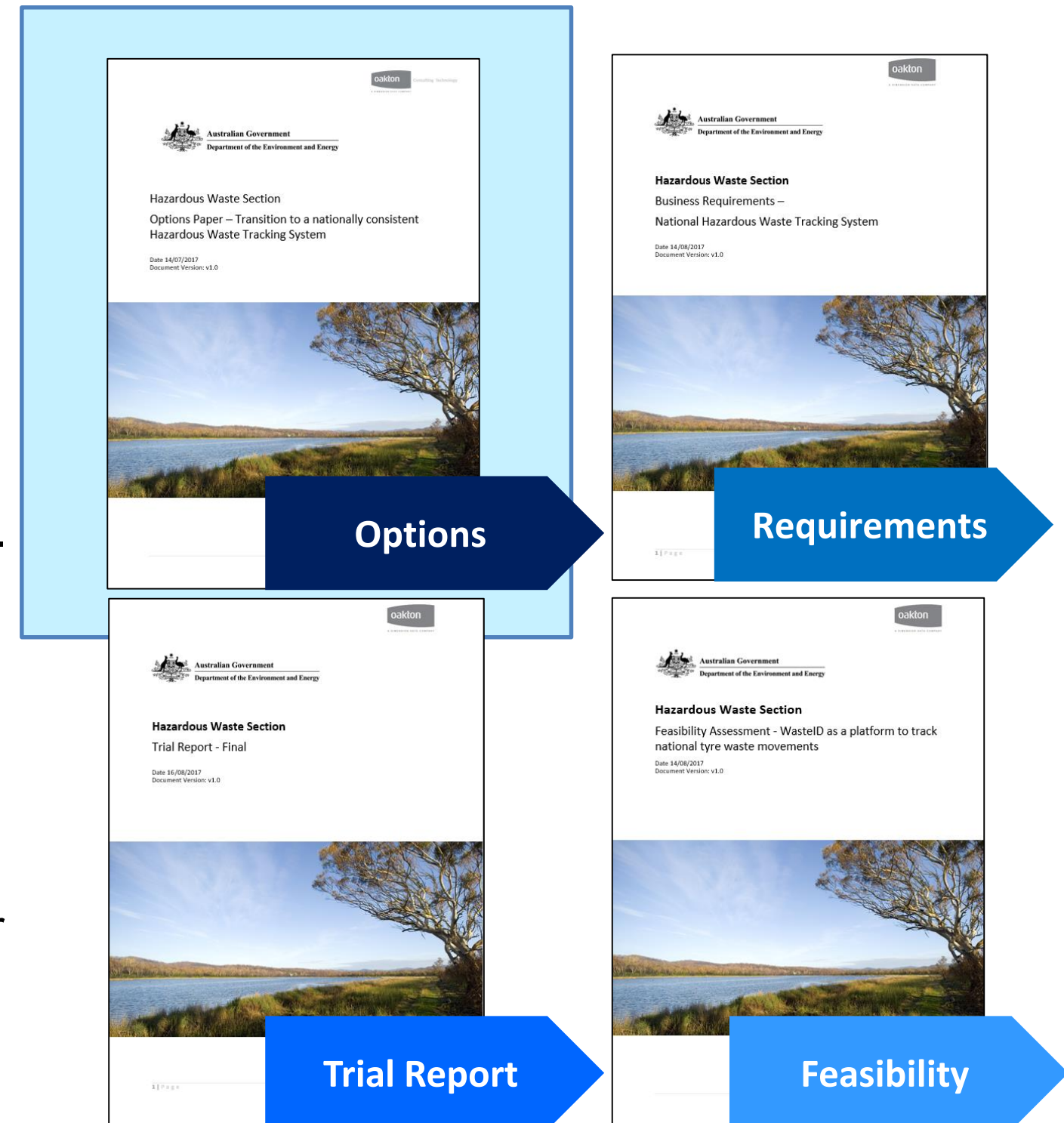
National Waste Tracking System Requirements and Development Study

The Hazardous Waste Section were looking to:

1. Identify and analyse the options for ending paper-based tracking certificates, recommend a preferred approach and ensure this is integrated into the final requirements documents.
2. Develop requirements documentation for the front and back end of the national electronic tracking system.
3. Support the Governments of Tasmania, the Australian Capital Territory and the Northern Territory in trialling the implementation of a current system used for interstate waste tracking.
4. Assess the feasibility of the Waste ID platform as a platform for tracking tyre waste nationally.

This engagement developed and delivered four (4) key outputs to meet the brief.

This summary report focuses primarily on the Options paper.



High level roadmap

The proposed national tracking system is one of five parts of the Australian Government’s hazardous waste reform program. The program aims to ensure Australia effectively and efficiently meets its international obligations and national policy objectives for the safe and environmentally sound management of hazardous and controlled waste.

- 1

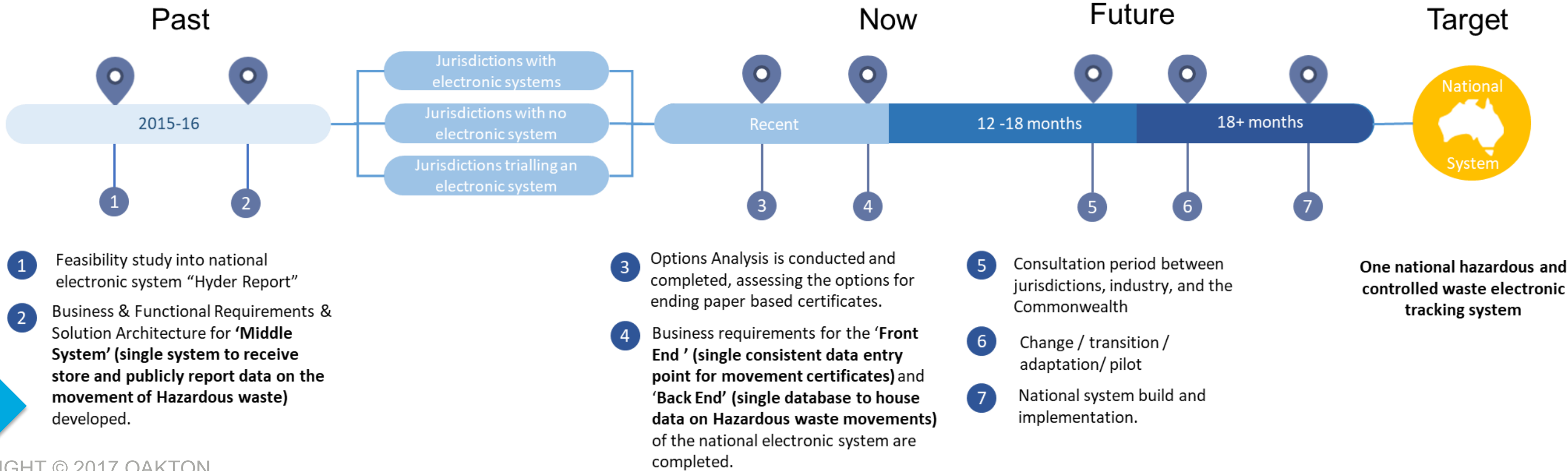
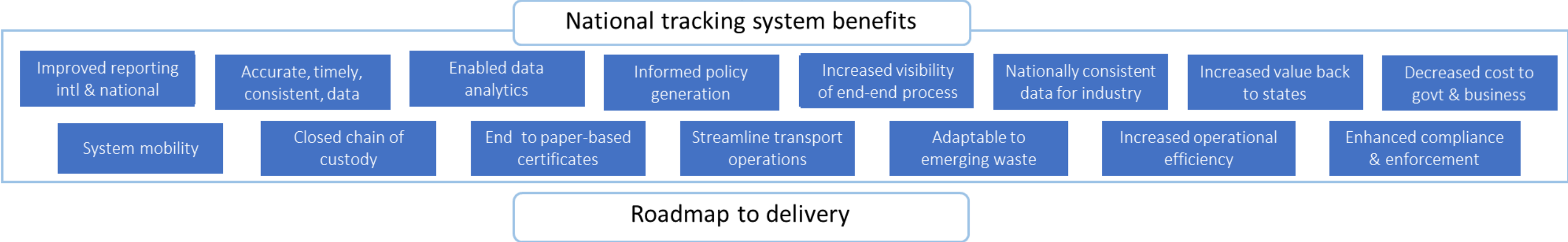
Amend & improve national hazardous waste legislation
- 2

Improve hazardous waste data and reporting
- 3

Hazardous waste infrastructure
- 4

Consistent system for tracking inter & intra state movements of hazardous and controlled waste
- 5

Harmonisation of policy & regulation for hazardous waste



SECTION

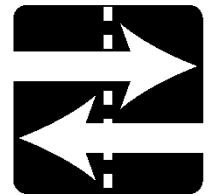
Options Analysis

Transition to a Nationally Consistent Hazardous Waste Tracking System

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The Problem

There are a number of issues. These have been summarised into the 6 main yet overlapping issues below.



Cross border (interstate) tracking

Encapsulating the chain of custody issue, tracking of movements across borders is non existent.



Paper-based certificates

Use of the five docket paper certificate contributes significantly to the poor quality of underlying jurisdictional movement data.



Lack of a tracking system to track waste

Several states apply exemptions to tracking of intrastate waste due to the lack of a system to track it.



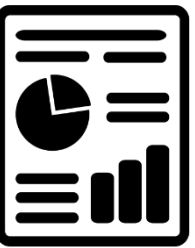
Data quality

Data accuracy and quality significantly impacts the ability to rely on this data to inform policy generation, understand the true state of the environment, or compile reports.



Transparency

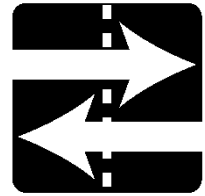
Transparency of waste movements to all stakeholders is compromised, particularly where interstate movements prevent jurisdictions from undertaking compliance and investigation activities.



National and international reporting

The jurisdictions and the Department are responsible for contributing to or compiling data for National and International reporting including the Basel Convention.

The Problem



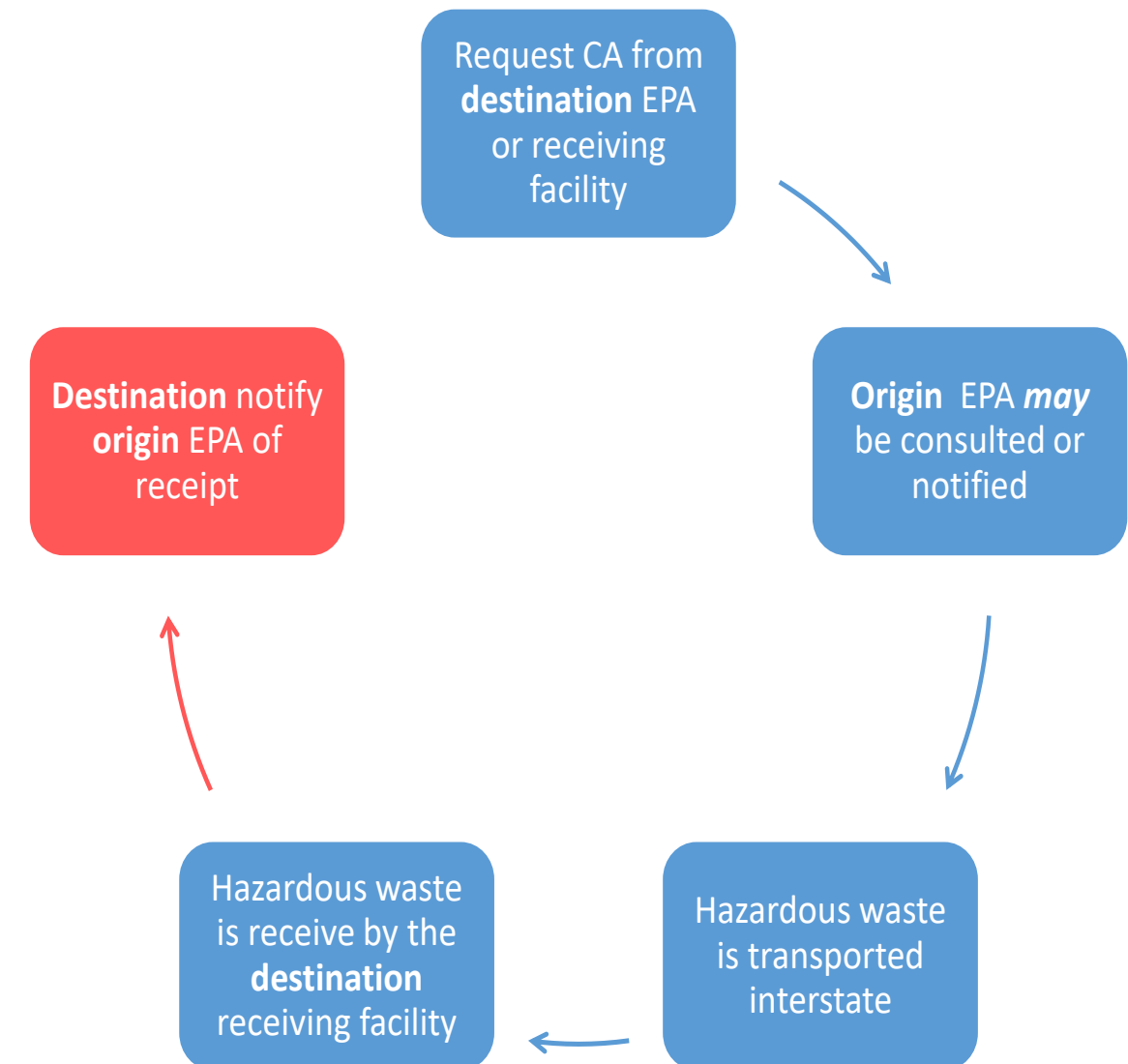
Cross border (interstate) tracking

Encapsulating the chain of custody issue, tracking of movements across borders is non-existent.

- 'Chain of custody' is the term Oakton has applied to the handling, notification, control and transfer of waste focussing primarily on the distribution of the layers of the five-docket paper WTC, as a waste movement progresses through its movement pathway.
- Typically used to track waste that cross interstate borders, the five-docket paper certificate contains five (5) copies of the detail of the waste being moved. Each copy is to be kept or sent to key stakeholders to the movement, including the EPA in the jurisdiction where the waste movement originated (origin). While stakeholders report that the paper dockets are misplaced regularly, the docket that should be sent to the origin jurisdiction is the one of the highest concern, and the one most likely to go astray. This problem is reported within all jurisdictions of Australia, and leads to removal of waste from a jurisdiction without the knowledge of the jurisdiction EPA.
- There is no current system that tracks interstate movements

FACT

- 100% of Jurisdictions report cross border (interstate) tracking and chain of custody as an issue.
- All industry operators engaged through this process reported double handling and issues when dealing with multiple jurisdictions



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The Problem



Paper-based certificates

Use of the five docket paper certificate contributes significantly to the poor quality of underlying jurisdictional movement data.

The five docket certificates are the current default method for tracking interstate hazardous waste movements.

Despite the best intentions of some jurisdictions to move toward removing the five-docket paper based certificates, a single jurisdiction cannot resolve the cross border need to use certificates given not all jurisdictions have an electronic tracking system, and existing jurisdictional systems do not integrate and submit data to each other. The paper based certificates used in all jurisdictions across Australia contribute significantly to the poor quality of underlying jurisdictional movement data including:

- **Transcription or data entry errors** – handwriting can be illegible or barely readable on the paper certificate. Best guess estimation of waste types and amounts often result when the data is transcribed to an electronic file or system. Operators can also miss-key information as there is often no quality assurance or verification to validate data entered.
- **Unit of measurement (kg/litres/m³)** – the amount of waste is recorded but the unit of measurement is often unclear, absent or incorrect. This often means cubic metres (m³) are transcribed as kilograms or vice versa. These unit errors lead to incorrect data capture, data spikes and variances in data reports. Time and resources must then be allocated to understand and determine the cause of the error months after it has occurred. This becomes increasingly difficult as errors are often not attributable to a single waste movement but many over an extended period of time.

FACT

- The five docket paper certificates are the leading contributor to underlying data quality issues
- The five docket paper certificates enable waste to leave a jurisdiction without the knowledge of the jurisdiction of origin (refer *Cross border (interstate) tracking*, above)



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The Problem



Lack of a tracking system

Several states apply exemptions to tracking of intrastate waste due to the lack of a system to track it.

Some jurisdictions do not have dedicated electronic tracking systems that allow industry to record either intrastate or interstate movements of hazardous waste. Because of the overhead to introduce a system, this has resulted in some jurisdictions 'exempting' industry from formally tracking waste movements. While most jurisdictions still ensure industry report on hazardous waste movements, this is sometimes not structured or formalised and may be an email to the relevant contact within a jurisdictions EPA, which generally provides a whole number of movements per waste type.

The lack of data available for analysis in these jurisdictions means that these jurisdictions do not fully understand the picture of the industry within their own remit. The lack of tangible data also has a flow on effect into national reporting on the state of the industry meaning estimates on waste generation and movement are made in lieu of better source data, as the likelihood of gaps within industry reported figures is high.

It is unlikely that on their own, jurisdictions without tracking systems are likely to be able to introduce a technology system.



FACT

- TAS, ACT and NT do not have tracking systems, however the ACT and the NT have indicated the intention to trial the SA tracking system but are likely to struggle financially to achieve implementation, and do not appear to have the required capability to deliver an outcome.



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The Problem



Data quality

Data accuracy and quality significantly impacts the ability to rely on this data to inform policy generation, understand the true state of the environment, or compile reports.

There are several aspects to this driver for change encapsulating other problems defined in this summary including errors when using the five docket paper certificate, as well as:

1. Waste code choice selected by the person recording the waste for movement either within an electronic system or written on the five docket paper WTC,
2. Unit of measurement choice (e.g. kg, litres, tons) selected by the person recording the waste for movement either within an electronic system or written on the five docket paper WTC, and
3. A mismatch of how each jurisdiction classifies waste, or how users apply these waste codes when recording a movement.



FACT

- Errors in unit of measurement can be significant. Consider where a movement is recorded as 1000m3 when it should have been kg's. This type of error is common place despite the method used to record the movement (electronic system or five docket paper based docket system). This error could be easily preventable with considered input validation used in an electronic system.



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The Problem



Transparency

Transparency of waste movements to all stakeholders is compromised, particularly where interstate movements prevent jurisdictions from undertaking compliance and investigation activities.

Transparency of information is a key driver for introducing a nationally consistent electronic system. In nearly all cases, access to information about a movement of hazardous waste across borders is not accessible by the EPA in the origin of a waste movement for either reporting, compliance or investigative purposes. Industry is also unable to reconcile or report a waste movement has arrived at its destination, or occurred at all.

Equally, while access to datasets for analysis relating to national reporting activity is permitted, some jurisdictions restrict the information sets provided which compromises the ability to understand the landscape of the industry. Access to movement information is generally restricted because jurisdictions are concerned about breach of confidentiality arrangements (either real or perceived) with their industry partners.



FACT

- Several jurisdictions have sought information on industry activity from neighbouring jurisdiction for compliance and investigation activities and have all been denied access to this information.



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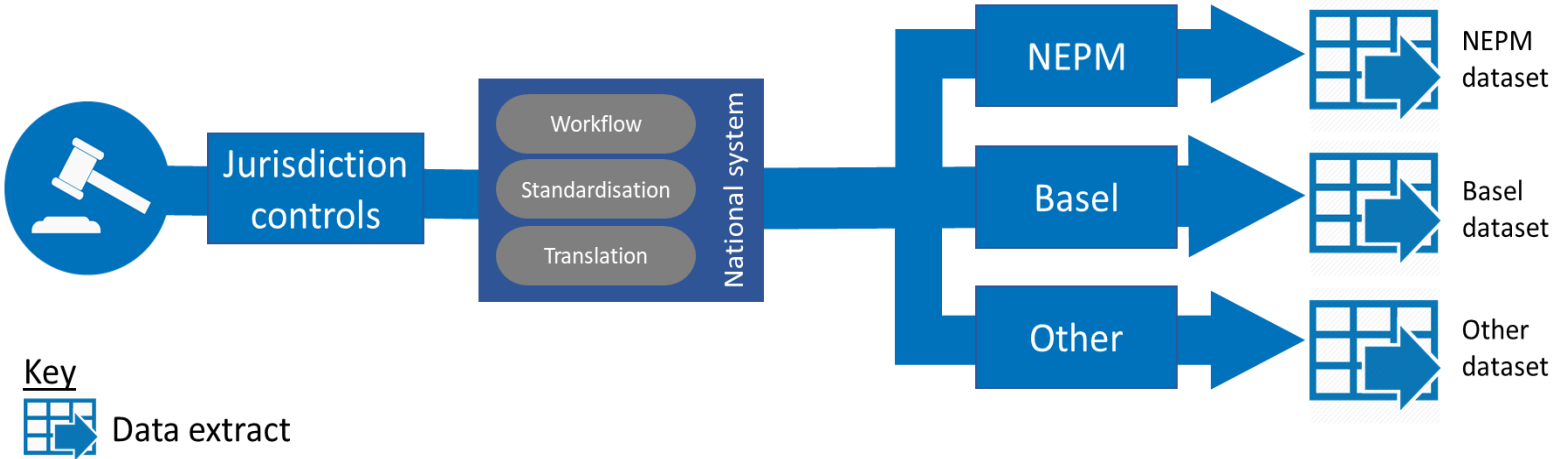
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The Problem



National and international reporting

The jurisdictions and the Department are responsible for contributing to or compiling data for National and International reporting including the Basel Convention.



Under the Basel Convention, the Department is required to report internationally on the generation of Hazardous Waste. In Australia, the best method for establishing reporting metrics is to use movement data supplemented by national permit, gap and other source data.

The interstate management and movement of waste falls under the guidelines of the National Environment Protection (Movement of Controlled Waste between States and Territories) Measure 1998 (NEPM). Nationally, the Department is responsible for collation of reporting data through the National Environmental Protection Council (NEPC) and this data is also used in various public information sets including the Hazardous Waste in Australia report.

Access to full datasets of movement information in order to investigate assumed errors when this information is provided by the jurisdictions to the Commonwealth is compromised due to access limitations and the ability to see the picture of movements that cross borders due the disparate nature of systems that manage movements within the jurisdictions of Australia.

The underlying quality of the movement data as impacted by the items detailed in this summary also compromise the ability to understand, analyse and compile accurate reporting or statistical figures on Australia's state of the environment with regard to hazardous waste.

FACT

- The quality of data provided by the jurisdictions impacts the Commonwealths ability to accurately understand and report on the state of hazardous waste in Australia.

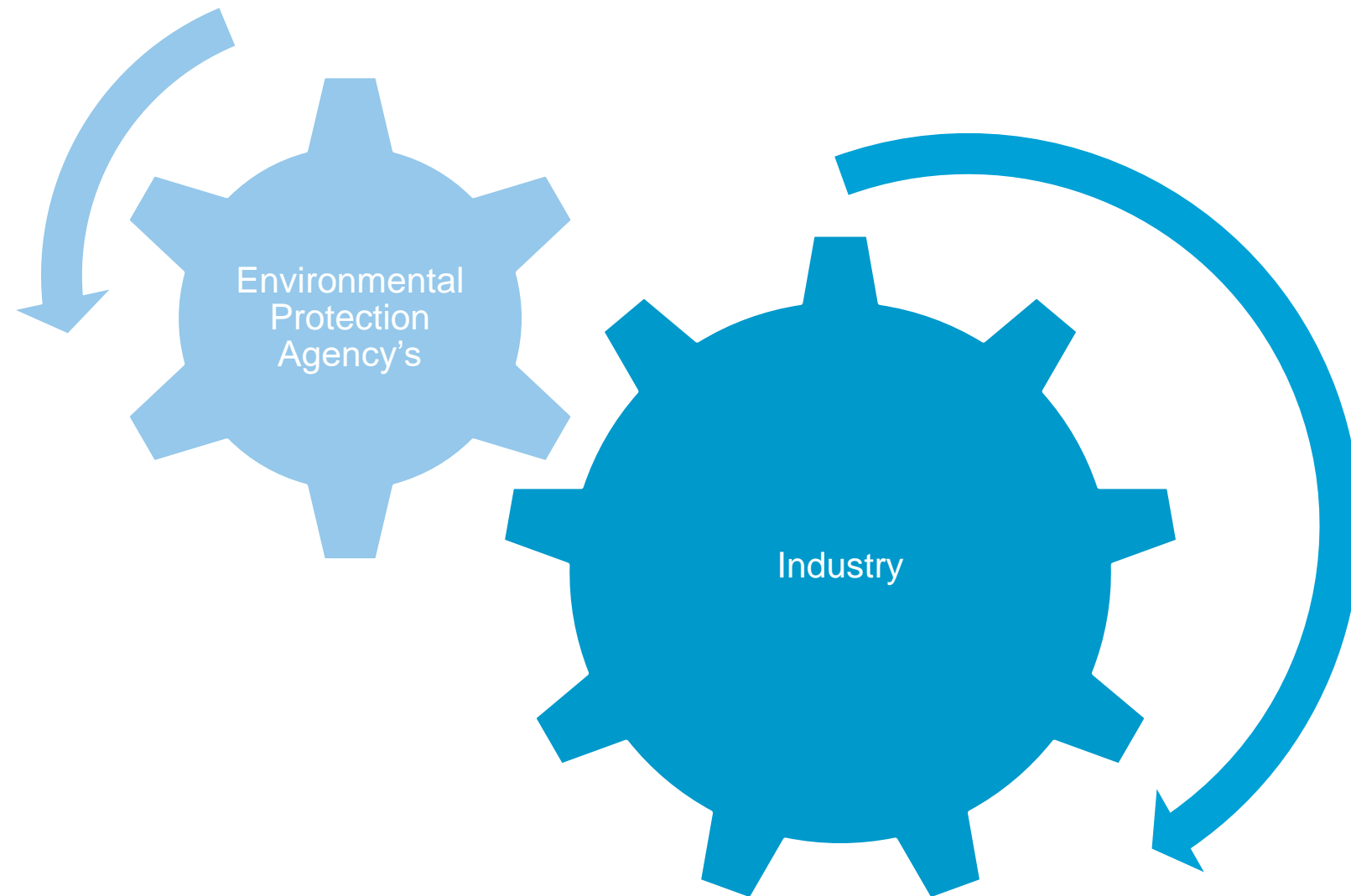


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Identification of options and evaluation criteria

Oakton worked with stakeholders to define the options, and shape the evaluation criteria.



Options analysed

Explored options	Option 1	System sharing
	Option 2	A single jurisdictions system nationally
	Option 3	Tailored stand-alone national system
	Option 4	Tailored integrated national system
	Option 5	Do nothing

Discounted options	Option 6	Back system
	Option 7	Adapt the middle system

Executive

Options defined

#	Option Name	Option Description	Status
1	System sharing and nation-wide access	<p>Jurisdictions currently without electronic systems would arrange to use a neighbouring jurisdictions system for themselves and industry.</p> <p>Each jurisdictions EPA would then permit access to both industry and EPA users from other jurisdictions to reconcile movements and run reports.</p>	Assessed
2	A single jurisdictions system nationally	Deploy a single jurisdiction EPA system nationally for all industry and jurisdictional users to adopt.	Assessed
3	Tailored stand-alone national system	Custom build of a system tailored to the needs of all jurisdictions and their industry users.	Assessed
4	Tailored integrated national system	<p>Custom build of a system tailored to the needs of all jurisdictions and their industry users (the same as option 3, above).</p> <p>This option would additionally permit existing industry and EPA systems to integrate, enabling both industry and EPA users to input movement data in their own systems.</p>	Assessed
5	Do nothing	Continue to do things as they are today.	Assessed
6	Back System (aka as a “translator”)	A “translator” that accepts submissions of movement data in real time through integration with EPA systems. Movement information would be automatically reconciled by marrying submissions across jurisdictions systems, and relevant stakeholders could be notified.	Discounted
7	Adapt the middle system	Permit movement data to be reconciled through uploads of movement data to the “middle” system.	Discounted

Functional comparison

		OPTION 1	OPTION 2	OPTION 3	OPTION 4	OPTION 5	OPTION 6	OPTION 7
		System sharing and nation-wide access	A single Jurisdictions system nationally	Tailored stand-alone national system	Tailored integrated national system	Do nothing	Back system	Adapt the middle system
Function	Description							
Interstate	Track interstate movements (all)	COMPROMISED	✓	✓	✓	✗	COMPROMISED	COMPROMISED
Intrastate	Track intrastate movements (all)	✓	✓	✓	✓	COMPROMISED	COMPROMISED	COMPROMISED
Consignment Authorisation	Manage the consignment Authorisation process	✗	✗	✓	✓	✗	✗	✗
Cradle to grave	Source to fate tracking (including source codes, and management types)	COMPROMISED	COMPROMISED	✓	✓	✗	COMPROMISED	COMPROMISED
Industry	Industry specific requirements and terminology	✗	✗	✓	✓	✗	✗	✗
Jurisdiction	Jurisdiction EPA requirements and waste codes	COMPROMISED	✗	✓	✓	✗	COMPROMISED	COMPROMISED
NEPM	Collation of NEPM reporting data	✗	COMPROMISED	✓	✓	✗	COMPROMISED	COMPROMISED
BASEL	Collation of Basel reporting data	✗	COMPROMISED	✓	✓	✗	COMPROMISED	COMPROMISED
Middle system	Incorporate the middle system	✗	✗	✓	✓	STAND-ALONE	✓	✓
Data quality	Remediate known issues that contribute to data quality	✗	✗	✓	✓	✗	✗	✗
Data visibility	Provide visibility of data to relevant stakeholders	COMPROMISED	COMPROMISED	✓	✓	✗	✗	✗
Integration	Provide system integration points to minimise impact	✗	✗	✗	✓	✗	✓	✗



Options analysed

Option 1

System sharing



1

Introduce system sharing arrangements with neighbouring jurisdictions

2

Each jurisdiction to permit access to industry and EPA users Australia wide for movement reconciliation and reporting

Key



Jurisdiction with system



Jurisdiction without system



Possible shared system option



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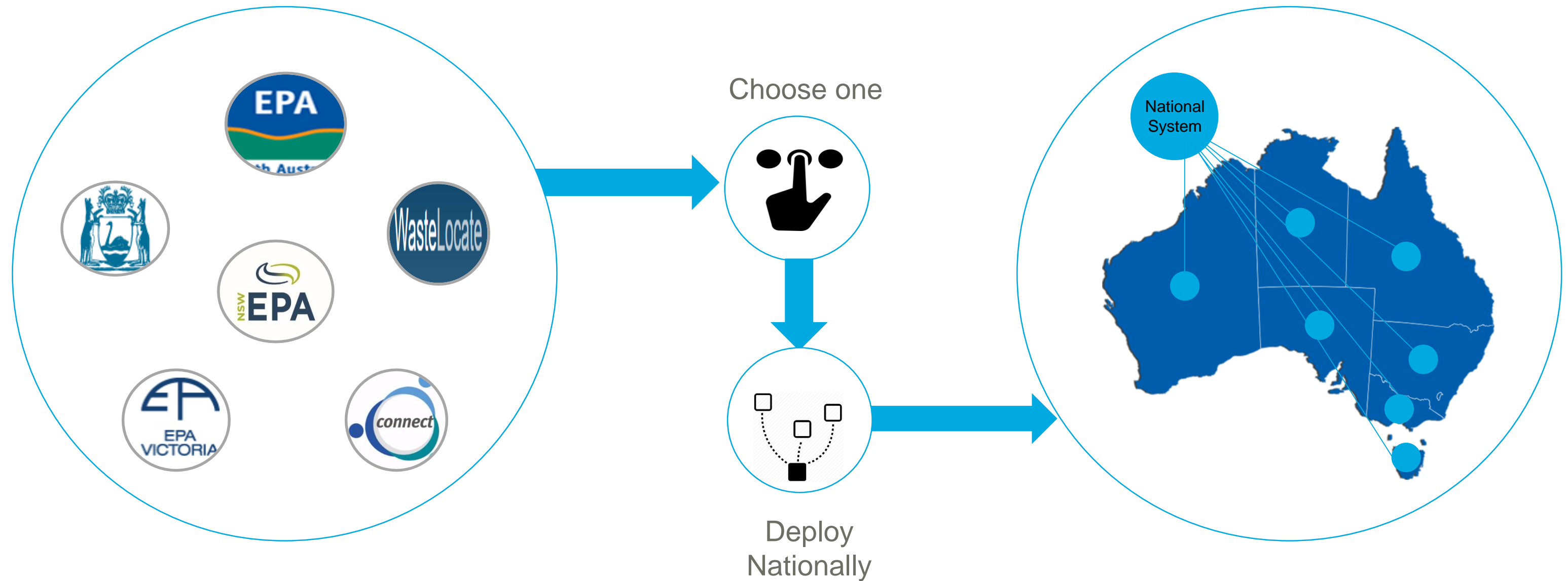
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Options analysed

Option 2

A single jurisdictions system nationally

Deploy a single jurisdiction EPA system nationally for all industry and jurisdictional users to adopt.



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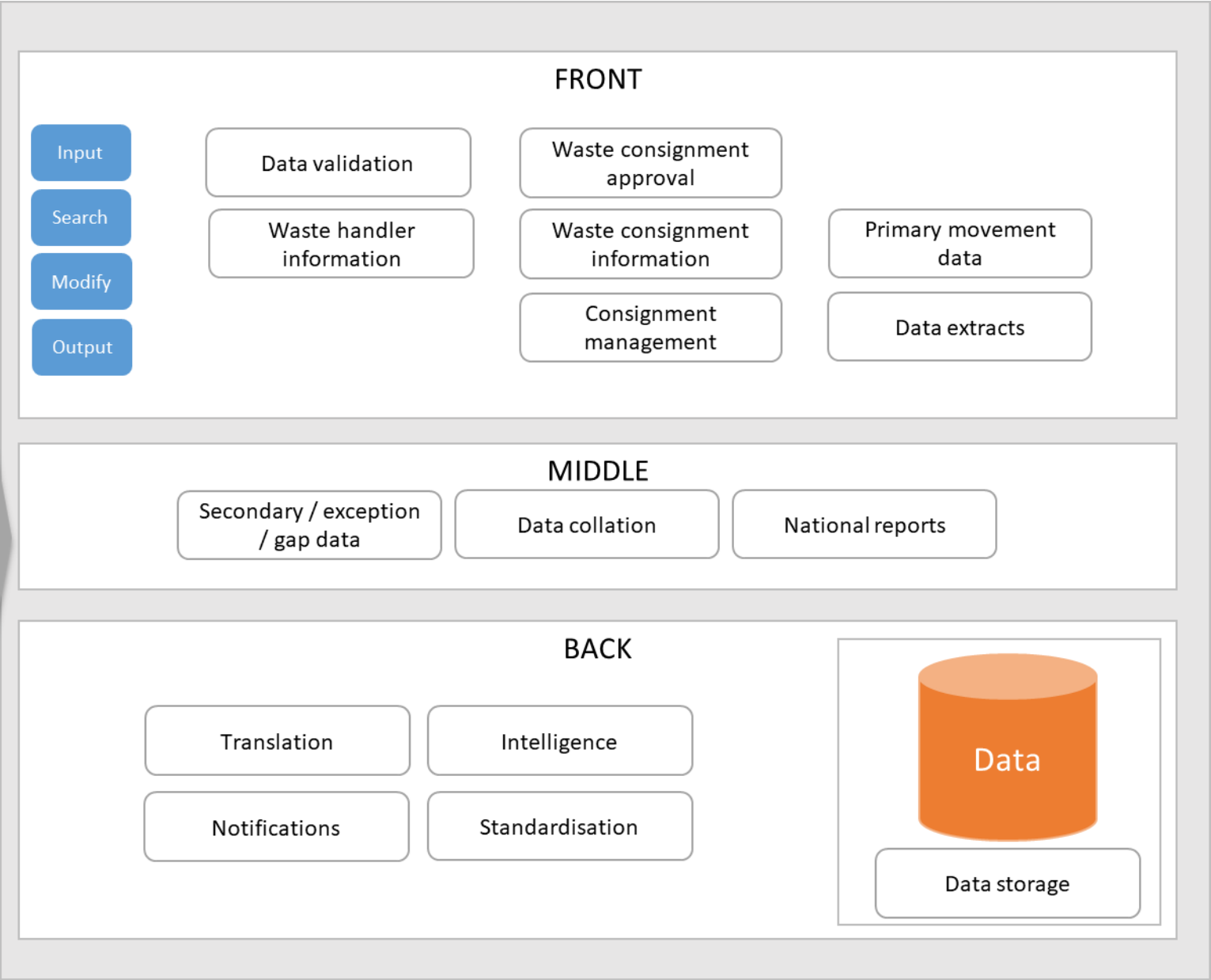
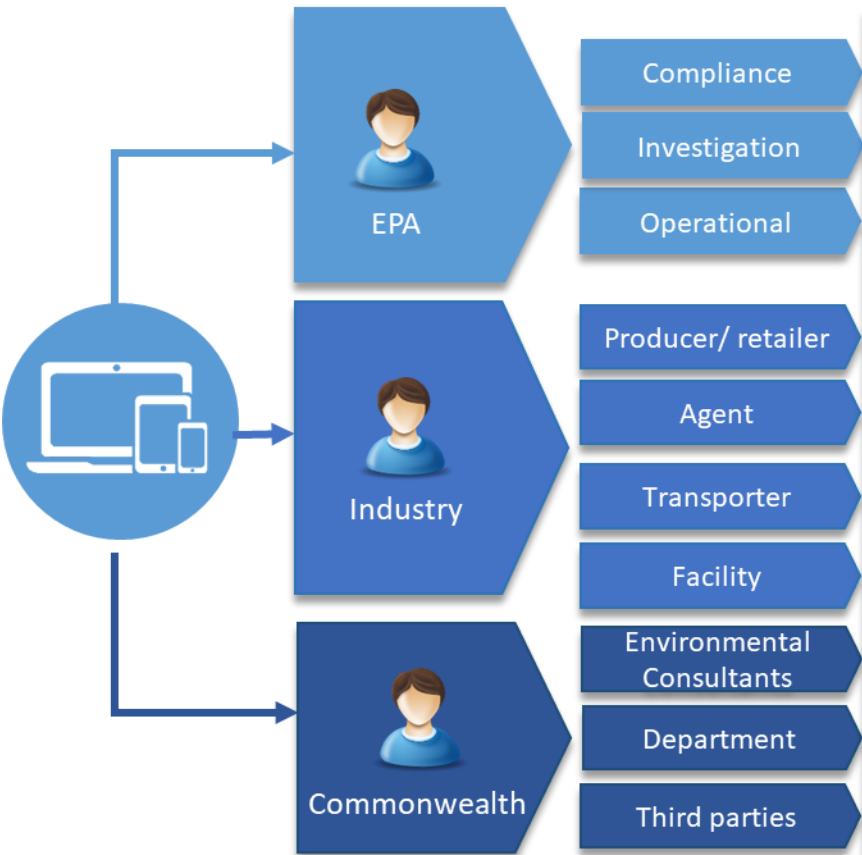
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Options analysed

Option 3

Tailored stand-alone national system

Custom build a system tailored to the needs of all jurisdictions and their industry users.

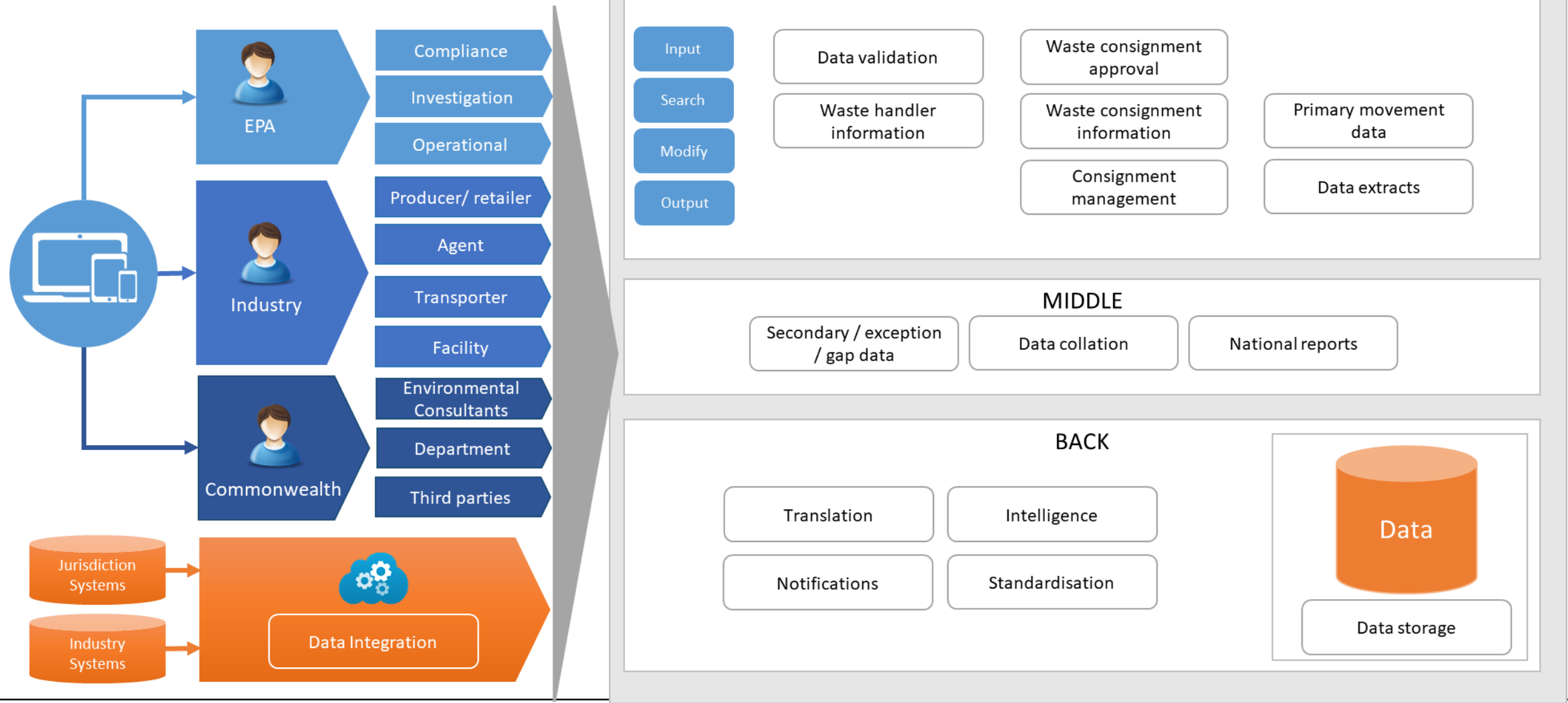


Options analysed

Option 4

Tailored integrated national system

Custom build of a system tailored to the needs of all jurisdictions and their industry users (the same as option 3, above). This option would additionally permit existing industry and EPA systems to integrate, enabling both industry and EPA users to input movement data in their own systems.



Options analysed

Option 5

Do nothing

Continue to do things as they are today.



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Options analysed

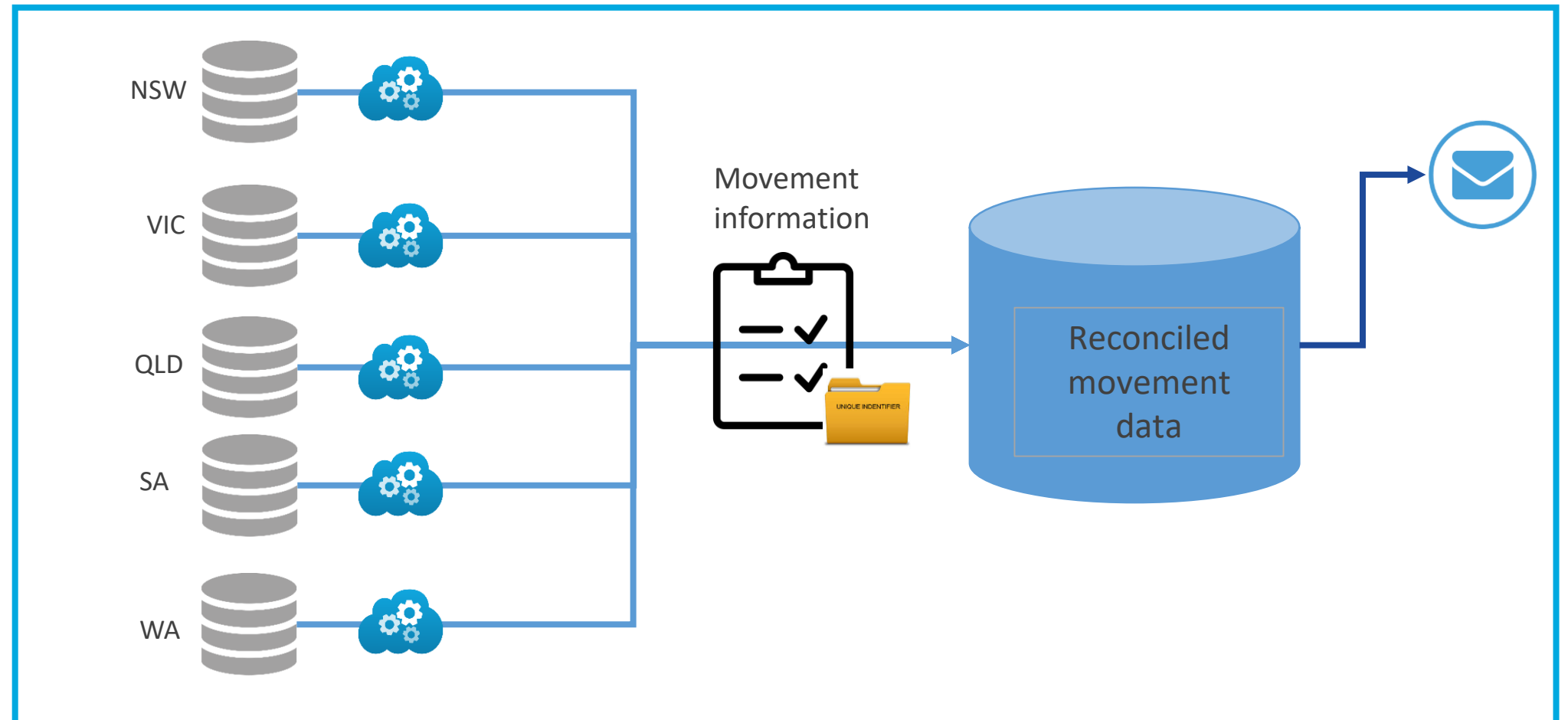
Option 6

Back system

A “translator” that accepts submissions of movement data in real time through integration with EPA systems. Movement information would be automatically reconciled by marrying submissions across jurisdictions systems, and relevant stakeholders could be notified.

Reason options was discounted:

- Does not meet the desired objective of removing the need for five-docket paper based transport certificates.
- Assumes there is a mechanism to match movement data supplied by different jurisdictions – this may not be possible.
- Does not cater to those jurisdictions who do not have a current tracking system



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Options analysed

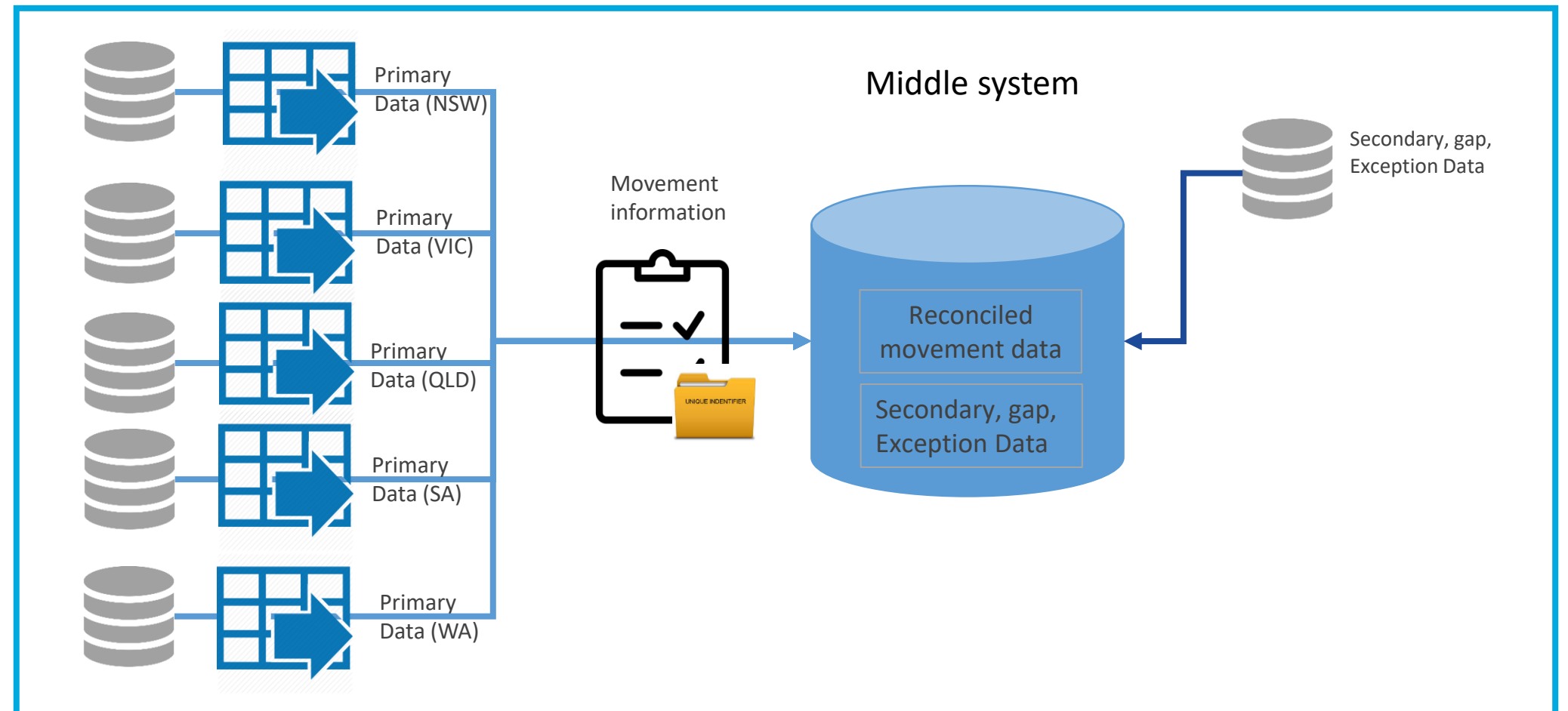
Option 7

Adapt the middle system

Permit movement data to be reconciled through uploads of movement data to the “middle” system.

Reason Options was discounted:

- Does not meet the desired objective of removing the need for the five-docket paper based tracking certificates.
- Assumes there is a mechanism to match movement data supplied by different jurisdictions – this may not be possible.
- Does not cater to those jurisdictions who do not have a current tracking system
- The “middle” system’s purpose is to collect information to compile data for NEPM and Basel reporting – to change the purpose of this system is to invalidate its original purpose



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SECTION

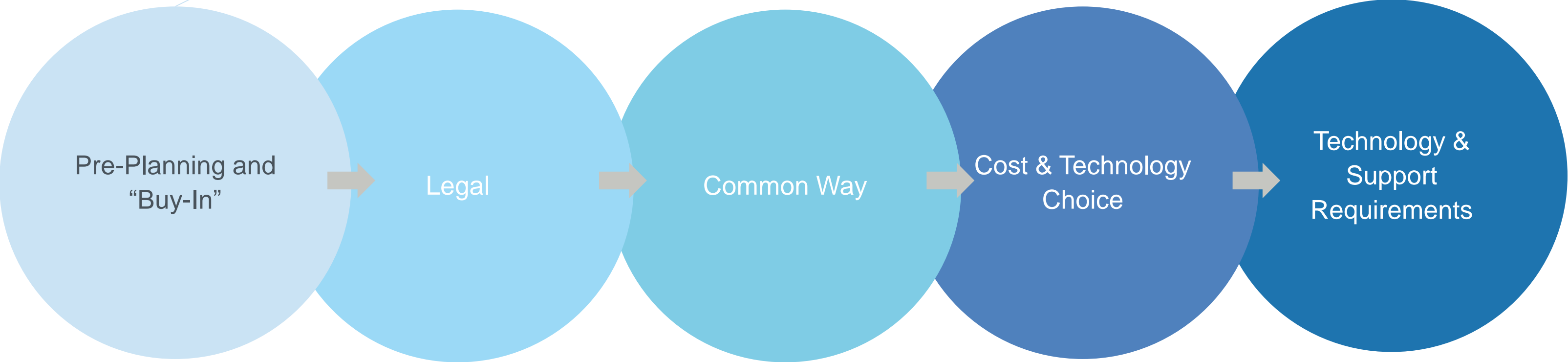
Next Steps

Transition to a Nationally Consistent Hazardous Waste Tracking System

THREE

Options Analysis - Next Steps

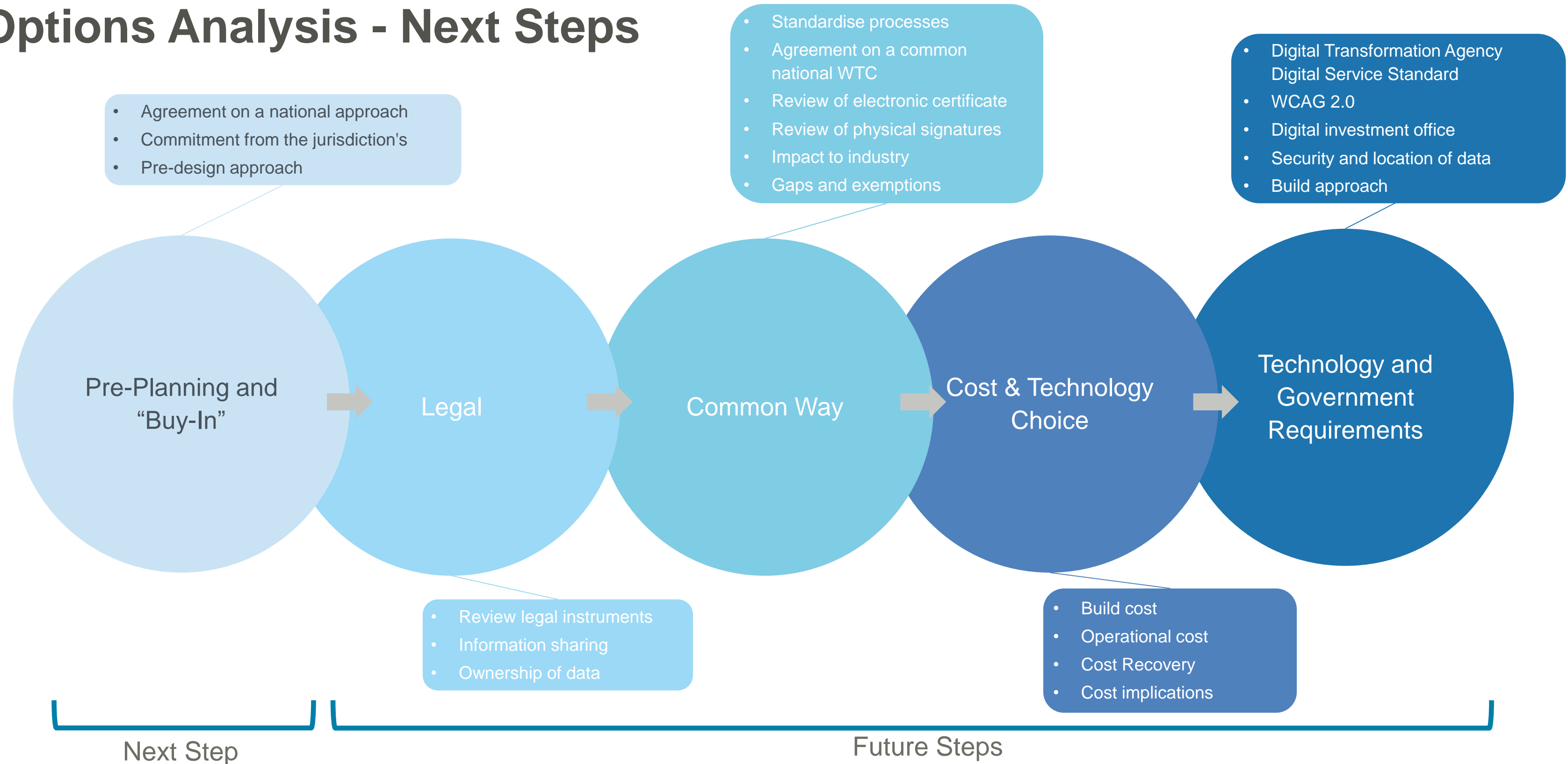
- Agreement on a national approach
- Commitment from the jurisdiction's
- Pre-design approach



Next Step



Options Analysis - Next Steps



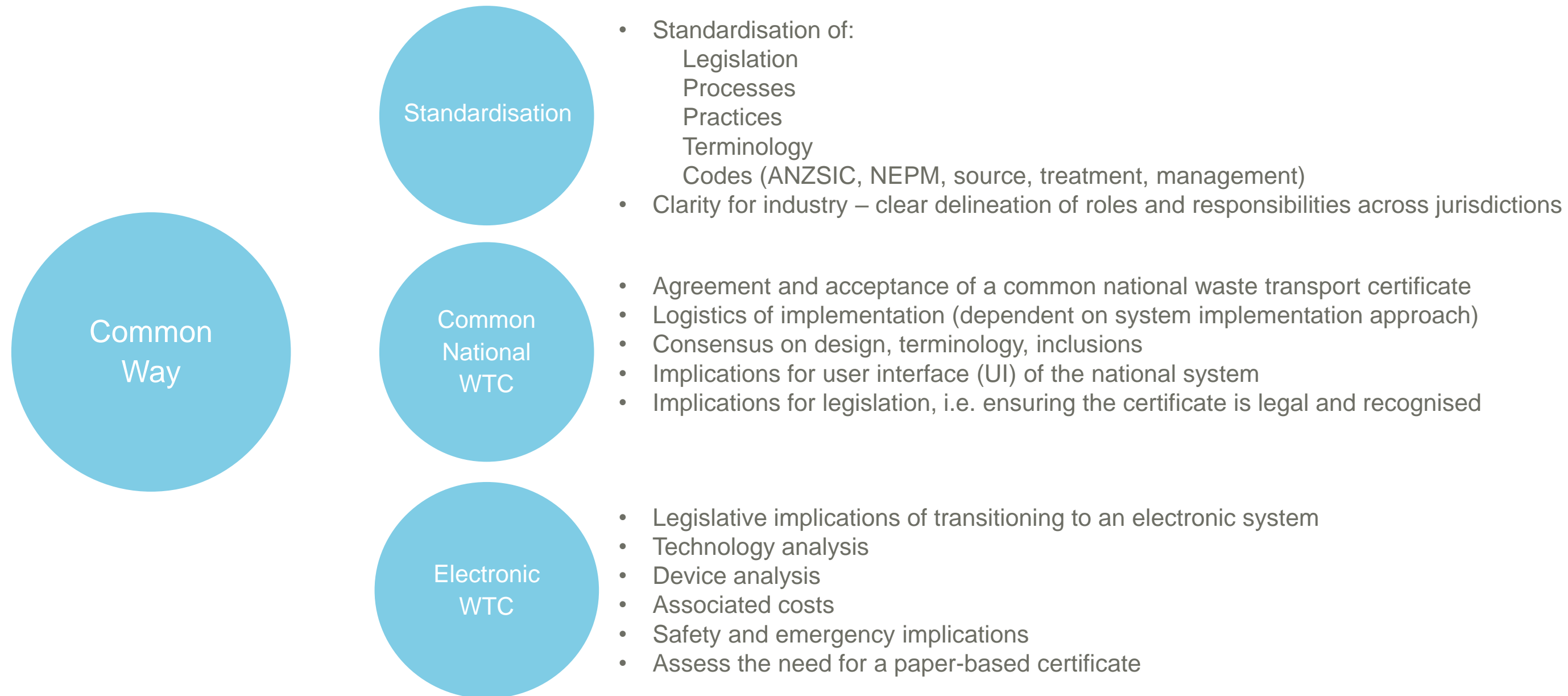
Options Evaluation – Next steps



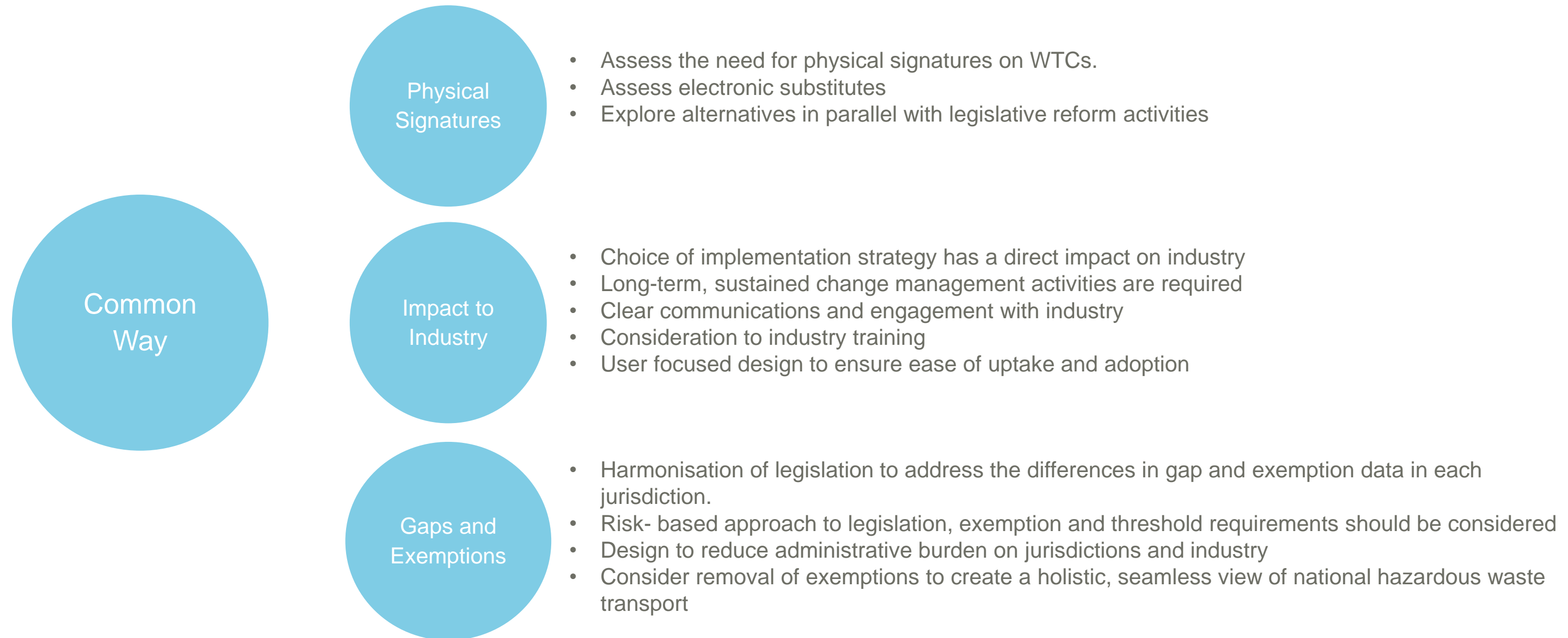
Options Evaluation – Future Steps



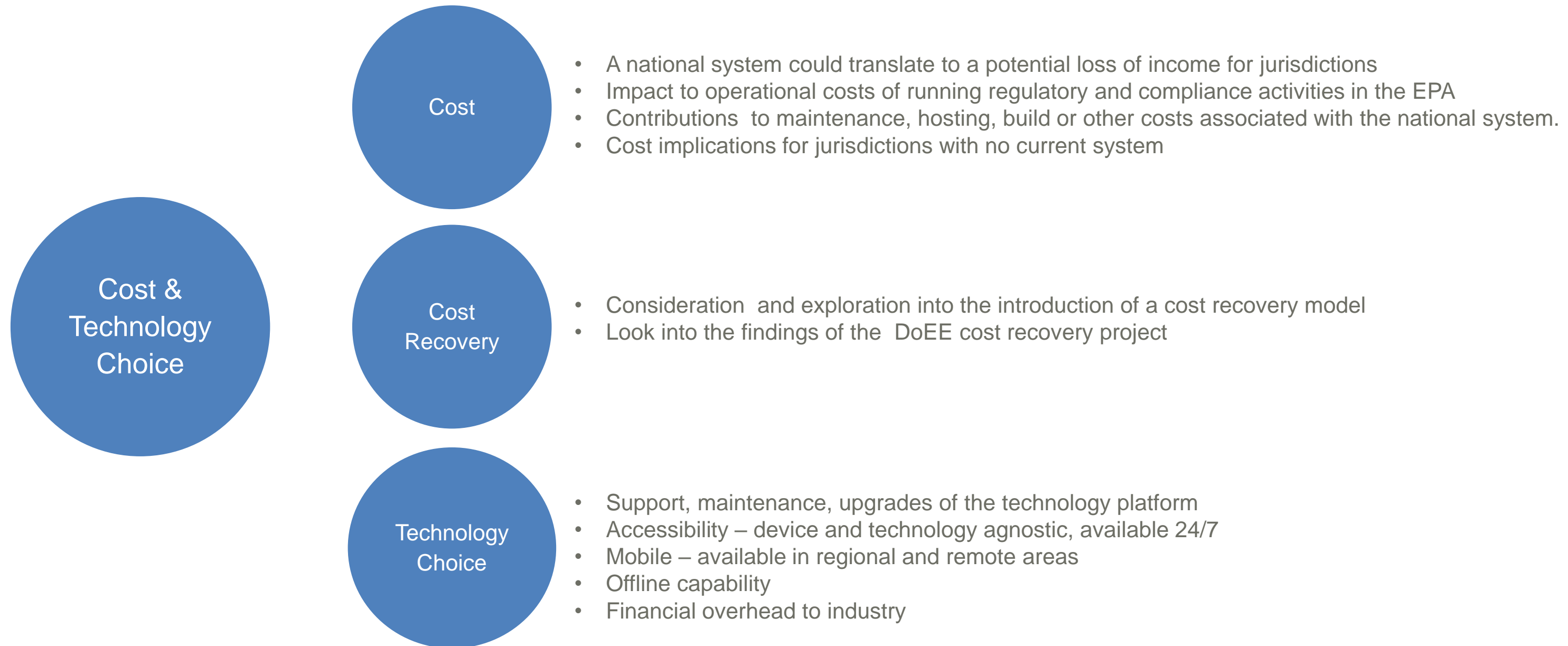
Options Evaluation – Future steps



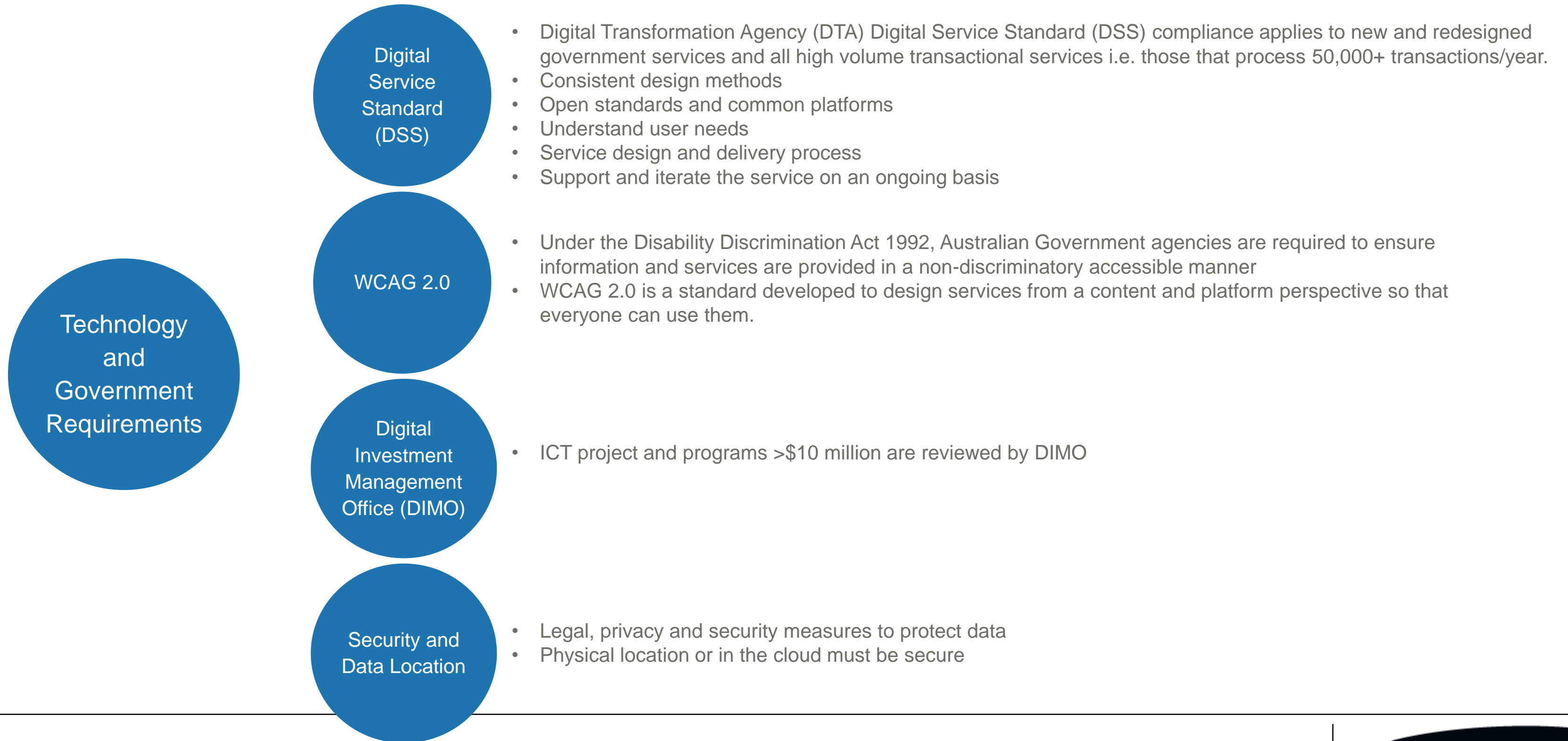
Options Evaluation – Future steps



Options Evaluation – Future steps



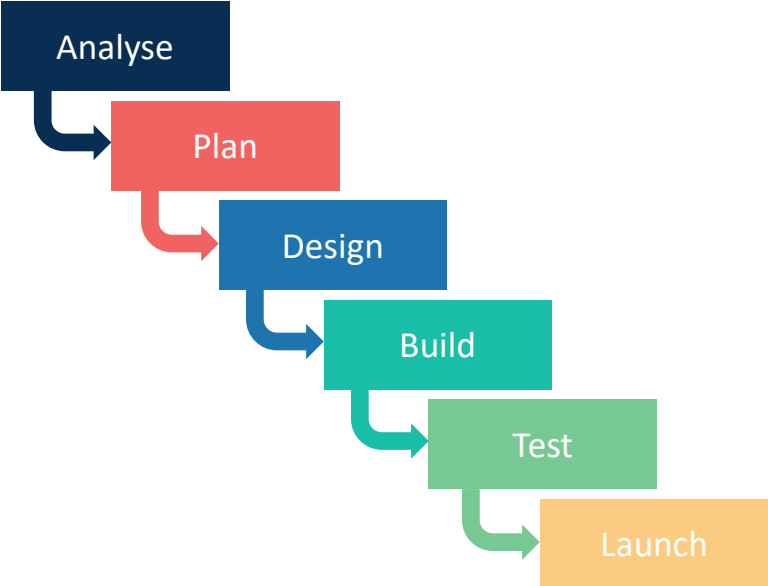
Options Evaluation – Future steps



Options Evaluation – Future Steps

Determine delivery approach

SDLC Waterfall model



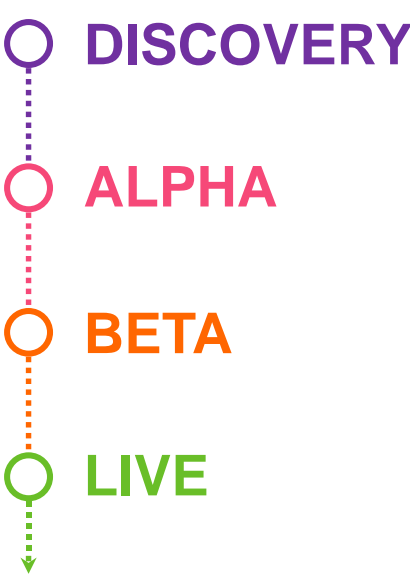
Traditional and sequential

Agile framework



Incremental and iterative

(DTA) Service design and delivery process



User-centred and iterative

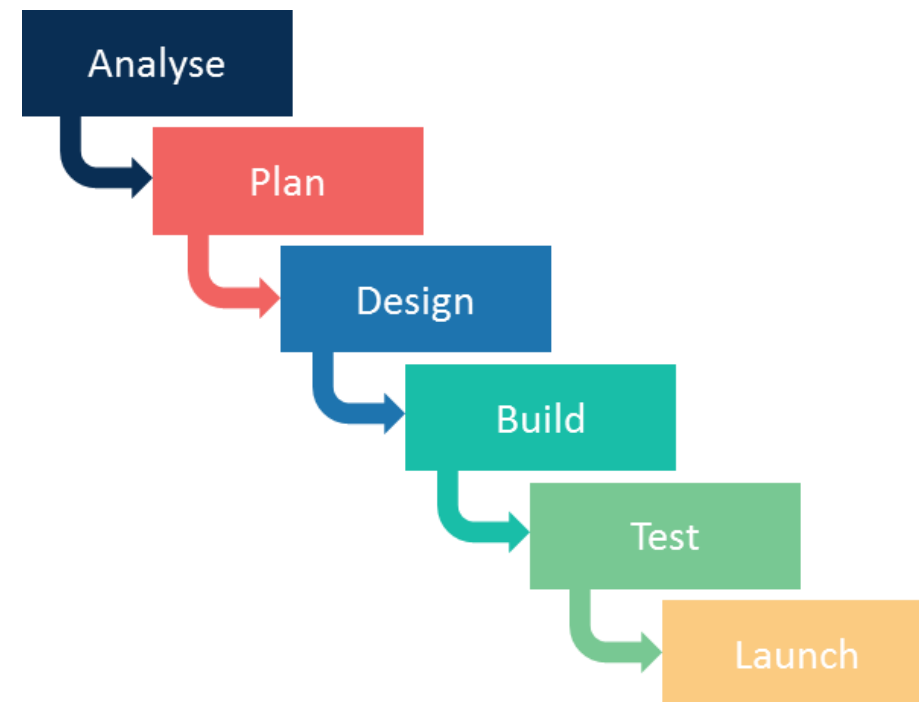


Options Evaluation – Future steps

Determine delivery approach

SDLC Waterfall Model

The waterfall model emphasises that a logical progression of steps be taken throughout the software development life cycle (SDLC), much like the cascading steps down an incremental waterfall. While the popularity of the waterfall model has waned over recent years in favour of more agile methodologies, the logical nature of the sequential process used in the waterfall method cannot be denied, and it remains a common design process in the industry.



Advantages

- Adapts to shifting teams
- Forces structured organisation
- Allows for early design changes
- Suited for milestone-focused development
- Scalability
- Well document
- Disciplined by design
- Easy learning curve

When to use waterfall?

- This model is used only when the requirements are very well known, clear and fixed.
- Product definition is stable.
- Technology is understood.
- There are no ambiguous requirements
- Ample resources with required expertise are available freely
- The project is short.

Disadvantages

- Non-adaptive time constraints
- Ignores mid-process client/user feedback
- Delayed testing period
- No working software until late in the development cycle
- High amounts of risk and uncertainty
- Not suitable to projects where requirements have a high risk of changing
- Projects rarely follow sequential flow
- Change is costly



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Options Evaluation – Future steps

Determine delivery approach

Agile framework

Software development within an Agile framework is focuses on iterative development, where requirements and solutions evolve through collaboration between self-organising, cross-functional teams. The Agile framework encourages frequent inspection and adaptation, a leadership philosophy that encourages team work, self-organisation and accountability, a set of engineering best practices intended to allow for rapid delivery of high quality software, a business approach that aligns development with customer needs and business goals.



Advantages

- High flexibility of the project
- Increased customer satisfaction throughout development process
- Constant interaction with stakeholders
- Continuous quality assurance
- Transparency
- Frequent and early opportunities to incorporate business feedback
- User focus

Disadvantages

- Problems with workflow coordination
- Difficult planning in early stages
- Professional teams are vital
- Lack of long term planning
- Less governance and reporting activities
- Difficult to fix price
- Work best with colocation of team members

When to use Agile?

- High degree of complexity
- Project is unique / novel
- Speedy develop is a necessity
- Requirements may change
- Ample resources with required expertise are available freely

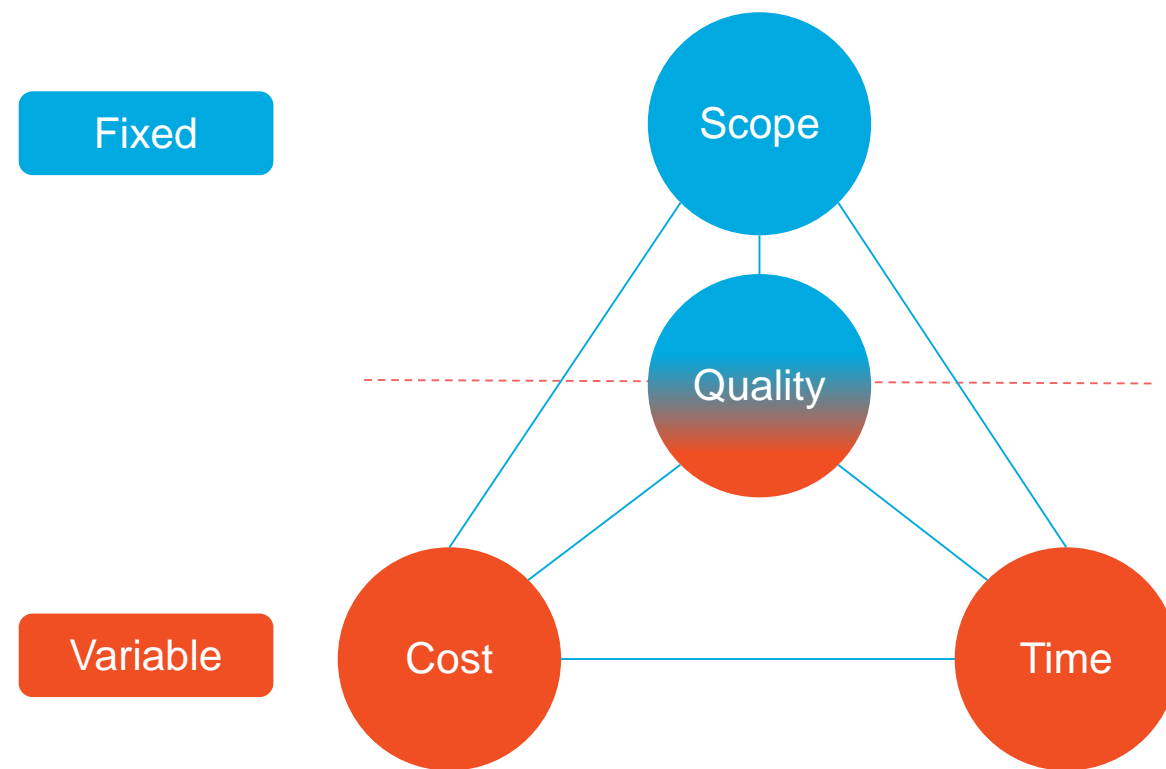


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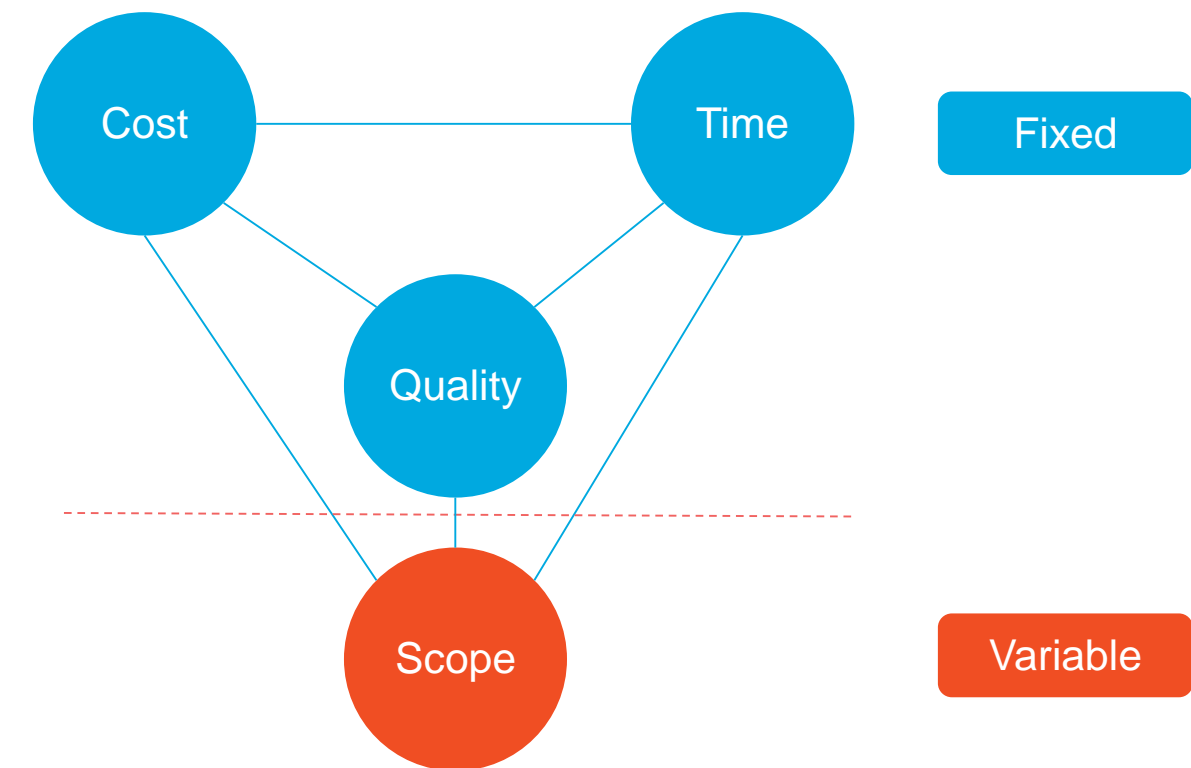
Options Evaluation – Future steps

Determine delivery approach

Waterfall Approach



Agile Approach

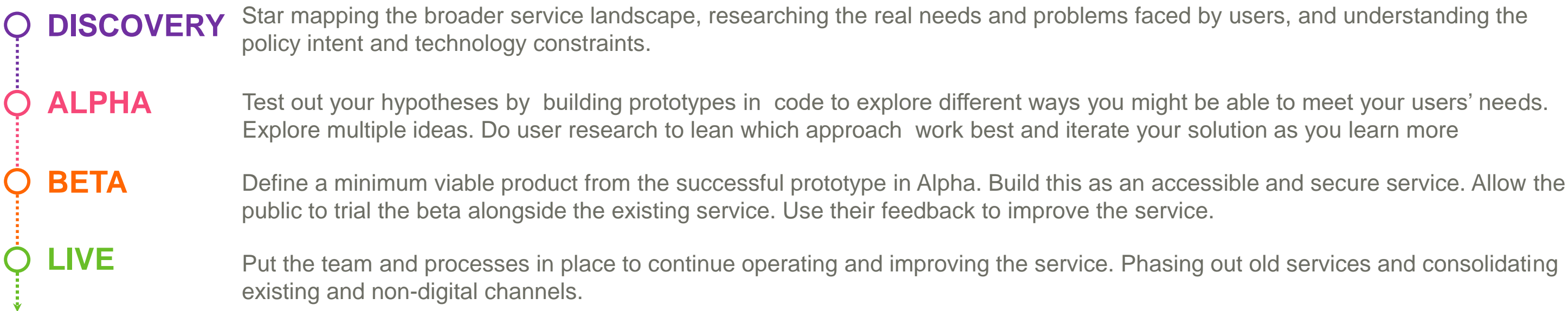


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Options Evaluation – Next steps

Determine delivery approach

(DTA) Service design and delivery process



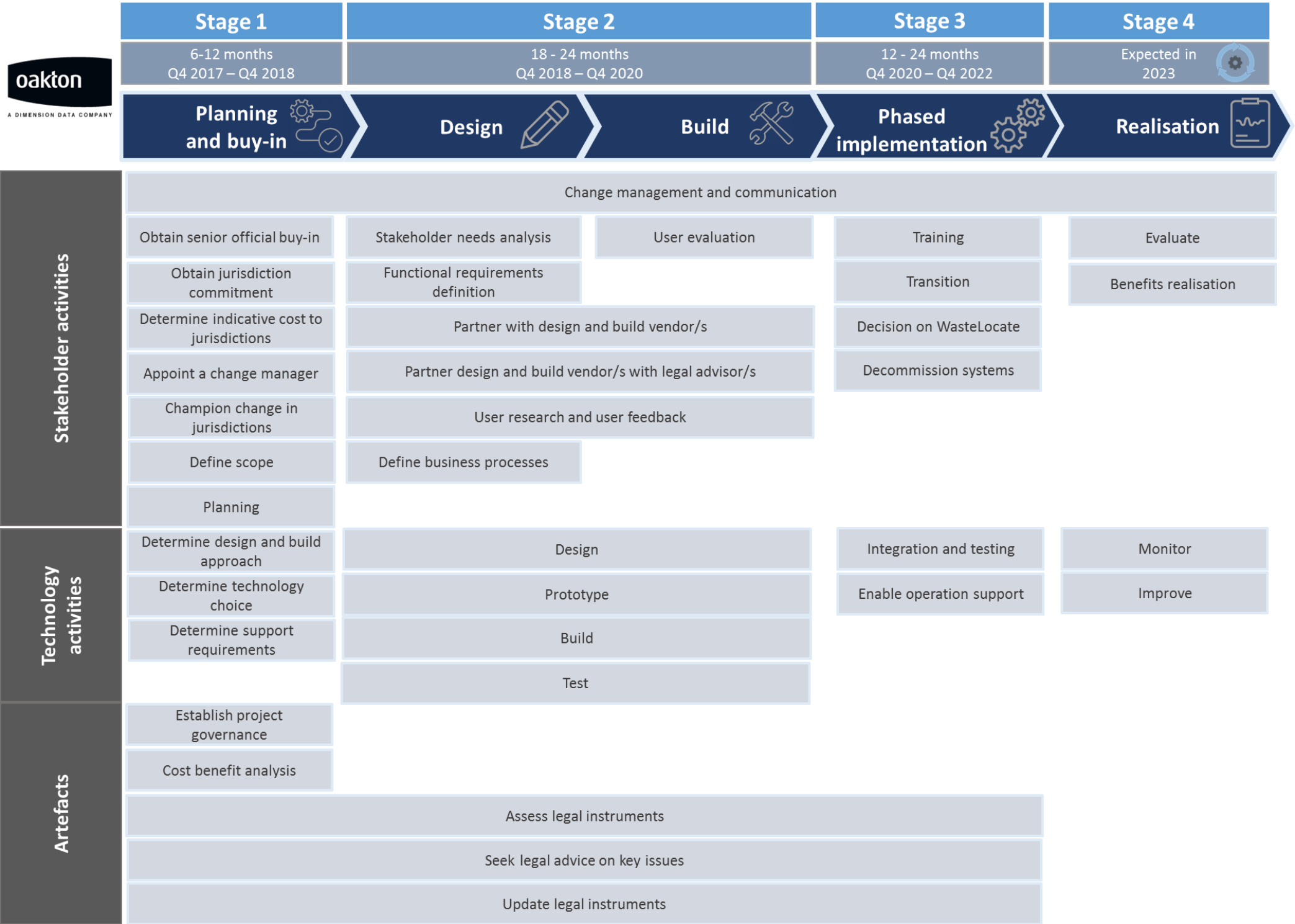
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Options Evaluation – Next steps

Define Implementation Plan for the selected option

This diagram outlines an indicative timeline and activities to consider for implementation of the selected option in stages. Activity represented under a stage is in no particular order.

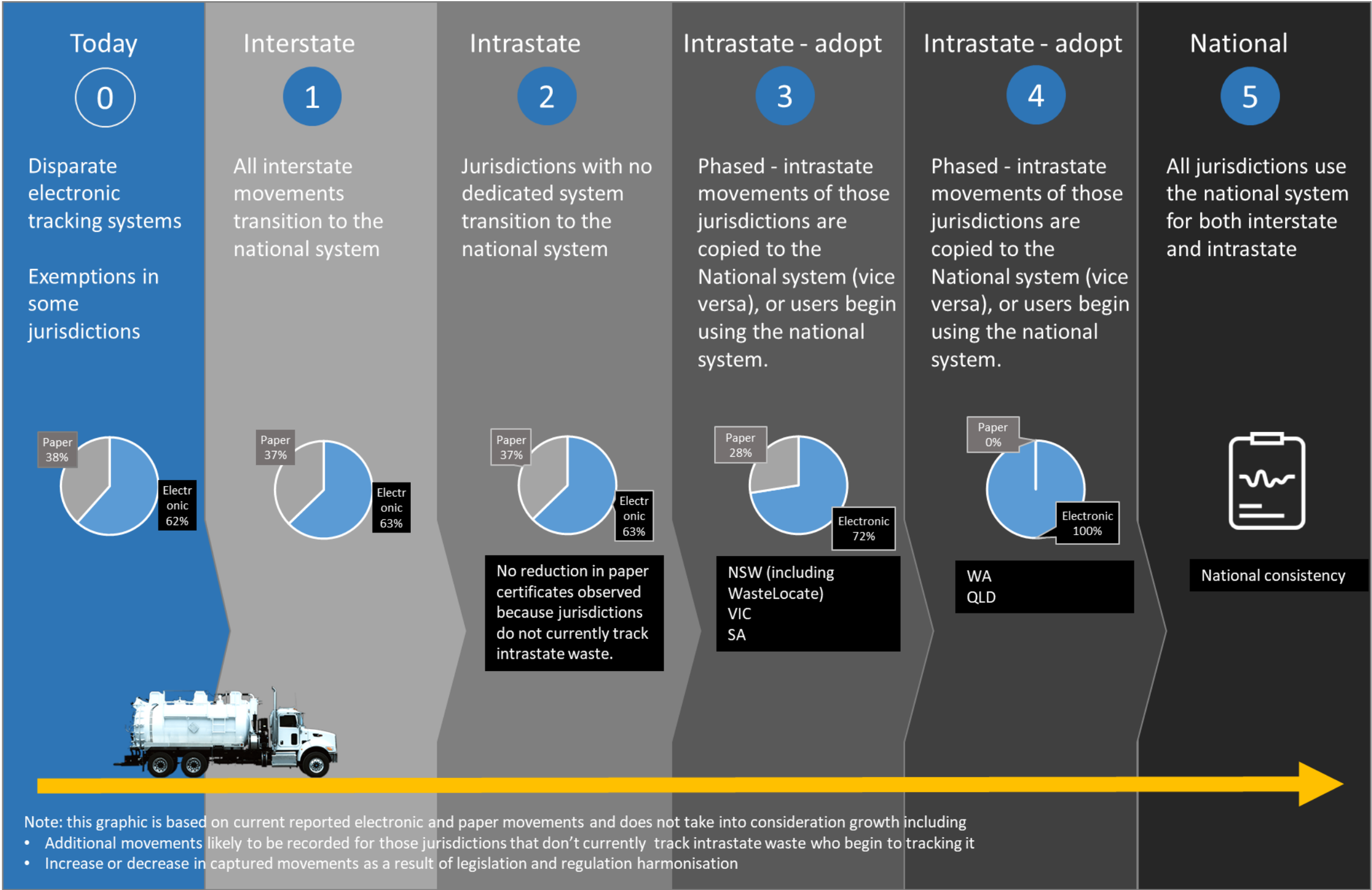


Options Evaluation – Next steps

Proposed transition

This graphic depicts an indicative transition of jurisdictions to a national system and demonstrates the slow decline in use of the five-docket paper certificates as adoption occurs.

Each jurisdiction can choose to integrate or adopt the national system – this includes WasteLocate.



Transition Risks



The Department does not secure the necessary funds to deliver a properly controlled project with relevant change management and training.



Changes in government or key jurisdictional senior officials during implementation see alternative view on need or adoption of a national system.



The Department is unsure about required support or platform options.



Stakeholders suffer from change management overload.



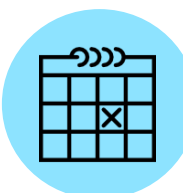
National system offers less features, functions and a compromised experience as compared to current system.



One or more jurisdictions are unwilling to review legal instruments to adopt the national system.



Lack of senior official and stakeholder buy-in and commitment.



Timelines are impacted due to delays with legislative reform.



Industry resist the change.



Key jurisdictional stakeholders are not enablers to the change.



One or more jurisdictions do not wish to use the national system.



Jurisdictions who integrate their system with the national system do not collect enough or the right data in line with the needs of the national system.



Jurisdictions who trial systems are unwilling to adopt the national system when it is ready.



Jurisdictions lack the technical capability to integrate their systems



Jurisdictions disagree on the way forward or a key standardisation to enable a national system.



Jurisdictions who integrate their system with the national system do not QA the input data and introduce data quality issues into the national system.



Implementation is confusing to industry about when they should use which system, and for what.



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SECTION

Complimentary work

National Waste Tracking System Requirements and Development Study

FOUR

Executive

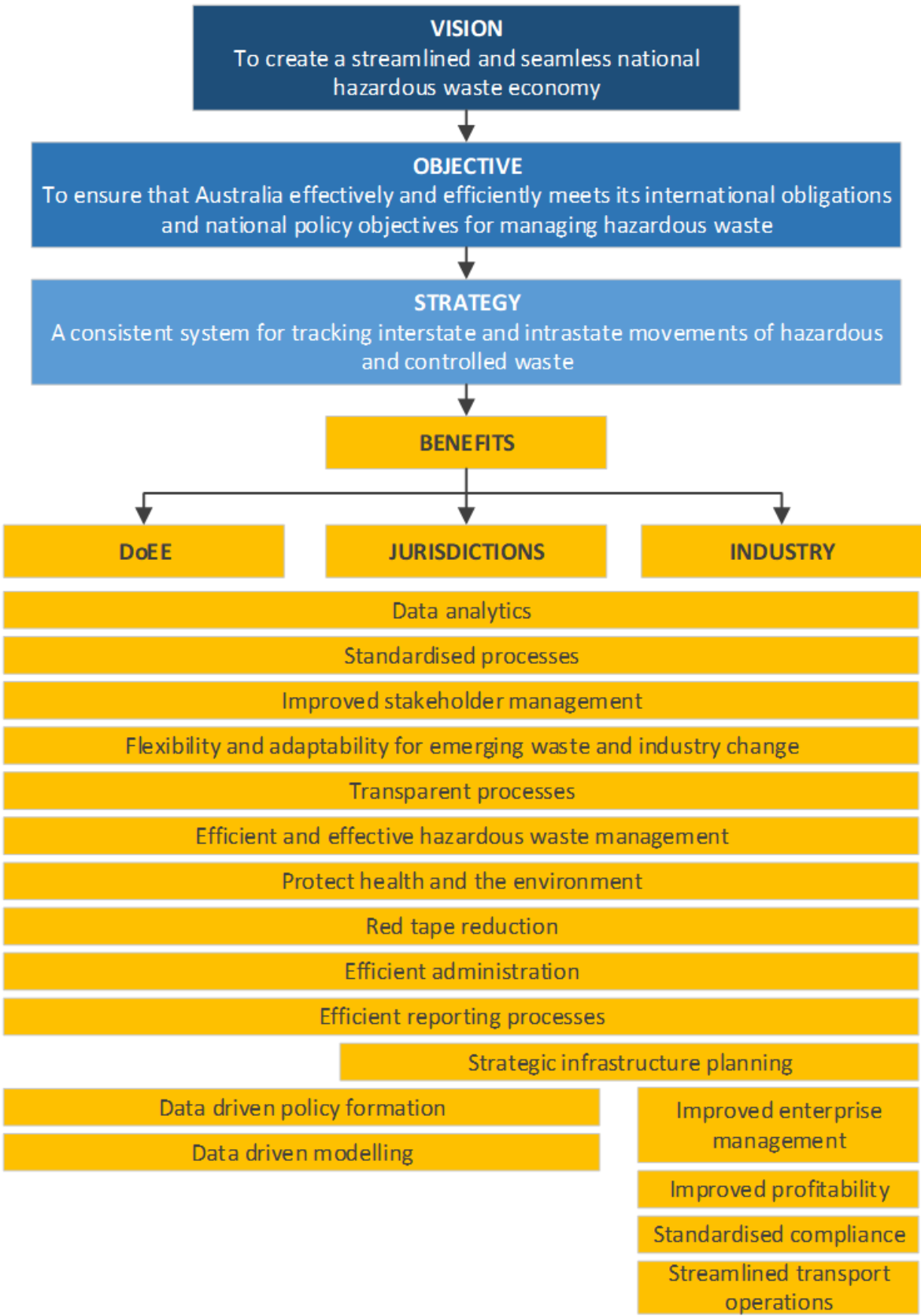
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Business Requirements

National Hazardous Waste Tracking System (NHWTS)

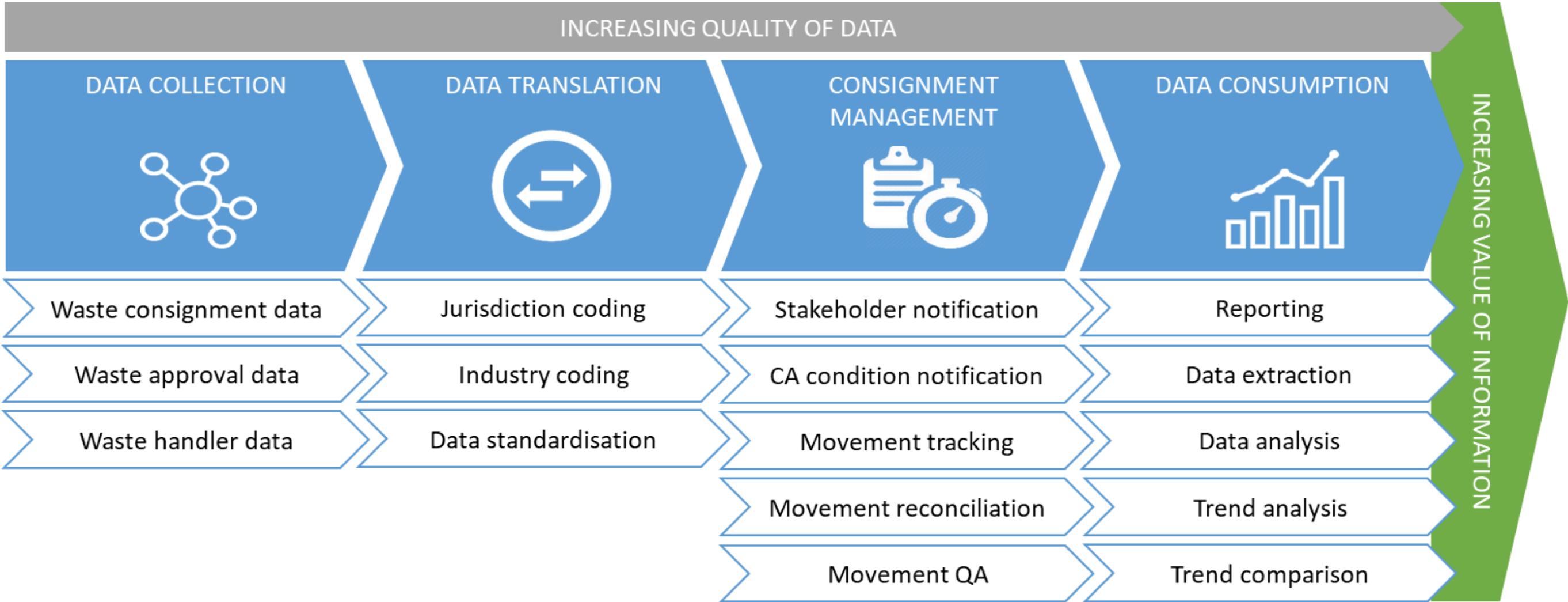
The diagram shows a clear line of traceability from initial vision to potential benefits, both shared and unique to the three primary stakeholders, the Department, the jurisdictions and industry. When analysed against the current state issues experienced nationally the true value of the Department’s reform vision is revealed.



Business Requirements

National Hazardous Waste Data & Tracking System (NHWTS) – Value chain

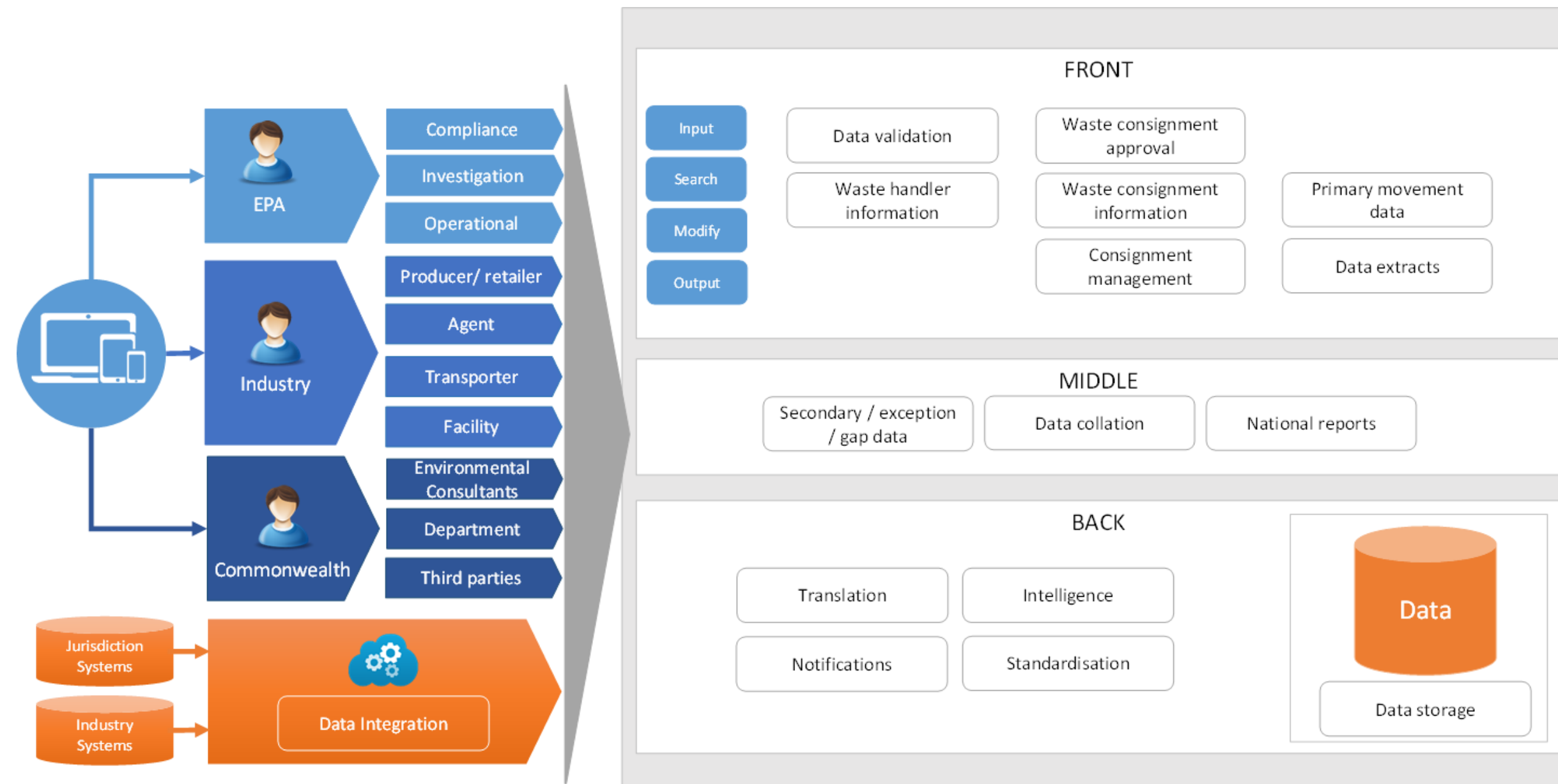
Implementation of a national system will see the quality of the data improve and the information the data yields will become increasingly valuable over time. This will assist the Department to trace the business requirements to the objectives of the national hazardous waste reform program to provide value to stakeholders.



Business Requirements

National Hazardous Waste Tracking System (NHWTS)

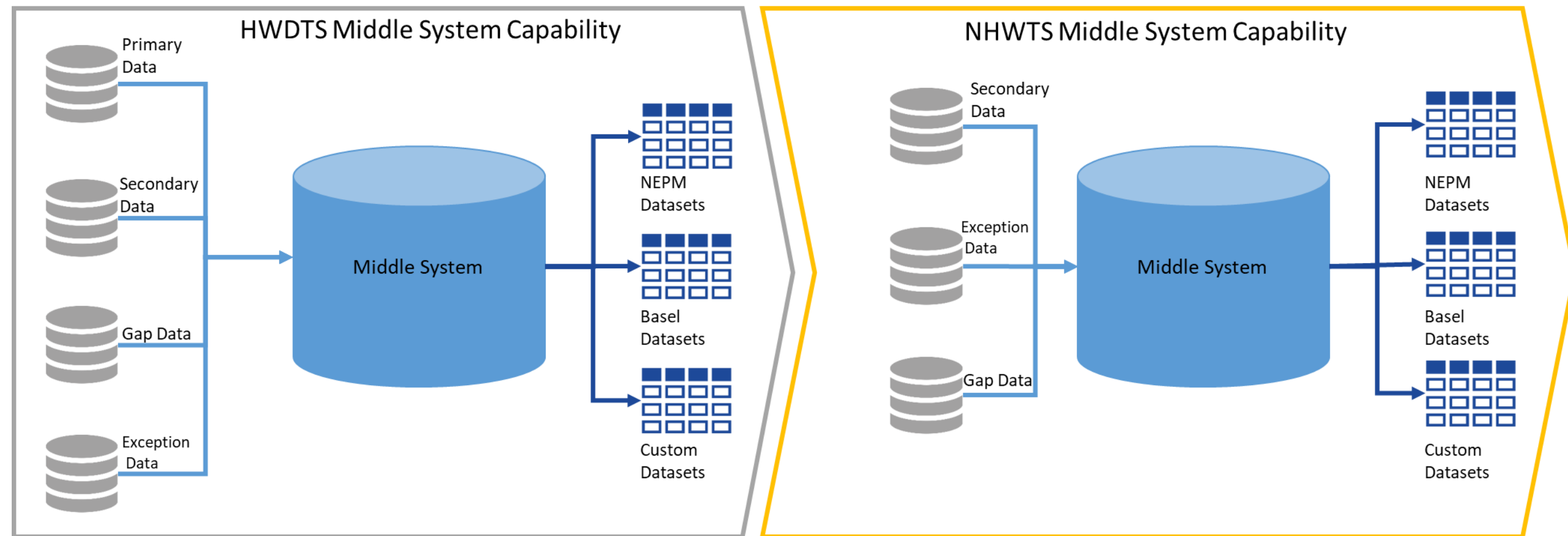
This system conceptual diagram that depicts the relationship between the front, middle and back systems and their capabilities, user types, user interaction with the system and the way external datasets may integrate with the NHWTS. This conceptual ‘system’ was derived from the options analysis and was used to assist shaping the business requirements.



Business Requirements

National Hazardous Waste Tracking System (NHWTS)

Change in the capability of the middle system the 'data tracking system' requirements study



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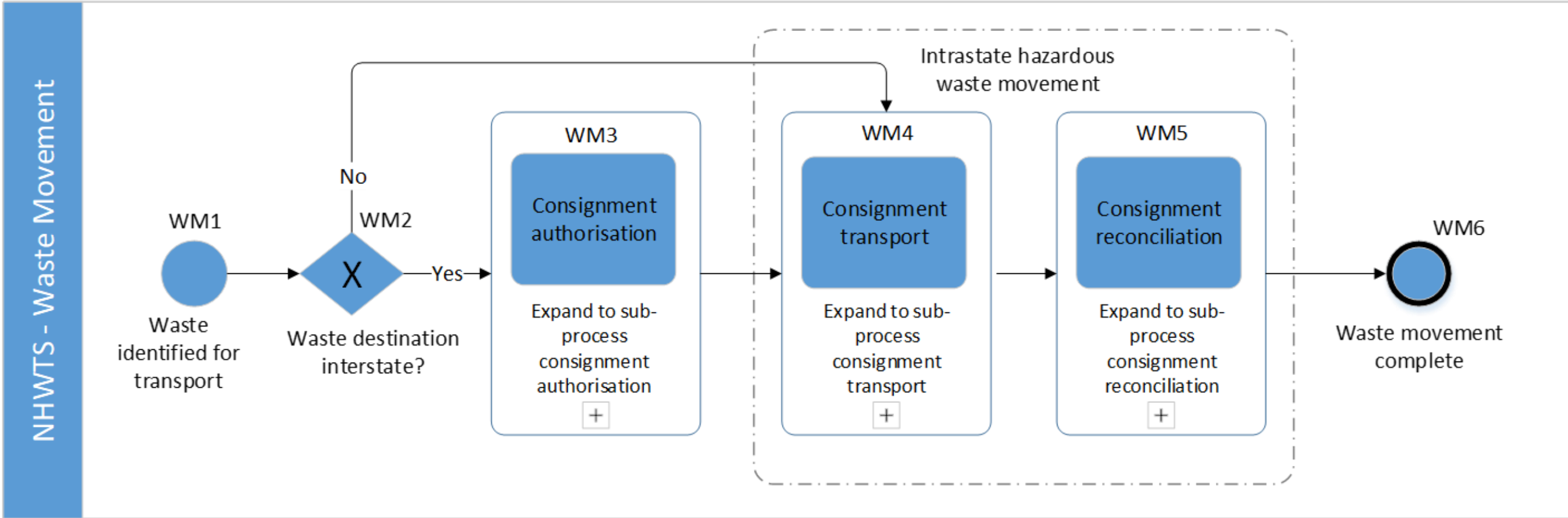


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Business Requirements

National Hazardous Waste Tracking System (NHWTS)

Business process diagrams were developed depicting the future state of hazardous waste tracking utilising the NHWTS.



Feasibility Assessment

WasteID as a platform to track national tyre waste movements

Objective:

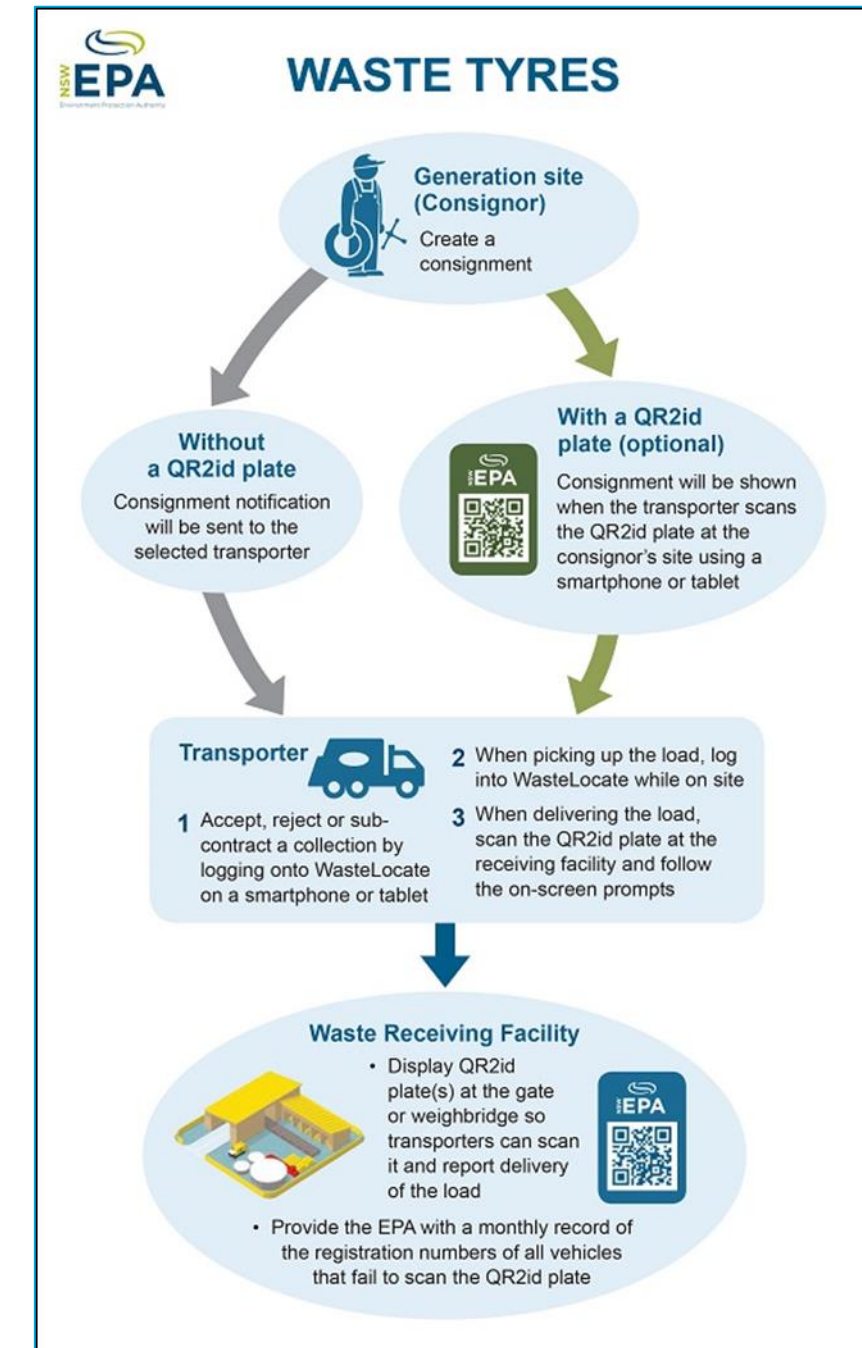
To evaluate the feasibility of using WasteID as a platform for tracking tyre and other waste types nationally, and to present the findings and recommendations to the Department on the outcome of this assessment.

Findings:

WasteID application is a viable base platform for tracking tyre and other waste types; however, it would require a moderate to high amount of customisation to meet the needs of a national system.

Considerations:

- Proposed implementation of the NHWTS
- Legislative changes required to enable successful implementation
- Detailed cost and cost recovery assessment
- Implementation strategy and timeframes
- Standardisation of processes
- Change management
- Data ownership



Electronic Systems Trial

Electronic systems trial in NT, ACT and TAS

Objective:

- Expose those jurisdictions without electronic systems to an electronic system.
- Enable the Department to form a preliminary understanding of requirements, gaps, issues and possible barriers to system implementation.
- Gain an understanding of jurisdictional capabilities
- Elicit requirements for a national system
- Prepare each jurisdiction for the proposed implementation of the future national hazardous waste tracking system (NHWTS)
- Understand required strategy and planning for implementation of a national system

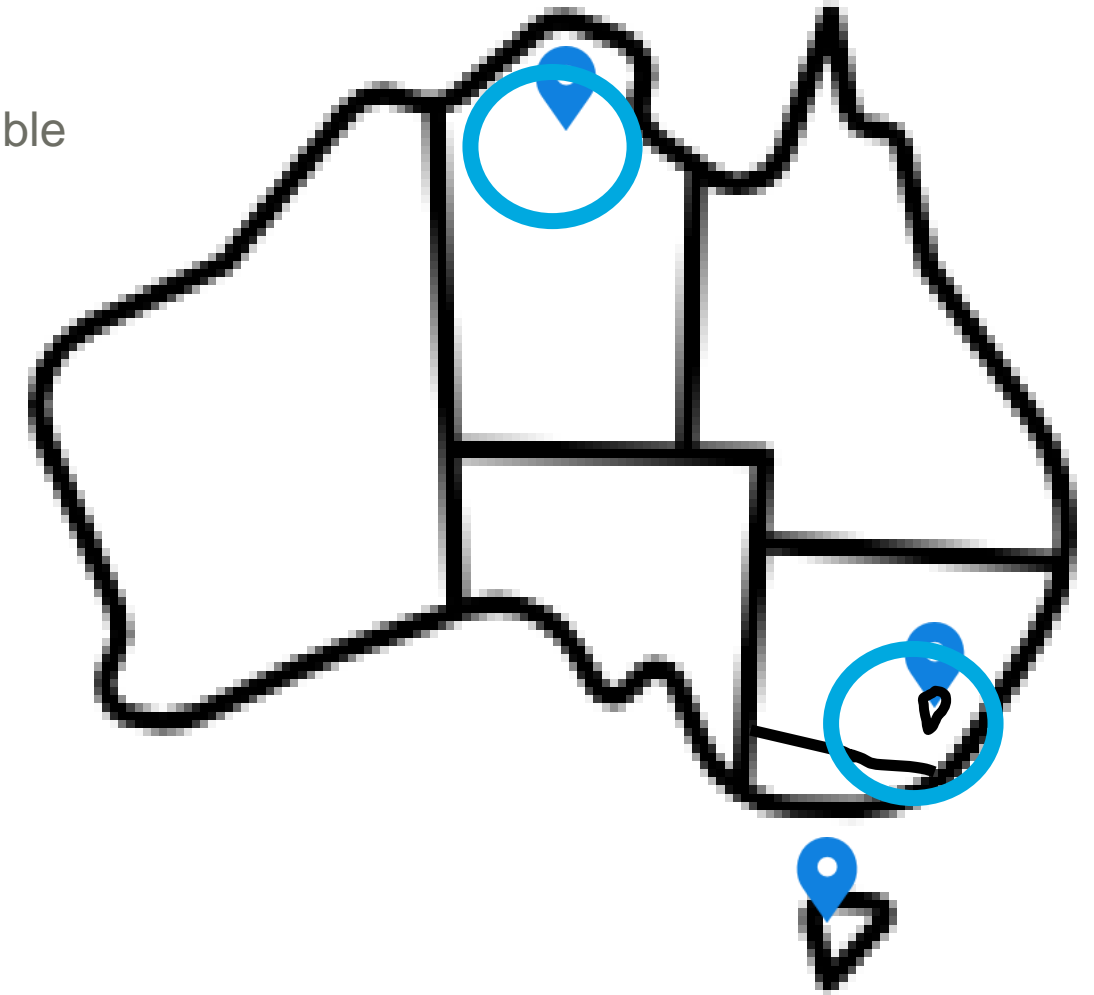
Participants:

- ACT & NT

Observations:

A number of observations in key areas were made that have implications for pertaining to the NHWTS implementation. There key areas were:

- IT capability
- Resourcing
- Comparison of systems
- Budget
- Clear mandate, approach and business owner
- Project governance and methodology
- Change management and training
- Legislative reform



Thankyou



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