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Project Deliverable

# *Cross-Border Road Transport Agency*

## *Architecture Roadmap*

Prepared for C-BRTA by Knotion Consulting



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## 1. Executive summary

The Cross-Border Road Transport Agency's vision is to consistently improve the flow of passenger and goods movements by road transport to ensure sustainable growth in the in the SADC region's economy.

The C-BRTA provides services to cross-border road transport operators, in the form of market access regulation, issuing cross-border permits as well as providing necessary support to the small and medium cross-border road transport businesses.

The future drive of the C-BRTA is to assist the South African economy by facilitating the movement of greater numbers of goods and passengers, and harmonising standards with neighbouring countries, thus increasing the value of trade between South Africa and the SADC community.

In order to achieve this the C-BRTA has recognised the need for an end-to-end operator management platform that conforms to industry standards and is built on a standard architecture. The Digital Operator Service Architecture (DOSA) has been developed as a Service Oriented architecture to achieve this need. The DOSA is supported by 6 reference architectures:

- Business Architecture
- Information Architecture
- Application Architecture
- Technology Architecture
- Integration Architecture
- Security Architecture

In order to develop a roadmap for implementing the DOSA, the current C-BRTA architecture was mapped onto various architectures in the form of heat maps. The business architecture does not show a large number of gaps as is supported by the SWOT analysis which states that the Agency has expert skills in relation to cross-border subject matter such as a good research team. The biggest gap for improvement is in the Application Architecture space. The C-BRTA in essence only has two systems that support its core capabilities - CBRTS and Enforcer. This actually counts in the favour of C-BRTA as there are less systems to be de-commissioned and that need to be integrated while the transformation process is happening.

By analysing the gaps 34 initiatives were identified to close the gaps. These are:



**Table 1: Theme and initiatives**

<b>Digitise Integrated Cross Border Management</b>
WP1 Implement a Web Discussion Forum
WP2 Web-site upgrade
WP3 Implement Social Media and Marketing solutions (Branding)
WP4 Implement flow calculator
WP5 Implement Project and Programme Management
WP6 Develop Market Access Regulation Tool (Scientific Modelling Tool)
WP7 Implement an Integrated Cross-Border Management System
WP8 Implement GIS solution
<b>Improve Relationship Management</b>
WP9 Improve stakeholder relations (CRM)
WP10 Improve Customer Support (CRM)
WP11 Implement Unified Communications
<b>Data sharing between departments (including real-time data)</b>
WP12 Implement an integration layer
WP13 Integrate with RTMC (Law Enforcement)
WP14 Integrate with Government Stakeholders (SARS, CIPC, eNATIS, etc.)
<b>Data and Information Sharing across C-BRTA</b>
WP15 Data sharing across CBRTA (Intranet)
WP16 Implement a Document Management Solution
WP17 Implement a data warehouse solution
WP18 Implement Business Intelligence Solution
<b>Automate supporting business capabilities</b>
WP19 Implement employee performance management
WP20 Implement an integrated HR management platform
WP21 Automate internal supporting processes (BPM)
WP22 Provide automated legal system
WP23 Implement a Risk and Compliance management solution
<b>Enhance Cyber Security</b>
WP24 Audit Logging
WP25 Implement security controls
WP26 Security monitoring and testing

<b>Modernise ICT</b>
WP27 Implement ICT Virtualisation
WP28 Develop a Cloud strategy
<b>Enhance ICT Capability</b>
WP29 IT Continuity Planning
WP30 Improve IT Service Management
WP31 Enhance IT Governance (COBIT)
WP32 Increase EA capability
WP33 Increase ICT capacity
WP34 Implement facility management solution

After analysing these initiatives, given C-BRTA's strategy and constraints, and changing them into work packages - it was possible to develop a roadmap consisting of 10 releases that will be implemented over 5 years.

An overview of the roadmap can be seen in the figure below:

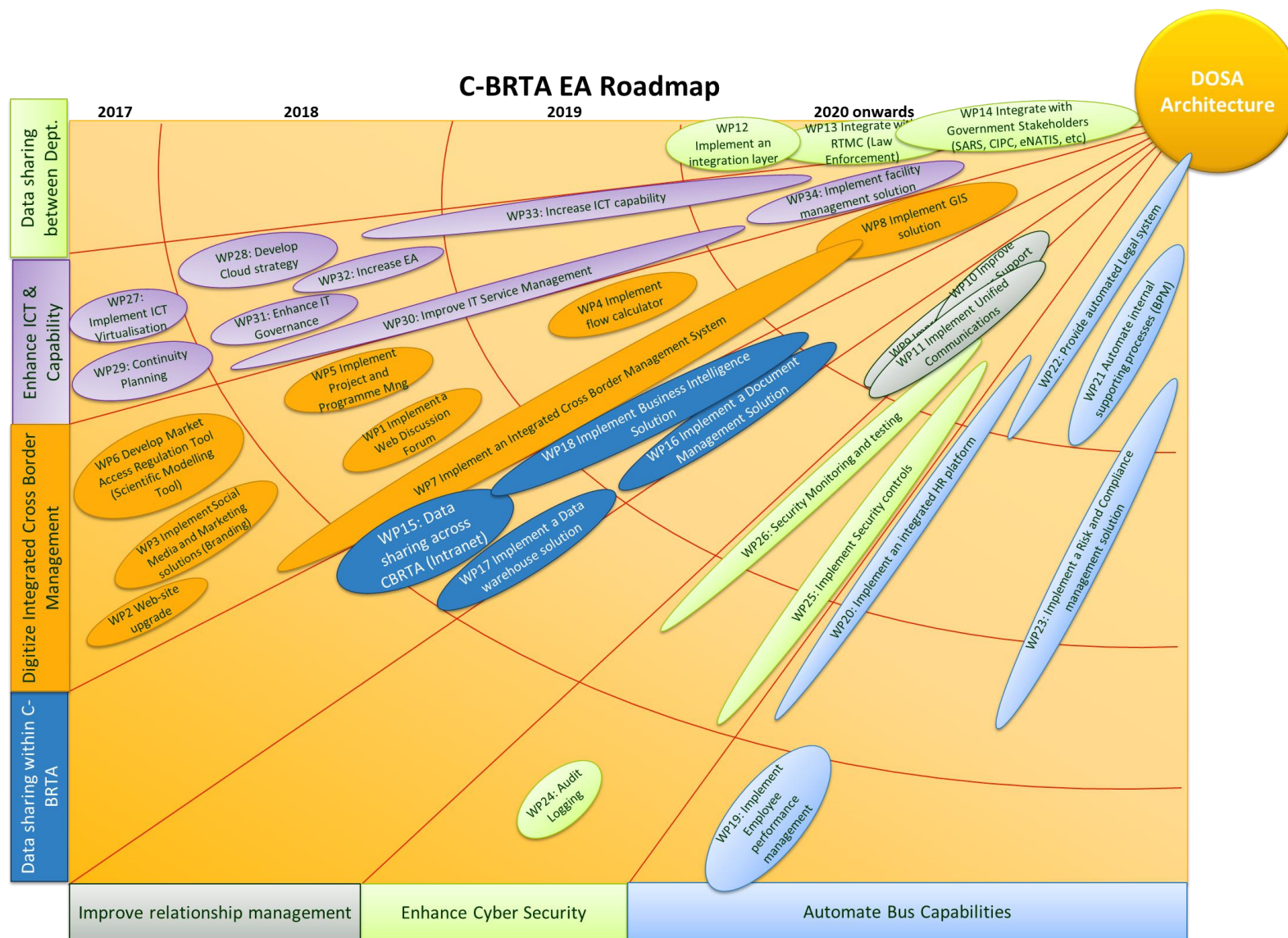


Figure 1: DOSA EA Roadmap

## 2. Business Overview and Background

The Cross-Border Road Transport Agency's vision is to consistently improve the flow of passenger and goods movements by road transport to ensure sustainable growth in the in the SADC region's economy.

The C-BRTA provides services to cross-border road transport operators, in the form of market access regulation, issuing cross-border permits, as well as providing necessary support to small and medium cross-border road transport businesses.

The future drive of the C-BRTA is to assist the South African economy by facilitating the movement of greater numbers of goods and passengers, and harmonising standards with neighbouring countries thus increasing the value of trade between South Africa and the SADC community.

The C-BRTA is mandated, and its operations are regulated in terms of the Cross-Border Road Transport Act (4 of 1998).

### 2.1. C-BRTA vision

The vision of C-BRTA has been revised to: "The champion of free-flowing inter-state operations"

### 2.2. C-BRTA mission

We spearhead the unimpeded flow of inter-state operations thereby facilitating sustainable social and economic development.

### 2.3. Strategic goals

During the 2015 - 2020 strategic planning process the following strategic goals were set out:

- Goal 1: Facilitate unimpeded flow of cross-border transport
- Goal 2: Strategic positioning to promote integration of the African continent
- Goal 3: Promote safe and reliable cross-border transport
- Goal 4: Enhance organisational performance in order to improve sustainability

### 2.4. Key performance indicators

During the 2015 - 2020 strategic planning process the following KPI's were identified to support the strategic goals:

- Implemented a scientific tool used by the Regulatory Committee to manage the supply and demand of cross-border passenger transport

- Developed and implemented Operator Compliance Accreditation Scheme (OCAS)
- Number of operator and corridor profiling reports for decision making
- Developed and implemented stakeholder management plan
- Number of Annual State of cross-border operations reports (ASCBOR) submitted to the Minister and other relevant stakeholders
- Number of country profiles developed
- Developed a model to calculate transit and cost of delays at commercial border posts
- Developed and implemented cross-border charges as an additional revenue stream
- Developed and implemented cross-border management system
- Percentage of temporary permits issued within pre-determined turnaround times

### 3. Architecture vision

#### 3.1. Business context

To develop an architecture vision, it is important to create a future business vision. Based on the mandate of C-BRTA and the current disruptive changes happening in the business environment today, a future vision for C-BRTA was created where:

- C-BRTA can play a part in the digital economy
- C-BRTA can be part of a “Smart Government”
- Permits are digital and the application for a permit can be done from anywhere
- Permit issuing is based on quality rather than quantity
- Seamless integration between government departments exist
- Trucks, busses, taxis - can provide information about their position and state of repair - rather than people
- C-BRTA can deliver a more cost-effective service to all stakeholders - because of technology
- Facilitation with operators and stakeholders happens pro-actively rather than reactively
- C-BRTA is the driver that unites the entire SADC cross-border industry (Linking Africa project)
- Staff can share information and work together seamlessly
- Processes within the C-BRTA are automated, efficient, and effective

In essence, a business architecture vision where:

“Free flow of transport is enabled by effective and efficient internal processes and by boundary less information flow”.

#### 3.2. Architecture context

Based on this business vision, an ICT architecture vision needs to be developed. This strategic Blueprint is needed to enable the four main objectives of C-BRTA in a digital world, namely:

- Regulate
- Facilitate

- Enforce
- Advise

The following principles were defined for the creation of the future architecture blueprint:

- One vision to work towards a common goal and alignment between business and IT
- Improve operator experience throughout the permit life-cycle journey (from providing a permit to facilitation of issues, etc.)
- Increase permit adherence through rewards and penalties by having a deeper and near real-time understanding of the operator behaviour
- Make the regulation and enforcement of operators autonomous (using technology rather than people) by using the latest technology such as: Service Oriented Architecture (SOA), Cloud and IoT (Internet of Things) to our advantage
- Increase value of permit by providing information to the operators when they need it, where they need it, in a secure and reliable manner
- Improve quality of advice given by C-BRTA to relevant stakeholders by exploiting data to create true business intelligence

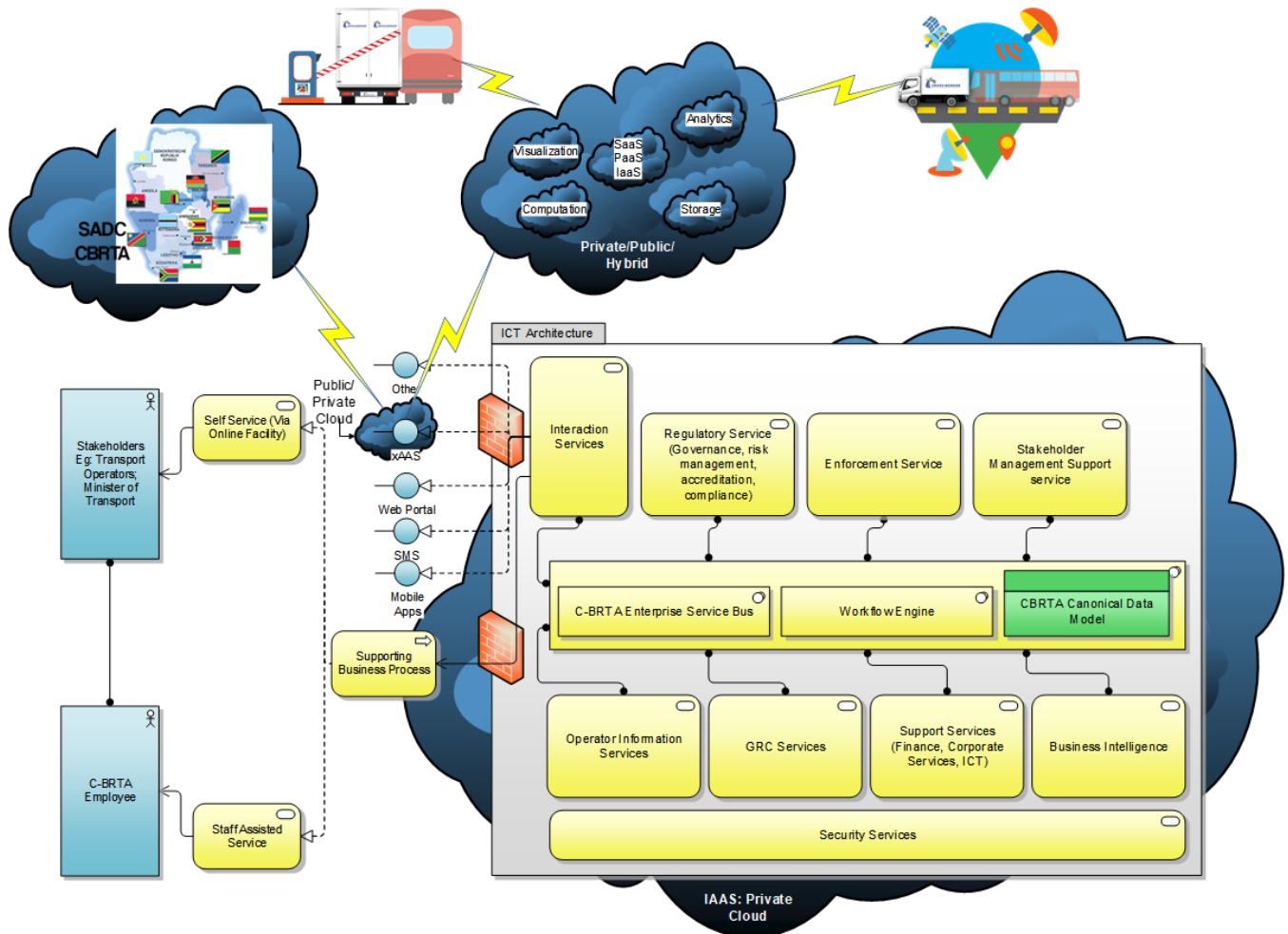
### 3.3. Digital Operator Servicing Platform

The resultant Enterprise Architecture vision is called the Digital Operator Servicing Platform (DOSA).

This Enterprise Architecture vision will be based on the following concepts:

- Reusable automated business processes
- Common entry point - Omni Channel or Portal
- Service Oriented Architecture (SOA)
- IoT - Internet of things
- Integration layer
- Security

See Figure 2: Digital Operator Servicing Architecture:



**Figure 2: Digital Operator Servicing Architecture**

The benefits of this target architecture are:

- Reduced waiting time on border posts and decreased number of road inspections
- Increased facilitation and communication with operators
- Sharing of information with all relevant agencies and regional integration
- Sharing of information with the C-BRTA
- Increased data for analytics and decision making
- Ability to exploit data to create new revenue-generating products
- System can be used and implemented in other SADC states
- Ability to provide digital permits based on quality rather than quantity
- Ability to track transport across SADC regions



### **3.3.1. Supporting Business Processes**

By introducing shared processes and removing process short falls C-BRTA will be able to perform their core functions in a more optimised and improved way by leveraging on automation and digitisation. With automated processes to govern and manage customer (citizen, operator, government stakeholder) relationship and facilitation, C-BRTA will be able to effectively regulate and manage the cross-border industry and increase service delivery. Automated processes will also enable the research and development capability within C-BRTA to effectively use data to create information and insight regarding the transport industry to guide decision making across C-BRTA and other stakeholders.

Using a SOA based ICT architecture means that supporting business processes can be created and updated quicker, and allows for process optimisation, as a process will be a string of services being executed in a specific order.

### **3.3.2. Interaction Service Portal**

The interaction service provides a common access point for various access mechanisms and will be in line with the broader eGovernment initiative and will enable integration into the broader government. This will enable C-BRTA to provide ease of use and unimpeded access to all stakeholders (internal and external), thus increasing the availability and reliability of C-BRTA service offering. The service will also allow stakeholders (external users and internal staff) to access, arrange, and view various content via multiple devices. The aim is also to enable an operator to start applying for a permit on one device and complete it through another channel.

A key benefit will be the ability to introduce of a set of mobile applications that will allow C-BRTA to communicate directly with the public and other stakeholders, thus increasing the value and recognition of the brand

### **3.3.3. Regulatory Service**

This supporting application capability will provide the following automated support:

- Request a new permit
- Request an investigation into a new route or a new operator
- Request to be registered as part of the accreditation scheme

- Request a service to be provided at a location (public)

The Permit Issuing service will be used by C-BRTA to create and store permits in an electronic format. This service will also determine the permit grading and rating, as well as the associated price of the permit. The assessment service will be used by C-BRTA personnel, third party inspectors, and enforcement agents to assess the operator's operations and vehicles from any location.

#### **3.3.4. Enforcement service**

The law infringement service will be used to capture and document any violation of an operator on a route or at an inspection area. The enforcement dispatch service will enable C-BRTA to systematically send notifications and instructions to enforcement agencies to act upon the issues in real-time. The alert service will give real-time data and alerts of any vehicles that are contravening their permit conditions. Device tracking and sensor data service will receive near-real-time information from all vehicles on the road.

#### **3.3.5. Stakeholder Management Support Service**

SADC client service will be used by SADC users to incorporate the DOSA system into their operations and creating an integrated environment. The notification service will be used by C-BRTA to send general public notifications, as well as to communicate and provide information to the drivers on the status of the route. The complaints service will enable operator drivers to notify C-BRTA of issues experienced on-route. The document management service will enable the different external stakeholders to get access to all relevant documentation pertaining to the operators. The industry management service will be used to assist the transportation industry to have a holistic view of all relevant operators and supporting agents within a specific area.

#### **3.3.6. Business Intelligence service**

The information sharing service will enable every stakeholder to get the correct information when and where they need it to make informed decisions and enhance the operations. The advisory reporting service will ensure that the C-BRTA create intelligent reports which will be used to:

- Provide advice to ministerial and bi-lateral stakeholders

- Create guidelines for policy development and programme initiatives by executives
- The scientific modelling service will enable the R&D department to analyse data and pick up trends and issues for:
  - Route and freight recommendations
  - Demand forecasting for corridors and operator types
  - To quickly profile drivers and operators in the industry

### 3.3.7. Support Services

Corporate services will use services from this service set to digitally manage all resources effectively. This includes:

- Human Capital Management
- Legal Services
- Facility Management

Finance and supply chain services will ensure that C-BRTA adheres to the correct governance rules and sound financial practises as part of its day-to-day operations; the services encapsulated in the offering are:

- Procurement
- Payments
- Penalties

Information Technology services will be the driver that ensures creative and effective solutions are introduced by understanding the entire ICT landscape and technical problems facing the core functions. It will also provide services to effectively manage ICT resources.

### **3.3.8. Governance, Risk & Compliance Service (GRC)**

By Incorporating GRC services C-BRTA will be able to deliver advanced risk management, with analysis of the impact of risks on strategic objectives and business performance. GRC applications automate audits and will ensure that C-BRTA and other stakeholders comply with all relevant rules and acts.

### **3.3.9. Operator Information Service**

This service will allow C-BRTA to “know your client” better by having a central source and “having the right information at the right time” about the operator to make informed decisions. Some of the information that may be contained are:

- A list off all drivers per operator and or drivers available in the industry
- Driver details and law enforcement infringements
- Vehicles registered per operator and all legal, regulatory, and roadworthiness information of the vehicles.
- Operator/driver traffic and permit compliance history
- Operator customs and load type and quantity history

This information set can be built through capturing information upon requesting a permit, but also using supplementary information from other government departments.

### **3.3.10. Integration Service**

Integration will be essential to create synergy across SA state agencies and the SADC regulatory bodies, as well as integrating with cloud IoT services. The enterprise service bus will enable seamless integration between different internal and external systems and will enable the sharing and storing of data between all relevant parties.

The integration service will also consist of a workflow management tool that will enforce business rules and ensure processes are followed, and it will enforce how information is shared with authorised users. The workflow engine provides the automation for business processes.

### **3.3.11. Canonical Data Model**

To operate as an effective integrated environment, data needs to be shared between various business applications via services. To share data effectively, a common definition for data needs to be defined, as various systems will have a different naming convention and even size definition for data. When systems want to share data - they do it using the common definition. The services use the common definition that is defined in the Canonical Data Model.

### **3.3.12. Security Services**

These sets of services will provide cross functional and cross domain security services ensuring that all system functions and information is safe and secured behind a robust security and firewall system. Deceive level security will ensure that the validity of data being received is trusted making sure devices are tamper proof minimising fraudulent activity. Network security will ensure that data is transported securely, shared, and accessed by authorised users only. Application level security will ensure that all data and information is safe and encrypted, and users have the correct system rights (edit vs. view). Service usage will be access controlled via a registration mechanism ensuring all records are kept of who access the system and what actions are performed.

### **3.3.13. Cloud Services**

Many businesses, large and small, use cloud computing today, either directly (e.g. Google or Amazon), or indirectly (e.g. Twitter) instead of traditional on-site alternatives. There are a number of reasons why cloud computing is so widely used among businesses today.

Up to date software - a cloud provider will be able to upgrade software keeping in mind feedback from previous software releases. Also, the servers are off-premise and out of sight, so the suppliers will take care of them on behalf of the organisation and roll out regular software updates - including security updates. Resources can then be used to focus on the things that matter, like growing support for BPC.

Reduction of costs - unlike on-site hosting the price of deploying applications in the cloud can be less due to lower hardware costs from more effective use of physical resources. Using cloud technology reduces your maintenance fees. No more servers, software, and update fees. Many of the hidden costs typically associated with software implementation, customisation, hardware, maintenance, and training are rolled into a transparent subscription fee. BPC simply pay as you

go and enjoy a subscription-based model. Add to that the ease of setup and management and suddenly a large, complex IT project becomes easier.

Universal access - cloud computing can allow remotely located employees to access applications and work via the internet. It's open - internet standards and web services will allow BPC to connect services to each other. This means that BPC can centralise information and access it from anywhere in the world, on any computer or mobile device, at any time. With cloud computing, if there is an internet connection an employee can be at work. And with most serious cloud services offering mobile apps, there is no restriction on which device could be used. The result? BPC can offer more flexible solutions to both clients and employees.

Potential to be greener and more economical - the average amount of energy needed for a computational action carried out in the cloud is far less than the average amount for an on-site deployment. This is because different organisations can share the same physical resources securely, leading to more efficient use of the shared resources. So it only uses the energy it needs and doesn't leave an oversized carbon footprint.

Flexibility - cloud computing allows users to scale up and down to meet their requirements. In today's economy, this flexibility is key, BPC can adjust its IT expenditures to meet its immediate needs, as you sell off or outsource certain functions, you can scale down on infrastructure requirements and cost.

Security - lost laptops are a billion dollar business problem. And potentially greater than the loss of an expensive piece of kit is the loss of the sensitive data inside it. Cloud computing gives you greater security when this happens. Because data is stored in the cloud, it can still be accessed, no matter what happens to the physical machine. Data can even be removed from lost laptops remotely.

Cloud-based systems will enable C-BRTA to optimise cost and expenditure for infrastructure and support service by using Platform-as-a-Service (PaaS) and/or Infrastructure-as-a-Service (IaaS)

Developing new C-BRTA Software-as-a-Service (SaaS) will allow C-BRTA to easily enable other SADC states or SA Agencies to use the same software as C-BRTA

With Internet-of-Things (i.e. devices in vehicles) - the data that will be received will be huge. It is therefore recommended to use a cloud subscription service to only receive relevant data about the transport vehicles. The cloud service can then receive, analyse, and store the data.

## 4. Target vs. Baseline Architecture

Using the architecture vision as a base, a detailed target architecture was developed. The current was then mapped into the target using a heat map analysis. The following sections show the gap between the baseline (current) and target (future) architecture in the form of heat maps with relevant findings: (this only provides an extract from the Target and Baseline Architecture deliverables)

### 4.1. Business Architecture gap analysis

See Figure 3: Business Architecture heat map below for a graphical view.

From the analysis that was done, at an architecture level there are not many major gaps to close. The following gaps however need to be considered and addressed as part of the roadmap:

- Digital Enforcement
  - New business capability with related business functions and processes will be required to manage digital tags and ePermits
- Enhanced Operator Information
  - To be able to store driver information, C-BRTA will need to understand from a POPI act point of view, what can be stored and the legal implications thereof
  - Understand the types of infringement information that can be stored and the impact on operators
- Foreign Operators and Vehicles
  - A limited profile for foreign operators will need to be developed
  - A linked device can then be used to monitor the good/non-compliant behaviour which may also result in infringements and fines
- Accreditation of Operators
  - Detailed processes and procedures need to be updated to assess and audit operators
  - Detailed processes and procedures need to be updated to manage operator accreditation status
- Other process gaps and/or improvements that will need to be made to realise the future vision
  - Route Optimisation
  - Development of Commercial Cross-Border Transport Industry
  - Regulatory compliance

- Corridor & route issues research
- Packaging and selling of research studies

#### Value Added Service Information

- The proposed enhanced capabilities and function to gather, collate and distribute value added information in terms of weather patterns and road conditions (road works, damaged road surfaces etc.) per corridor.
- Research is also required to gather added services along the routes, such as emergency medical and mechanical services. These services require accreditation. These accredited services are then disseminated to the operators per route and corridor, should these services be required.
- This information needs to be reviewed regularly.





## 4.2. ICT Architecture gap analysis

See Figure 4: ICT Landscape heat map below for a graphical view.

From the analysis that was done, at an architecture level it is in the provisioning of ICT support that can contribute the most to the efficiency of C-BRTA and this will be required to enable C-BRTA to become a digital player in the cross-border road traffic business.

The following gaps are highlighted:

- An Integrated Cross Border Management System that is developed, greenfields and modular will enable future growth
- C-BRTA will greatly benefit from an Enterprise Data Management capability
- Development of a Mobile App will provide a value-add service to Operators
- “Plugging” an Enterprise Business Intelligence solution unto the Integrated Cross-Border Management System will have major research and decision-making support benefits
- Enhancing the existing ICT capability will be required
- IOT device management and communication network will be required
- Automating processes will greatly improve service delivery
- Providing a CRM solution will improve both operator and stakeholder communication

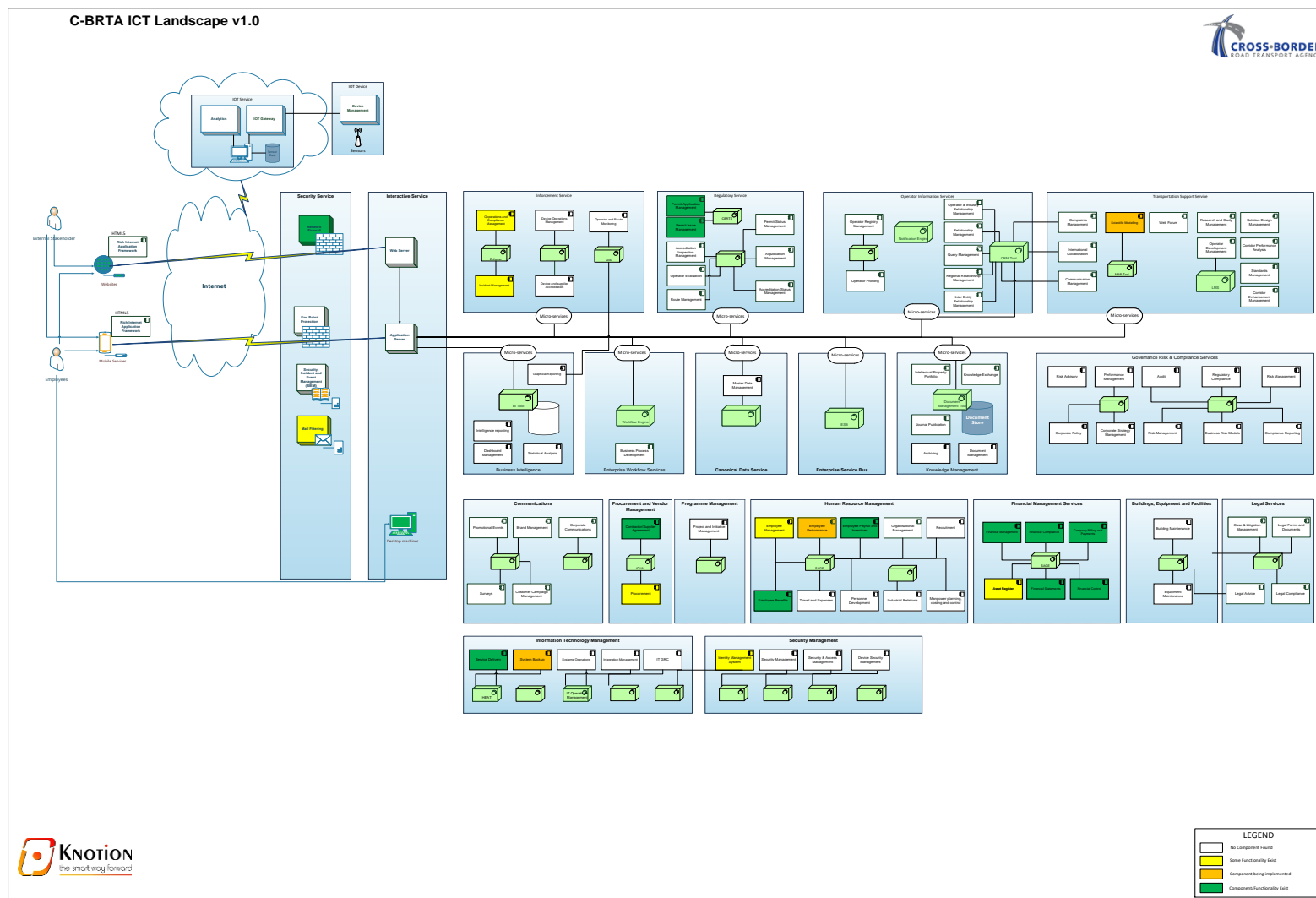


Figure 4: ICT Landscape heat map

### 4.3. Security gap analysis

See Figure 5: Security heat map below for a graphical view.

From the analysis that was done, at an Architecture level.

- Security standards will have to be reviewed to take into account the new technology and information assets
- Active security testing and measurements will need to be introduced as well as new testing processes
- Network and end-point device security controls will have to be improved
- Identity and access management controls will need to be enhanced
- Application access and authorisation controls will need to be continually reviewed and assessed as the Integrated Cross-Border Management System implementation progresses each financial year
- Crypto or information integrity controls will need to be reviewed to ensure that the future systems are secure

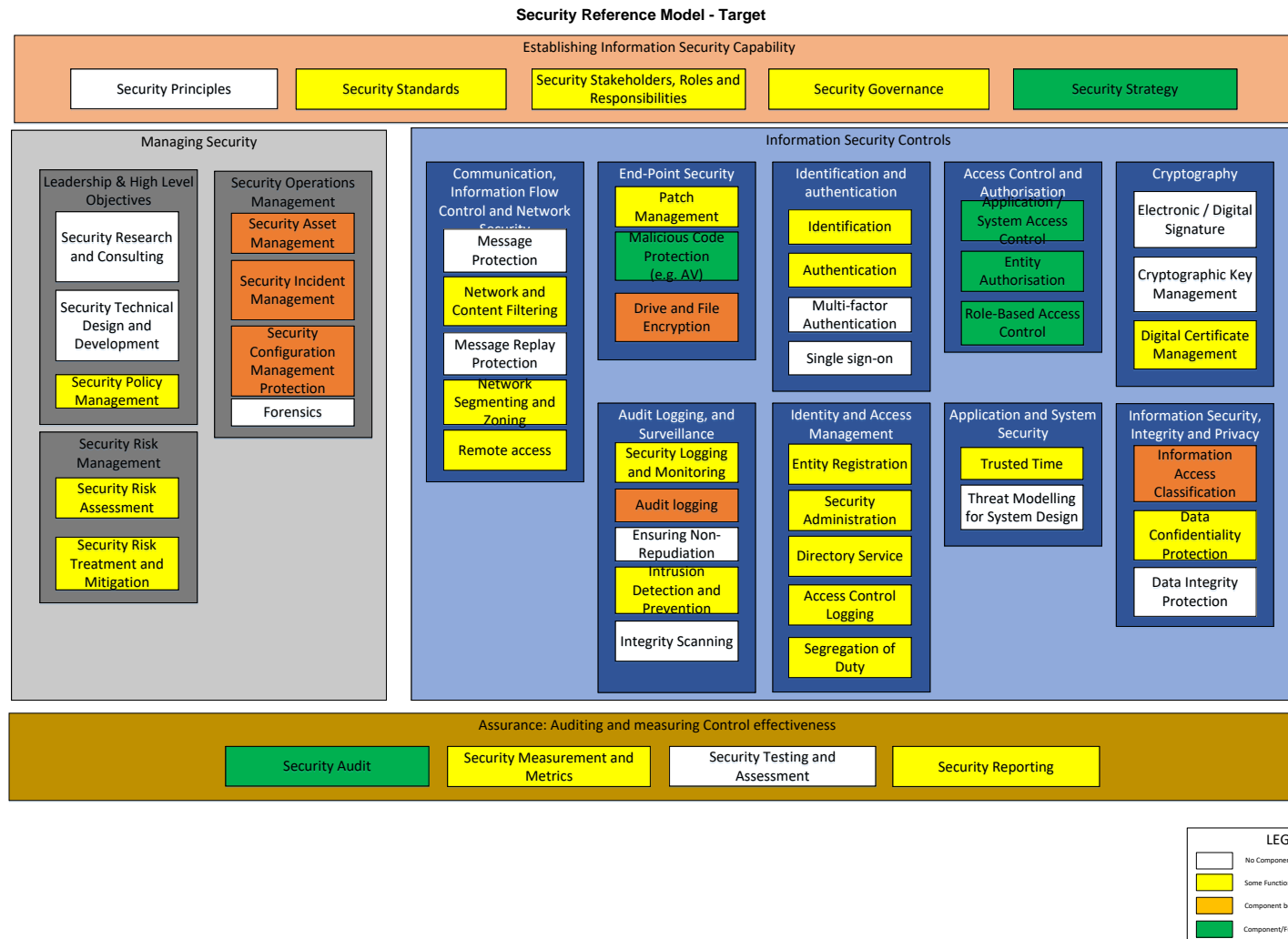


Figure 5: Security heat map

#### 4.4. Gap closure initiatives

To close the gaps between the Target and the Baseline architecture a set of initiatives (work packages) were identified. These were then grouped into themes:

**Table 2: Theme and initiatives**

<b>Digitize Integrated Cross Border Management</b>
WP1 Implement a Web Discussion Forum
WP2 Web-site upgrade
WP3 Implement Social Media and Marketing solutions (Branding)
WP4 Implement flow calculator
WP5 Implement Project and Programme Management
WP6 Develop Market Access Regulation Tool (Scientific Modelling Tool)
WP7 Implement an Integrated Cross-Border Management System
WP8 Implement GIS solution
<b>Improve Relationship Management</b>
WP9 Improve stakeholder relations (CRM)
WP10 Improve Customer Support (CRM)
WP11 Implement Unified Communications
<b>Data sharing between departments (including real-time data)</b>
WP12 Implement an integration layer
WP13 Integrate with RTMC (Law Enforcement)
WP14 Integrate with Government Stakeholders (SARS, CIPC, eNATIS, etc)
<b>Data and Information Sharing across C-BRTA</b>
WP15 Data sharing across CBRTA (Intranet)
WP16 Implement a Document Management Solution
WP17 Implement a data warehouse solution
WP18 Implement Business Intelligence Solution
<b>Automate supporting business capabilities</b>
WP19 Implement employee performance management
WP20 Implement an integrated HR management platform
WP21 Automate internal supporting processes (BPM)
WP22 Provide automated legal system
WP23 Implement a Risk and Compliance management solution
<b>Enhance Cyber Security</b>

WP24 Audit Logging
WP25 Implement security controls
WP26 Security monitoring and testing
<b>Modernize ICT</b>
WP27 Implement ICT Virtualisation
WP28 Develop a Cloud strategy
<b>Enhance ICT Capability</b>
WP29 IT Continuity Planning
WP30 Improve IT Service Management
WP31 Enhance IT Governance (COBIT)
WP32 Increase EA capability
WP33 Increase ICT capacity
WP34 Implement facility management solution

## 5. Roadmap considerations

In order to develop a suitable roadmap to close the gap between the current and target architecture the following were considered:

- C-BRTA 2015-2020 Strategy Document
- C-BRTA ICT Strategy plan 2017/2018
- One-on-one interviews with executives

### 5.1. Strategy document

The strategy document was reviewed and key considerations were taken from the document that may have a bearing on the creation of the roadmap. The following considerations were taken from the Strategy Document:

#### 5.1.1. PEST Analysis

- “The Agency has to maintain and catch-up with emerging trends because the digital economy has increased cross-border transactions...”
- “The general move towards paperless business operations in the cross border sector...”
- “The process of implementing alternative revenue streams have commenced...”

#### 5.1.2. SWOT Analysis

##### Strengths:

- The Agency has expert skills in relation to cross-border subject matter such as a good research team.
- Existence of governance structures.
- Regional thought-leadership on Cross-Border matters.
- Efficient centralised issuing of permits.

##### Weakness:

- Lack of implementing and monitoring new initiatives
- Disintegrated and outdated IT infrastructure
- Divisions working in silos
- Lack of stakeholder management capabilities
- Inefficient customer and support service
- Centralised permit system
- Unknown Brand

##### Threat:



- Ineffective border management & governance systems
- Lack of systems process integration across the value chain
- Dissatisfied freight transport industry
- Unsustainable funding model
- Lack of regional political will, with regards to harmonisation
- Lack of alignment of legislation within transport

**Opportunity:**

- Linking Africa initiatives
- Cross-border flow calculator - provide real-time information to transport industry
- Introduction of an accreditation scheme (OCAS) to promote smooth operations across borders
- Establishing a cross-border data bank
- Establish a web-based operator forum
- Administration of cross-border road user charges
- Development and regulation of cross-border vehicles standards
- Policy and regulatory changes at regional/national levels, in favour of quality regulation
- Decentralisation of permit issuance using information technology to save money and time for operators to automate the submission, approval, and payments of permit application.

**Key Performance Indicators:**

- See paragraph 2.4 Key performance indicators

**5.2. ICT strategy document**

The ICT strategy document was reviewed and key projects were taken from this document. The following initiatives were considered:

- Market Access Regulation - development of improved front-end for the scientific tool
- Business analytics platform
- Customer relationship management (CRM) tool
- HR performance management solution
- Facilities management solution
- Business process management platform
- C-BRTA intranet
- Service management tool
- Document management solution

- Risk management solution
- Audit System
- OCAS System
- eTracking

### 5.3. Executive session input

One-on-one sessions were held with various executives and the following key messages were taken from these sessions:

- The first phase of the Integrated Cross-Border Management System should be well developed and form a solid basis for future development
- Integration with: eNatis, SARS, CIPC, Weigh Bridges, law enforcement (Trafman) are required
- Accreditation status implementation is key
- Market Access Regulation is an important quick win
- Move towards quality vs. quantity permit allocation
- Impact of new regulations on the success of creating the future DOSA architecture
- Selling of information as a revenue stream
- Collection of cross border charges as a potential revenue stream
- Smart vehicle at border posts
- Automation of regulatory system
- End-to-end HR solution
- Linking Africa
- Organisational document management system
- Flow calculator is required
- Digital permits need to be the way forward
- Risk and compliance monitoring is required
- Teaching SADC counterparts could be a product to sell
- C-BRTA size and funds need to be considered in development of the roadmap
- Roadmap should have a 3-to-5-year span

#### 5.4. Initiative value calculation

To determine the value of each initiative/work package the following were used:

- Each initiative was considered against the impact it would make with regards to the considerations mentioned above.
- The following was allocated for each initiative:
  - P - supporting a PEST initiative
  - W - decreasing a weakness
  - T - decreasing a threat
  - O - supporting an opportunity
  - K - supporting a KPI
  - E - supporting an executive drive
- An H, M, L were allocated to each initiative depending on the number of considerations it influences
  - 1 or 0 - L
  - 2/3 - M
  - 3 or more - H
- Adjustments were made based on overall importance considerations, for example using this security rated L but due to its importance it was increased to M.

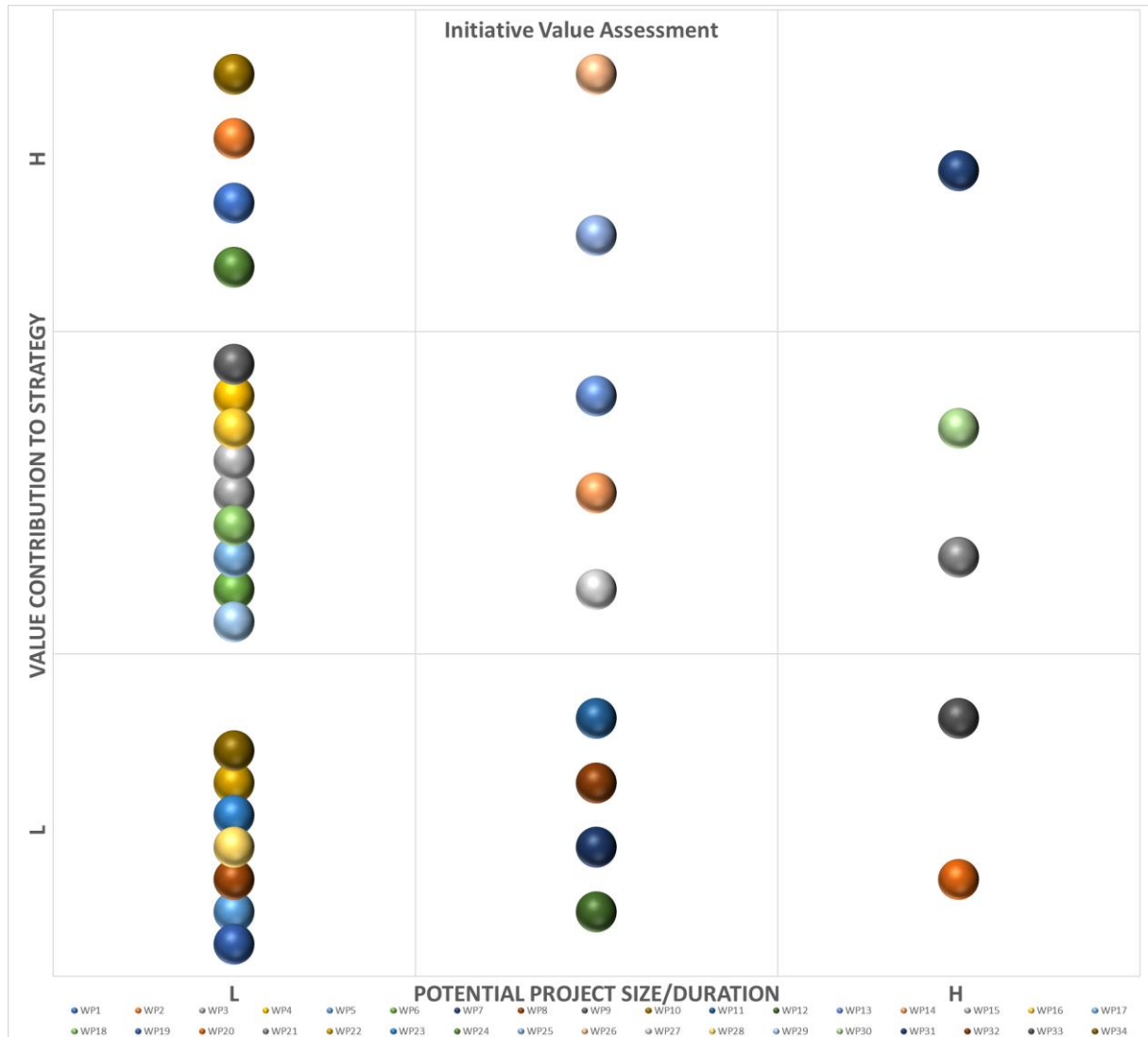
#### 5.5. Initiative size calculation

To measure that was used to calculate this was the potential order of magnitude duration of the project (excluding tender and negotiation time but actual project work effort). Duration was allocated as follows:

- 3 months (L)
- 6 months (M)
- >6 months (H)

#### 5.6. Business value assessment

Using the business value assessment technique, initiatives were plotted as per the figure below.



**Figure 6: Initiative value assessment**

Within each intersection, the initiatives were rated based on importance. Please note that ratings had two meanings and the actual numerical value has no significance:

1. The numerical value shows order of importance - higher value more important than lower value
2. Assisted with the diagrammatic placement of the dot on the diagram, else all dots would have been on top of each other.

The outcome is as follows:

### 5.6.1. High value initiatives

*Table 3: High value/small size projects*

Impact	Value	Size	Rating	Initiative	Duration
T*	3	1	2	WP24 Audit Logging	3 months
P, W2, K	3	1	4	WP2 Web-site upgrade	3 months
K	3	1	6	WP1 Implement a Web Discussion Forum	3 months
W, O, K	3	1	8	WP10 Improve Customer Support (CRM)	3 months

These are normally referred to as the low hanging fruit as they have a high value to C-BRTA but will not take long to implement

*Table 4: High value/medium size projects*

Impact	Value	Size	Rating	Initiative	Duration
T*	3	2	3	WP25 Implement security controls	24 months
T*	3	2	8	WP26 Security Monitoring and testing	18 months

*Table 5: High value/large size projects*

Impact	Value	Size	Rating	Initiative	Duration
P, W2, T, O4, K2	3	3	5	WP7 Implement an Integrated Cross Border Management System	24 months

### 5.6.2. Medium value initiatives

*Table 6: Medium value/small size projects*

Impact	Value	Size	Rating	Initiative	Duration
P, W	2	1	1	WP29 IT Continuity Planning	3 months
O, K2	2	1	2	WP6 Develop Market Access Regulation Tool (Scientific Modelling Tool)	3 months
O	2	1	3	WP17 Implement a Data warehouse solution	3 months

O, K3	2	1	4	WP18 Implement Business Intelligence solution	3 months
W	2	1	5	WP3 Implement Social Media and Marketing solutions (Branding)	3 months
W	2	1	6	WP15 Data sharing across CBRTA (Intranet)	3 months
P	2	1	7	WP16 Implement a Document Management solution	3 months
E	2	1	8	WP4 Implement flow calculator	3 months
W, O, K	2	1	9	WP9 Improve Stakeholder relations (CRM)	3 months

These are normally referred to as the low hanging fruit as they have a high value to C-BRTA but will not take long to implement

**Table 7: Medium value/medium size projects**

Impact	Value	Size	Rating	Initiative	Duration
P, W	2	2	2	WP27 Implement ICT Virtualisation	6 months
W	2	2	5	WP14 Integrate with Government Stakeholders	6 months
W	2	2	8	WP13 Integrate with RTMC (Law Enforcement)	3 months

**Table 8: Medium value/large size projects**

Impact	Value	Size	Rating	Initiative	Duration
W, T	2	3	3	WP21 Automate internal supporting processes (BPM)	9 months
P, W	2	3	7	WP30 Improve IT Service Management	12 months

### 5.6.3. Low value initiatives

**Table 9: Low value/small size projects**

Impact	Value	Size	Rating	Initiative	Duration
E	1	1	1	WP19 Implement Employee performance management	3 months
W	1	1	2	WP5 Implement Project and Programme Management	3 months
	1	1	3	WP8 Implement GIS solution	3 months
P	1	1	4	WP28 Develop a Cloud strategy	3 months
E	1	1	5	WP23 Implement a Risk and Compliance management solution	3 months
E	1	1	6	WP22 Provide automated Legal system	3 months
	1	1	7	WP34 Implement facility management solution	3 months

**Table 10: Low value/medium size projects**

Impact	Value	Size	Rating	Initiative	Duration
T	1	2	2	WP12 Implement an integration layer	6 months
	1	2	4	WP31 Enhance IT Governance (COBIT)	6 months
	1	2	6	WP32 Increase EA capability	6 months
W	1	2	8	WP11 Implement Unified Communications	6 months

**Table 11: Low value/large size projects**

Impact	Value	Size	Rating	Initiative	Duration
E	1	3	3	WP20 Implement an integrated HR management platform	12 months
	1	3	8	WP33 Increase ICT capacity	24 months

These initiatives are the ones that should be done last.

## 6. Enterprise Architecture Roadmap

### 6.1. Approach

Using the outcome of the analysis above, the following thinking was applied to develop a roadmap:

- Position initiatives in order as follows:
  - High value first from low size to large, in order or priority rating
  - Medium value next from low size to large, in order or priority rating
  - Low value from low size to large, in order or priority rating
- Current initiatives from the ICT Strategy for 2017 were re-positioned to this financial year
- From 2018 financial year, initiatives were re-positioned as follows:
  - Manage two main programme streams:
    - Implementation of an Integrated Cross-Border Management System
    - Business Intelligence (Data sharing across C-BRTA)
  - ICT support stream
  - Allocate small projects throughout the 3-to-5-year period based on value, size, and rating to maintain a fairly constant delivery
  - Consider yearly ICT budget
- Finally, the initiatives were broken up into 6-monthly releases. Ten releases covering five years were identified.
- Some initiatives - now referred to as work packages - are too big to be implemented in one release, but can practically be delivered over 2 or more releases. Each release will still deliver a working solution that is tested.
- Costs were also allocated to each work package and the durations were reviewed.

**NOTE ON COSTS:** *Please keep in mind these are order of magnitude costs, as costs can vary widely based on:*

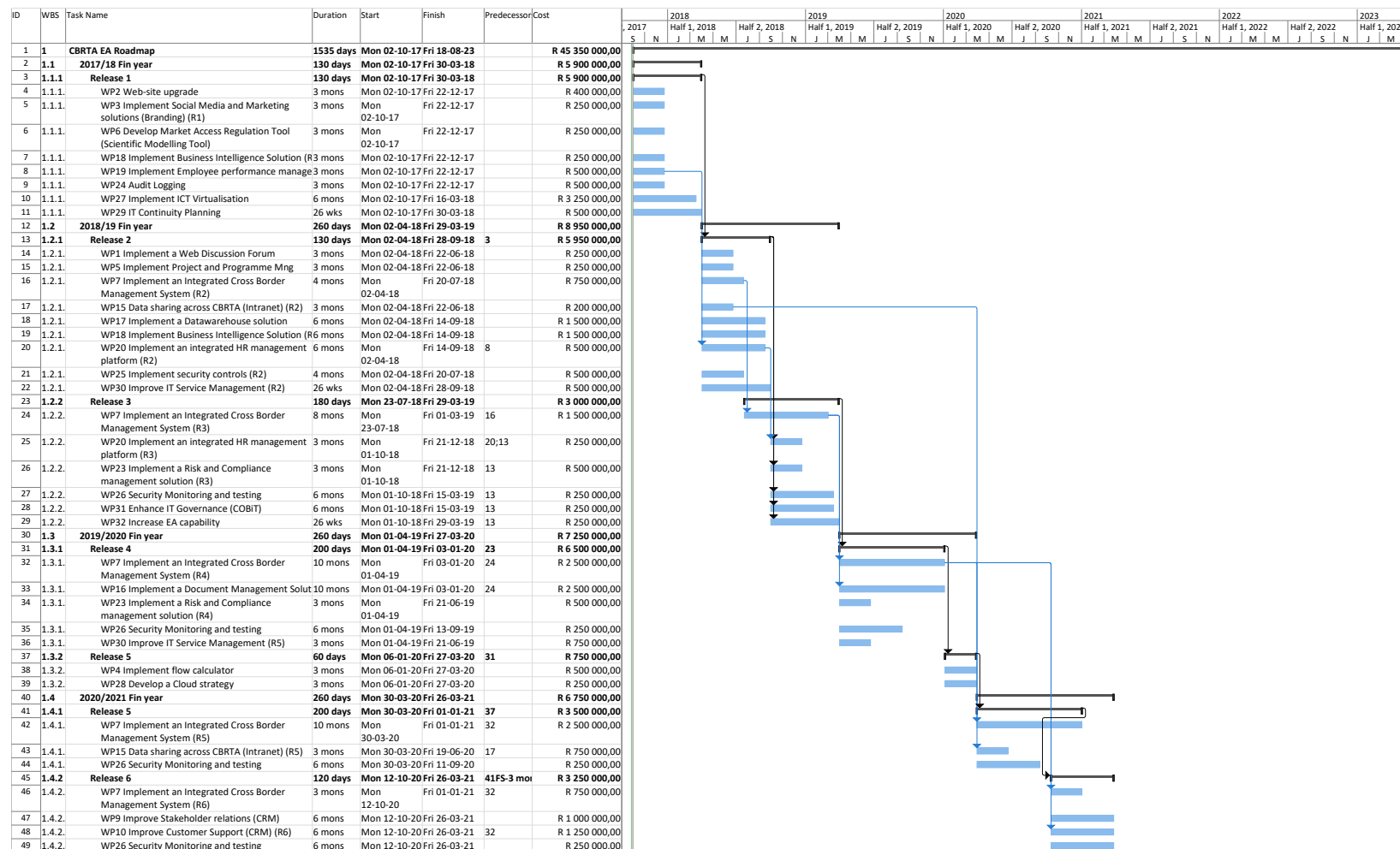
- *Selected implementation partner*
- *Open source vs. commercial type solution*
- *Tendering vs self-implementation*

*Cost should therefore be taken as a guide. Also inflationary effects were not taken into consideration, neither was the cost of potential resources that may need to be appointed.*



## 6.2. Roadmap

The end result roadmap per release is as follows:



42

Or as follows:

ID	WBS	Task Name	Duration	Start	Finish	Predecessor	Cost
1	1	<b>CBRTA EA Roadmap</b>	<b>1535 days</b>	<b>Mon 02-10-17</b>	<b>Fri 18-08-23</b>		<b>R 45 350 000,00</b>
2	1.1	<b>2017/18 Fin year</b>	<b>130 days</b>	<b>Mon 02-10-17</b>	<b>Fri 30-03-18</b>		<b>R 5 900 000,00</b>
3	1.1.1	<b>Release 1</b>	<b>130 days</b>	<b>Mon 02-10-17</b>	<b>Fri 30-03-18</b>		<b>R 5 900 000,00</b>
4	1.1.1.1	WP2 Web-site upgrade	3 mons	Mon 02-10-17	Fri 22-12-17		R 400 000,00
5	1.1.1.1	WP3 Implement Social Media and Marketing solutions (Branding) (R1)	3 mons	Mon 02-10-17	Fri 22-12-17		R 250 000,00
6	1.1.1.1	WP6 Develop Market Access Regulation Tool (Scientific Modelling Tool)	3 mons	Mon 02-10-17	Fri 22-12-17		R 250 000,00
7	1.1.1.1	WP18 Implement Business Intelligence Solution (R3)	3 mons	Mon 02-10-17	Fri 22-12-17		R 250 000,00
8	1.1.1.1	WP19 Implement Employee performance management	3 mons	Mon 02-10-17	Fri 22-12-17		R 500 000,00
9	1.1.1.1	WP24 Audit Logging	3 mons	Mon 02-10-17	Fri 22-12-17		R 500 000,00
10	1.1.1.1	WP27 Implement ICT Virtualisation	6 mons	Mon 02-10-17	Fri 16-03-18		R 3 250 000,00
11	1.1.1.1	WP29 IT Continuity Planning	26 wks	Mon 02-10-17	Fri 30-03-18		R 500 000,00
12	1.2	<b>2018/19 Fin year</b>	<b>260 days</b>	<b>Mon 02-04-18</b>	<b>Fri 29-03-19</b>		<b>R 8 950 000,00</b>
13	1.2.1	<b>Release 2</b>	<b>130 days</b>	<b>Mon 02-04-18</b>	<b>Fri 28-09-18</b>	3	<b>R 5 950 000,00</b>
14	1.2.1.1	WP1 Implement a Web Discussion Forum	3 mons	Mon 02-04-18	Fri 22-06-18		R 250 000,00
15	1.2.1.1	WP5 Implement Project and Programme Mng	3 mons	Mon 02-04-18	Fri 22-06-18		R 250 000,00
16	1.2.1.1	WP7 Implement an Integrated Cross Border Management System (R2)	4 mons	Mon 02-04-18	Fri 20-07-18		R 750 000,00
17	1.2.1.1	WP15 Data sharing across CBRTA (Intranet) (R2)	3 mons	Mon 02-04-18	Fri 22-06-18		R 200 000,00
18	1.2.1.1	WP17 Implement a Datawarehouse solution	6 mons	Mon 02-04-18	Fri 14-09-18		R 1 500 000,00
19	1.2.1.1	WP18 Implement Business Intelligence Solution (R6)	6 mons	Mon 02-04-18	Fri 14-09-18		R 1 500 000,00
20	1.2.1.1	WP20 Implement an integrated HR management platform (R2)	6 mons	Mon 02-04-18	Fri 14-09-18	8	R 500 000,00
21	1.2.1.1	WP25 Implement security controls (R2)	4 mons	Mon 02-04-18	Fri 20-07-18		R 500 000,00
22	1.2.1.1	WP30 Improve IT Service Management (R2)	26 wks	Mon 02-04-18	Fri 28-09-18		R 500 000,00
23	1.2.2	<b>Release 3</b>	<b>180 days</b>	<b>Mon 23-07-18</b>	<b>Fri 29-03-19</b>		<b>R 3 000 000,00</b>
24	1.2.2.1	WP7 Implement an Integrated Cross Border Management System (R3)	8 mons	Mon 23-07-18	Fri 01-03-19	16	R 1 500 000,00
25	1.2.2.1	WP20 Implement an integrated HR management platform (R3)	3 mons	Mon 01-10-18	Fri 21-12-18	20;13	R 250 000,00
26	1.2.2.1	WP23 Implement a Risk and Compliance management solution (R3)	3 mons	Mon 01-10-18	Fri 21-12-18	13	R 500 000,00
27	1.2.2.1	WP26 Security Monitoring and testing	6 mons	Mon 01-10-18	Fri 15-03-19	13	R 250 000,00
28	1.2.2.1	WP31 Enhance IT Governance (COBIT)	6 mons	Mon 01-10-18	Fri 15-03-19	13	R 250 000,00
29	1.2.2.1	WP32 Increase EA capability	26 wks	Mon 01-10-18	Fri 29-03-19	13	R 250 000,00
30	1.3	<b>2019/2020 Fin year</b>	<b>260 days</b>	<b>Mon 01-04-19</b>	<b>Fri 27-03-20</b>		<b>R 7 250 000,00</b>
31	1.3.1	<b>Release 4</b>	<b>200 days</b>	<b>Mon 01-04-19</b>	<b>Fri 03-01-20</b>	23	<b>R 6 500 000,00</b>
32	1.3.1.1	WP7 Implement an Integrated Cross Border Management System (R4)	10 mons	Mon 01-04-19	Fri 03-01-20	24	R 2 500 000,00
33	1.3.1.1	WP16 Implement a Document Management Solution	10 mons	Mon 01-04-19	Fri 03-01-20	24	R 2 500 000,00
34	1.3.1.1	WP23 Implement a Risk and Compliance management solution (R4)	3 mons	Mon 01-04-19	Fri 21-06-19		R 500 000,00
35	1.3.1.1	WP26 Security Monitoring and testing	6 mons	Mon 01-04-19	Fri 13-09-19		R 250 000,00
36	1.3.1.1	WP30 Improve IT Service Management (R5)	3 mons	Mon 01-04-19	Fri 21-06-19		R 750 000,00
37	1.3.2	<b>Release 5</b>	<b>60 days</b>	<b>Mon 06-01-20</b>	<b>Fri 27-03-20</b>	31	<b>R 750 000,00</b>
38	1.3.2.1	WP4 Implement flow calculator	3 mons	Mon 06-01-20	Fri 27-03-20		R 500 000,00
39	1.3.2.1	WP28 Develop a Cloud strategy	3 mons	Mon 06-01-20	Fri 27-03-20		R 250 000,00
40	1.4	<b>2020/2021 Fin year</b>	<b>260 days</b>	<b>Mon 30-03-20</b>	<b>Fri 26-03-21</b>		<b>R 6 750 000,00</b>
41	1.4.1	<b>Release 5</b>	<b>200 days</b>	<b>Mon 30-03-20</b>	<b>Fri 01-01-21</b>	37	<b>R 3 500 000,00</b>
42	1.4.1.1	WP7 Implement an Integrated Cross Border Management System (R5)	10 mons	Mon 30-03-20	Fri 01-01-21	32	R 2 500 000,00
43	1.4.1.1	WP15 Data sharing across CBRTA (Intranet) (R5)	3 mons	Mon 30-03-20	Fri 19-06-20	17	R 750 000,00
44	1.4.1.1	WP26 Security Monitoring and testing	6 mons	Mon 30-03-20	Fri 11-09-20		R 250 000,00
45	1.4.2	<b>Release 6</b>	<b>120 days</b>	<b>Mon 12-10-20</b>	<b>Fri 26-03-21</b>	41FS-3 mons	<b>R 3 250 000,00</b>
46	1.4.2.1	WP7 Implement an Integrated Cross Border Management System (R6)	3 mons	Mon 12-10-20	Fri 01-01-21	32	R 750 000,00
47	1.4.2.1	WP9 Improve Stakeholder relations (CRM)	6 mons	Mon 12-10-20	Fri 26-03-21		R 1 000 000,00
48	1.4.2.1	WP10 Improve Customer Support (CRM) (R6)	6 mons	Mon 12-10-20	Fri 26-03-21	32	R 1 250 000,00
49	1.4.2.1	WP26 Security Monitoring and testing	6 mons	Mon 12-10-20	Fri 26-03-21		R 250 000,00
50	1.5	<b>2021/2022 Fin year</b>	<b>265 days</b>	<b>Mon 29-03-21</b>	<b>Fri 01-04-22</b>		<b>R 6 000 000,00</b>
51	1.5.1	<b>Release 7</b>	<b>140 days</b>	<b>Mon 29-03-21</b>	<b>Fri 08-10-21</b>	45	<b>R 3 250 000,00</b>
52	1.5.1.1	WP7 Implement an Integrated Cross Border Management System (R7)	6 mons	Mon 29-03-21	Fri 10-09-21	18;19;24;3	R 1 500 000,00
53	1.5.1.1	WP10 Improve Customer Support (CRM) (R7)	3 mons	Mon 29-03-21	Fri 18-06-21	48	R 750 000,00
54	1.5.1.1	WP20 Implement an integrated HR management platform (R7)	7 mons	Mon 29-03-21	Fri 08-10-21	8	R 250 000,00
55	1.5.1.1	WP26 Security Monitoring and testing	6 mons	Mon 29-03-21	Fri 10-09-21		R 250 000,00
56	1.5.1.1	WP34 Implement facility management solution	3 mons	Mon 29-03-21	Fri 18-06-21		R 500 000,00
57	1.5.2	<b>Release 8</b>	<b>125 days</b>	<b>Mon 11-10-21</b>	<b>Fri 01-04-22</b>	51	<b>R 2 750 000,00</b>
58	1.5.2.1	WP3 Implement Social Media and Marketing solutions (Branding) (R8)	3 mons	Mon 11-10-21	Fri 31-12-21		R 250 000,00
59	1.5.2.1	WP16 Implement a Document Management Solution	3 mons	Mon 11-10-21	Fri 31-12-21	33	R 250 000,00
60	1.5.2.1	WP21 Automate internal supporting processes (R8)	25 wks	Mon 11-10-21	Fri 01-04-22	24	R 1 500 000,00
61	1.5.2.1	WP23 Implement a Risk and Compliance management solution (R8)	3 mons	Mon 11-10-21	Fri 31-12-21		R 500 000,00
62	1.5.2.1	WP26 Security Monitoring and testing	6 mons	Mon 11-10-21	Fri 25-03-22		R 250 000,00
63	1.6	<b>2022/2023 Fin year</b>	<b>360 days</b>	<b>Mon 04-04-22</b>	<b>Fri 18-08-23</b>		<b>R 10 500 000,00</b>
64	1.6.1	<b>Release 9</b>	<b>240 days</b>	<b>Mon 04-04-22</b>	<b>Fri 03-03-23</b>	57	<b>R 8 000 000,00</b>
65	1.6.1.1	WP7 Implement an Integrated Cross Border Management System (R9)	6 mons	Mon 04-04-22	Fri 16-09-22	32	R 1 500 000,00
66	1.6.1.1	WP12 Implement an integration layer	6 mons	Mon 04-04-22	Fri 16-09-22		R 4 000 000,00
67	1.6.1.1	WP13 Integrate with RTMC (Law Enforcement)	3 mons	Mon 19-09-22	Fri 09-12-22	66	R 500 000,00
68	1.6.1.1	WP14 Integrate with Government Stakeholders (SARS, CIPC, eNATIS, etc)	6 mons	Mon 19-09-22	Fri 03-03-23	66	R 1 000 000,00
69	1.6.1.1	WP22 Provide automated Legal system	3 mons	Mon 04-04-22	Fri 24-06-22		R 250 000,00
70	1.6.1.1	WP26 Security Monitoring and testing	6 mons	Mon 04-04-22	Fri 16-09-22		R 250 000,00
71	1.6.1.1	WP30 Improve IT Service Management (R9)	6 mons	Mon 04-04-22	Fri 16-09-22		R 500 000,00
72	1.6.2	<b>Release 10</b>	<b>120 days</b>	<b>Mon 06-03-23</b>	<b>Fri 18-08-23</b>	64	<b>R 2 500 000,00</b>
73	1.6.2.1	WP8 Implement GIS solution	3 mons	Mon 06-03-23	Fri 26-05-23	32;66	R 750 000,00
74	1.6.2.1	WP11 Implement Unified Communications	6 mons	Mon 06-03-23	Fri 18-08-23		R 1 000 000,00
75	1.6.2.1	WP20 Implement an integrated HR management platform (R10)	4 mons	Mon 06-03-23	Fri 23-06-23		R 500 000,00
76	1.6.2.1	WP26 Security Monitoring and testing	6 mons	Mon 06-03-23	Fri 18-08-23		R 250 000,00
77	1.7	<b>Enhance ICT Capability</b>	<b>960 days</b>	<b>Mon 01-10-18</b>	<b>Fri 03-06-22</b>		<b>R 0,00</b>
78	1.7.1	WP33 Increase ICT capacity	48 mons	Mon 01-10-18	Fri 03-06-22	13	R 0,00

### 6.3. 2017/2018 plan

The roadmap implementation plan for the 2017/2018 financial year is as follows:

Task Name
<b>Digitise Permit Business</b>
WP2 Web-site upgrade
WP3 Implement Social Media and Marketing solutions (Branding) (R1)
WP6 Develop Market Access Regulation Tool (Scientific Modelling Tool)
<b>Data and Information Sharing across C-BRTA</b>
WP18 Implement Business Intelligence Solution (R1)
<b>Automate supporting business capabilities</b>
WP19 Implement Employee performance management
<b>Enhance Cyber Security</b>
WP24 Audit Logging
<b>Modernize ICT</b>
WP27 Implement ICT Virtualisation
<b>Enhance ICT Capability</b>
WP29 IT Continuity Planning
WP30 Improve IT Service Management

### 6.4. 2018/2019 plan

The roadmap implementation plan for the 2018/2019 financial year is as follows:

Task Name
<b>Digitize Permit Business</b>
WP1 Implement a Web Discussion Forum
WP5 Implement Project and Programme Management
WP7 Implement an Integrated Cross-Border Management System (R2 & R3)
<b>Data and Information Sharing across C-BRTA</b>
WP15 Data sharing across CBRTA (Intranet) (R2)
WP17 Implement a Data warehouse solution
WP18 Implement Business Intelligence Solution (R2)
<b>Automate supporting business capabilities</b>

WP20 Implement an integrated HR management platform (R2 & R3)
WP23 Implement a Risk and Compliance management solution (R3)
<b>Enhance Cyber Security</b>
WP25 Implement security controls (R2)
WP26 Security Monitoring and testing
<b>Enhance ICT Capability</b>
WP30 Improve IT Service Management (R2)
WP31 Enhance IT Governance (COBiT)
WP32 Increase EA capability
WP33 Increase ICT capacity

### 6.5. 2019/2020 plan

The roadmap implementation plan for the 2019/2020 financial year is as follows:

Task Name
<b>Digitise Permit Business</b>
WP7 Implement an Integrated Cross Border Management System (R4)
WP4 Implement flow calculator
<b>Data and Information Sharing across C-BRTA</b>
WP16 Implement a Document Management Solution (R4)
<b>Automate supporting business capabilities</b>
WP23 Implement a Risk and Compliance management solution (R4)
<b>Modernize ICT</b>
WP28 Develop a Cloud strategy
<b>Enhance ICT Capability</b>
WP30 Improve IT Service Management (R4)
WP33 Increase ICT capacity

### 6.6. 2020/2021 plan

The roadmap implementation plan for the 2020/2021 financial year is as follows:

Task Name
<b>Digitise Permit Business</b>

WP7 Implement an Integrated Cross Border Management System (R5 & R6)
<b>Data and Information Sharing across C-BRTA</b>
WP15 Data sharing across CBRTA (Intranet) (R5)
<b>Improve Relationship Management</b>
WP9 Improve Stakeholder relations (CRM)
WP10 Improve Customer Support (CRM) (R6)
<b>Enhance ICT Capability</b>
WP33 Increase ICT capacity

## 6.7. 2021/2022 plan

The roadmap implementation plan for the 2021/2022 financial year is as follows:

Task Name
<b>Digitise Permit Business</b>
WP3 Implement Social Media and Marketing solutions (Branding) (R8)
WP7 Implement an Integrated Cross Border Management System (R7 & R8)
<b>Improve Relationship Management</b>
WP10 Improve Customer Support (CRM) (R7)
<b>Data and Information Sharing across C-BRTA</b>
WP16 Implement a Document Management Solution (R8)
<b>Automate supporting business capabilities</b>
WP20 Implement an integrated HR management platform (R7)
WP23 Implement a Risk and Compliance management solution (R8)
<b>Automate supporting business capabilities</b>
WP21 Automate internal supporting processes (BPM)
<b>Enhance ICT Capability</b>
WP33 Increase ICT capacity
WP34 Implement facility management solution

## 6.8. 2022/2023 plan

The roadmap implementation plan for the 2022/2023 financial year is as follows:

Task Name
<b>Digitise Permit Business</b>
WP7 Implement an Integrated Cross Border Management System (R9)
WP8 Implement GIS solution
<b>Improve Relationship Management</b>
WP11 Implement Unified Communications
<b>Data sharing between departments (including real-time data)</b>
WP12 Implement an integration layer
WP13 Integrate with RTMC (Law Enforcement)
WP14 Integrate with Government Stakeholders (SARS, CIPC, eNATIS, etc)
<b>Automate supporting business capabilities</b>
WP20 Implement an integrated HR management platform (R10)
WP22 Provide automated Legal system
WP23 Implement a Risk and Compliance management solution
<b>Enhance ICT Capability</b>
WP30 Improve IT Service Management (R9)
WP33 Increase ICT capacity

## 7. Work package descriptions

Based on initial work done and grouping of resultant findings it was decided to group work packages into different releases. A release aims last about 6 months and the idea is to complete two releases in one financial year.

### 7.1. Work package 1: Implement a Web Discussion Forum

#### Description:

This is an initiative that was identified as an opportunity in the C-BRTA strategy document: “Establish a web-based operator forum”. The focus of this work package is therefore to establish this forum.

#### Business value:

- This can be done as a quick win
- Improves C-BRTA’s visibility as a service provider
- Will enable the agency to catch-up with emerging trends
- Improve customer and support service

#### Key actions:

- Select a Rich Internet Application Framework as standard
- Select a Web Server and Application Server as standard
- Select a Web Forum application
- Select a suitable implementation partner
- Test and implement the solution

#### Recommendations:

- Decide on a standard for the Rich Internet Application Framework, Web Server and Application Server that will be able to be a standard for the larger architecture implementation

**C-BRTA Resources requirement estimation:** Web Application specialist

#### Order of magnitude costing:

The potential cost of this work package is: R 250,000.00

### 7.2. Work package 2: Web-site upgrade



**Description:**

This work package is based on the project that C-BRTA has currently embarked on to update the web-site.

**Business value:**

- Improves C-BRTA's visibility as a service provider
- Improve customer and support service

**Key actions:**

- Select a Web Server and Application Server as standard
- Select a suitable implementation partner
- Test and implement the solution

**Recommendations:**

- Decide on a standard for the Web Server and Application Server that will be able to be a standard for the larger architecture implementation

**C-BRTA Resources requirement estimation:** Web Application specialist

**Order of magnitude costing:**

The potential cost of this work package is: R 400,000.00

### **7.3. Work package 3: Implement Social Media and Marketing solutions (Branding)**

**Description:**

Implement tools to help manage communication, marketing and social media interactions in a well-structured manner.

**Business value:**

- This can be done as a quick win
- Improves C-BRTA's visibility as a service provider
- Improve customer and support service
- Increase Brand awareness
- Better understanding of the success of marketing campaigns

- Controlled and effective marketing campaigns
- Better support for direct marketing

To manage costs and size - it is recommended to split this work package into two releases:

- Work package 3: Implement Social Media and Marketing solutions (Branding) (R2)
- Work package 3: Implement Social Media and Marketing solutions (Branding) (R8)

#### **7.4. Work package 3: Implement Social Media and Marketing solutions (Branding) (R2)**

##### **Description:**

Implement on-line tools to help manage marketing and social media interactions in a well-structured manner.

##### **Key actions:**

- The following business processes will need to be reviewed:
  - Facilitate Industry Development
- Research solutions to the following application components:
  - Promotional events
  - Brand management
  - Surveys
  - Campaign Management
- Determine marketing requirements
- Select a suitable on-line provider to manage the success of external marketing campaigns
- Train marketing users in using it

##### **Recommendations:**

- Potential on-line providers are:
  - Hootsuite
  - Sendible
  - SOCIAL BOOSTER

- Newsclip
- Meltwater
- Due to the fact that C-BRTA needs to build/improve its brand and there is a possibility that operators do not purchase permits because they may not know that they need it, it is therefore recommended to implement these tools to assist the marketing business unit in running structured campaigns.

**C-BRTA Resources requirement estimation:** None

**Order of magnitude costing:**

The potential cost of this work package is: R 250,000. These services are paid for on a pay-per-use basis and monthly.

### **7.5. Work package 3: Implement Social Media and Marketing solutions (Branding) (R8)**

**Description:**

Implement a corporate communications tool to assist with corporate communication messages.

**Key actions:**

- The following business processes will need to be reviewed:
  - Manage public relations program
- Research solutions to the following application components:
  - Corporate Communications
- Understand the requirements for corporate communications and public relations management
- Select a suitable solution
- Implement and test solution
- Train marketing users in using it

**Recommendations:**

- None

**C-BRTA Resources requirement estimation:** None

**Order of magnitude costing:**

The potential cost of this work package is: R 250,000.

**7.6. Work package 4: Implement flow-calculator****Description:**

Implement an automated solution to the flow-calculator model that is being developed.

**Business value:**

- Provide real-time information to transport industry
- Increase C-BRTA's understanding of the cross-border flow

**Key actions:**

- The following business processes will need to be reviewed:
  - Perform Route Optimisation
- Understand the flow-calculator model
- Understand the business implementation requirements
- Select a suitable implementation partner
- Develop the Corridor Performance Analysis application component
- Implement and test solution

**Recommendations:**

- It is recommended that C-BRTA uses the standardised Rich Internet application framework, Web and Application server as basis
- It is also recommended that Micro Services should be used in the construction of this application component - so that it can be integrated into the iCBMS as and when required.

**C-BRTA Resources requirement estimation:** Web application specialist

**Order of magnitude costing:**

The potential cost of this work package is: R 500,000.00

## 7.7. Work package 5: Implement project and programme management

### Description:

Implement a project and programme management solution to manage the various projects within C-BRTA.

### Business value:

- Improve the agency's ability to implement and monitor new initiatives
- Will contribute to the successful implementation of the large Integrated Cross-Border Management System

### Key actions:

- The following business processes will need to be reviewed:
  - Manage Programmes and Projects
  - Manage Portfolio
- Consider the creation of a Project Management Office (PMO) within C-BRTA.
- Understand the requirements for a programme and project management solution and how it will be used
- Select a suitable solution for the Project and Initiative Management application building block
- Implement and test solution
- Train users in using it

### Recommendations:

- It is recommended that C-BRTA implement this before starting with most of the initiatives in this roadmap - to ensure successful management across the various work packages
- It is also recommended that C-BRTA select an easy to use solution - such as MS-Project, as complex solutions do exist for usage on large engineering projects.

**C-BRTA Resources requirement estimation:** Programme and project management office

### Order of magnitude costing:

The potential cost of this work package is: R 250,000.00

## 7.8. Work package 6: Develop Market Access Regulation Tool

**Description:**

The focus of this work package is to develop a user-friendly front-end for the Market Access Regulation (Scientific tool) which is an Excel-based solution. This was part of the 2017/18 ICT Strategy plan.

**Business value:**

- Improve internal efficiencies.

**Key actions:**

- The following business processes will need to be reviewed:
  - Conduct Route Analysis and Optimisation
  - Assess Corridor Issues and Initiatives
  - Engage Regional and International Stakeholders
- Select a suitable implementation partner
- Implement and test solution
- Train marketing users in using it

**Recommendations:**

- It is recommended that C-BRTA uses the standardised rich internet application framework, Web, and Application server as basis
- It is also recommended that Micro Services should be used in the construction of this front-end application component - so that it can be integrated into the iCBMS as and when required. It also creates separation between the front-end and the current system - should C-BRTA in the future want to integrate this front-end or replace the back-end component it can be done much easier.

**C-BRTA Resources requirement estimation:** Web Application Specialist

**Order of magnitude costing:**

The potential cost of this work package is: R 250,000.00

## 7.9. Work package 7: Implement an Integrated Cross Border Management System

### Description:

The focus of this work package is to develop an Integrated Cross-Border Management System (iCBMS) that will provide automated support for the following:

- Provisioning of digital permits
- Profiling of operators to provide permits based on quality rather than quantity
- Operator accreditation
- Cross-border charges
- Non-compliance enforcement

As this will be a big programme the work package will be broken up into smaller packages to be delivered in various releases:

- WP7 Implement an Integrated Cross Border Management System (R2)
- WP7 Implement an Integrated Cross Border Management System (R3)
- WP7 Implement an Integrated Cross Border Management System (R4)
- WP7 Implement an Integrated Cross Border Management System (R5)
- WP7 Implement an Integrated Cross Border Management System (R6)
- WP7 Implement an Integrated Cross Border Management System (R7)
- WP7 Implement an Integrated Cross Border Management System (R9)

### Business value:

- Improve internal efficiencies.
- Increase the agency's usage of emerging trends and becoming part of the digital economy
- Move towards paperless business operations
- Assist with the implementation of alternative revenue streams
- Enhance the current IT infrastructure
- Improve customer and support service
- Create better brand awareness
- Improve border management & governance systems

- Enhance systems process integration across the value chain
- Increase freight transport industry satisfaction
- Contribute to a more sustainable funding model
- Ultimately can contribute to linking Africa initiatives by becoming a system to be used across SADEC
- Implementation of the accreditation scheme (OCAS) to promote smooth operations at across borders
- Enable the establishment of a cross-border data bank
- Enable the administration of cross-border road user charges
- Decentralisation of permit issuance using information technology to save money and time for operators requires automating the submission, approval and payments of permit application.
- But still exploiting the current efficient centralised issuing of permit ability of C-BRTA.

**Recommendations:**

- It is recommended that C-BRTA decide on a standard for a rich internet application framework before starting this project
- It is recommended that C-BRTA also considers a SAAS implementation partner, which will partner with C-BRTA in the development, sharing of costs and future profits as the model is rolled out across SADEC countries. The benefit in the short term is that C-BRTA may develop more functionality at a much lower cost.

**7.10. Work package 7: Implement an Integrated Cross Border Management System (R2)****Description:**

The focus of this work package is to develop a user friendly front-end to the current CBRTS system and to allow operators to register on-line using a Web or Mobile Application interface. This will start to de-couple the front-end from the existing CBRTS back-end system.

**Key actions:**

- The following business processes will need to be reviewed:



- Evaluate Operator
- Process permit application
- Conduct a requirements analysis to understand which functionality from the existing CBRTS system can be made available to internal staff and/or operators via a web and/or mobile front-end.
- Develop requirements for the implementation of the Operator Registry Management application component
- Identify suitable Regulatory and Operator Information services
- Select a suitable implementation partner that can walk the journey with C-BRTA across all 9 remaining releases
- Implement and test solution
- Train users in using it

**Recommendations:**

- It is recommended that C-BRTA uses the standardised rich internet application framework, Web, and Application server as basis
- It is also recommended that Micro Services should be used in the construction of this new iCBMS application

**C-BRTA Resources requirement estimation:** Web Application Specialist

**Order of magnitude costing:**

The potential cost of this work package is: R 750,000.00

## **7.11. Work package 7: Implement an Integrated Cross Border Management System (R3)**

**Description:**

The focus of this work package is to enhance iCBMS to replace the existing CBRTS system. At the end of this release iCBMS will still provide printed permits. At the end of this release iCBMS will be able to run concurrent to CBRTS for a while until CBRTS can be de-commissioned in the next release.

**Key actions:**

- The following business processes will need to be reviewed:
  - Audit Operator Business Operations
  - Verify Administrative Compliance
  - Process Freight Permit Application
  - Process Passenger Permit Application
  - Process Tourist Permit Application
  - Issue Permit
- Conduct a requirements analysis to understand which functionality from the existing CBRTS system needs to be replaced, as well as new supporting requirements, to enable the implementation of the following application components:
  - Adjudication management (light version as per the current CBRTS system)
  - Permit Application Management
  - Permit Issue Management
  - Operator Evaluation
- Identify the process that can be automated as part of Permit Application Management
- Identify a suitable workflow engine to compliment the iCBMS solution
- Identify suitable Enterprise Workflow and Regulatory services to be updated or newly developed
- Implement and test solution
- Train users in using it

**Recommendations:**

- Use the workflow engine. It is recommended that C-BRTA uses the standardised rich internet application framework, Web, and Application server as basis
- It is also recommended that Micro Services should be used in the construction of this front-end application component - so that it can be integrated into the iCBMS as and when required. It also creates separation between the front-end and the current system - should C-BRTA in the future want to integrate this front-end or replace the back-end component, it could be done much easier.

**C-BRTA Resources requirement estimation: Workflow and Web Application Specialist**

**Order of magnitude costing:**

The potential cost of this work package is: R 1,500,000.00

**7.12. Work package 7: Implement an Integrated Cross Border Management System (R4)****Description:**

The focus of this work package is to enhance the iCBMS to support:

- Fully automated adjudication of permit applications
- Issuing of digital permits
- Implement route management

At the end of this work package the existing CBRTS system should be de-commissioned. This release will also enable business to start moving away from quantity to quality permits.

**Key actions:**

- The following business processes will need to be reviewed:
  - Conduct Regulatory Hearing
  - Negotiate Permit with relevant Stakeholders
  - Publish Permit Application Notice
  - Record and Process Objections
  - Audit Operator Business Operations
  - Verify Administrative Compliance
  - Process Freight Permit Application
  - Process Passenger Permit Application
  - Process Tourist Permit Application
  - Issue Permit
  - Conduct Route Analysis and Optimisation
  - Perform Route Optimisation
- Conduct a requirements analysis to understand the new requirements to enable the implementation of the following application components:

- Adjudication management (full version)
- Permit Issue Management (digital permits)
- Route Management
- Identify suitable Enterprise Workflow and Regulatory services to be updated or newly developed
- Implement and test solution
- Train users in using it
- Decommission CBRTS

**Recommendations:**

- During this release the iCBMS will also be able to integrate with the Document Management Solution - see WP16 Implement a Document Management Solution (R4). This will enable operators to submit digital documents and paper documents which can be scanned and stored.

**C-BRTA Resources requirement estimation:** Workflow and Web Application Specialist

**Order of magnitude costing:**

The potential cost of this work package is: R 2,500,000.00

### **7.13. Work package 7: Implement an Integrated Cross Border Management System (R5)**

**Description:**

The focus of this work package is to enhance the iCBMS to support:

- Permit status management
- Accreditation

**Key actions:**

- The following business processes will need to be reviewed:
  - Audit Operator Business Operations
  - Assign Demerit Points
  - Manage Operator Accreditation

- Assess Operator Permit Condition Compliance
  - Inspect Vehicle (on Route)
- Conduct a requirements analysis to understand the new requirements to enable the implementation of the following application components:
  - Permit Status Management
  - Accreditation Inspection Management
  - Accreditation Status Management
- Identify suitable Enterprise Workflow and Regulatory services to be updated or newly developed
- Implement and test solution
- Train users in using it

**Recommendations:**

- During this release, the Flow Calculator (WP4 Implement flow calculator) will also be implemented - consideration can be given to possible integration between the two.

**C-BRTA Resources requirement estimation:** Workflow and Web Application Specialist

**Order of magnitude costing:**

The potential cost of this work package is: R 2,500,000.00

## **7.14. Work package 7: Implement an Integrated Cross Border Management System (R6)**

**Description:**

The focus of this work package is to enhance the iCBMS to support Operator Profiling. This will be a small release.

**Key actions:**

- The following business processes will need to be reviewed:
  - Develop Operator Community Profile
  - Develop Operator Profile
  - Manage Operator Risk Profile

- Conduct a requirements analysis to understand the new requirements to enable the implementation of the following application components:
  - Operator Profiling
- Develop services to access Enforcer information to assist with the profiling
- Identify suitable Enterprise Workflow and Operator Information services to be updated or newly developed
- Implement and test solution
- Train users in using it

**Recommendations:**

- During this release, the CRM solution will also be implemented. Consideration should be given to possible services that will support a successful CRM implementation.

**C-BRTA Resources requirement estimation:** Workflow and Web Application Specialist

**Order of magnitude costing:**

The potential cost of this work package is: R 750,000.00

## **7.15. Work package 7: Implement an Integrated Cross Border Management System (R7)**

**Description:**

The focus of this work package is to develop complimentary support services. These do not necessarily form part of the iCBMS but can be developed as add-ons to a Document Management Solution, BI solution, or Project Management Solution. In this work package, a Learning Management Solution (LMS) will also be selected to provide training courses to operators or cross-border counterparts as part of an income generating initiative.

**Key actions:**

- The following business processes will need to be reviewed:
  - Conduct Operator Training
  - Develop Operator Community Profile
  - Develop Start-Up SME Operator (Incubation)
  - Conduct a Feasibility Study

- Research Transport Industry Studies
  - Conduct a Feasibility Study
  - Conduct Root Cause Analysis
  - Define Solution and Remedial Action Plan
  - Define Solution and Remedial Action Plan
- Conduct a requirements analysis to understand the new requirements to enable the implementation of the following application components:
  - Research and Study Management
  - Operator Development Management
  - Solution Design Management
  - Standards Management
  - Enhancement Management
- Identify learning and training requirements
- Select a suitable LMS suite and implementation partner
- Identify suitable Business Intelligence, Enterprise Workflow, Knowledge Management, and Operator Information services to be updated or newly developed
- Implement and test solutions
- Train users in using it

**C-BRTA Resources requirement estimation:** None - based on other work packages the required resources would have been dealt in there

**Order of magnitude costing:**

The potential cost of this work package is: R 1,500,000.00

## **7.16. Work package 7: Implement an Integrated Cross Border Management System (R9)**

**Description:**

The focus of this work package is to replace relevant Enforcer functionality with functionality in iCBMS and to decommission Enforcer.

**Key actions:**

- The following business processes will need to be reviewed:
  - Assign Infringement Fine
  - Issue Infringement Notice
  - Assess Operator Permit Condition Compliance
  - Inspect Vehicle (on Route)
- Conduct a requirements analysis to understand the new requirements to enable the implementation of the following application components:
  - Incident Management
  - Operations & Compliance Management
- Identify suitable Enforcer services to be updated or newly developed
- Implement and test solution
- Train users in using it

**Recommendations:**

- During this release, the Enterprise Service Bus will be implemented. Consideration should be given to the impact that it may have on any current services.

**C-BRTA Resources requirement estimation:** Web Application Specialist

**Order of magnitude costing:**

The potential cost of this work package is: R 1,500,000.00

**7.17. Work package 8: Implement GIS solution****Description:**

The focus of this work package is to implement a GIS solution that will be able to extract information from the Integrated Cross Border Management System to assist the C-BRTA specialist to graphically extract and display information. This will complement the information that is currently in the iCBMS and information that can be extracted from the internet via IoT.

**Business value:**

- Graphically see over or under usage of corridors



- Do trend analysis on cross-border transport
- Assist with cross-border transport research
- Increase the agency's usage of emerging trends and becoming part of the digital economy
- Move towards paperless business operations
- Assist with the implementation of alternative revenue streams
- Enhance the current IT infrastructure
- Improve customer and support service
- Improve border management & governance systems
- Increase freight transport industry satisfaction

**Key actions:**

- The following business processes will need to be reviewed:
  - Monitor device behaviour
  - Collect infringement information
- Conduct a requirements analysis to understand the new requirements to enable the implementation of the following application components:
  - Graphical reporting
  - Operator and route monitoring
- Select a suitable GIS solution and implementation partner
- Identify suitable enforcement and business intelligence services
- Implement and test solutions
- Train users in using it

**Recommendations:**

- It is recommended that C-BRTA only implements this when most of the Integrated Cross-Border Management System has been implemented. Only then will there be enough data available to successfully use a GIS.

**C-BRTA Resources requirement estimation: GIS Specialist****Order of magnitude costing:**

The potential cost of this work package is: R 750,000.00

## 7.18. Work package 9: Improve Stakeholder relations

### Description:

The focus of this work package is to implement a Customer Relationship Management solution that will enable C-BRTA to start monitoring engagements with various stakeholders such as: Ministers, various local, and African counterparts.

### Business value:

- Improve internal efficiencies
- Enhance sharing of C-BRTA thought-leadership on Cross-Border matters across regions
- Move towards paperless business operations
- Enhance the current IT infrastructure
- Improve inter-departmental support
- Improve synergy between divisions (breaking down silos)
- Improve stakeholder management capabilities
- Supporting “Linking Africa” initiatives

### Key actions:

- The following business processes will need to be reviewed:
  - Consult Minister of Transport
  - Consult National Government Departments
  - Consult Provincial / Local Government
  - Engage State Owned Agencies
  - Engage Traffic Authorities
  - Respond to Parliamentary Questions
  - Engage International Countries
  - Manage Stakeholder Communication
  - Engage Rest of Africa Stakeholder

- Engage SACU Countries
- Engage SADC Countries
- Conduct a requirements analysis to understand the new requirements to enable the implementation of the following application components:
  - Inter Entity Relationship Management
  - International Collaboration
  - Query Management
  - Regional Relationship Management
- Identify suitable Operator Information and Transportation Support services to be updated or newly developed
- Select a suitable product and implementation partner
- Implement and test solution
- Train people on using it

**Recommendations:**

- It is recommended that C-BRTA not only consider stakeholder relationship management requirements but also customer relationship requirements - as the aim is to obtain one solution that will cater for both initiatives.

**C-BRTA Resources requirement estimation: CRM Specialist****Order of magnitude costing:**

The potential cost of this work package is: R 1,000,000.00

**7.19. Work package 10: Improve Customer relations****Description:**

The focus of this work package is to implement a customer relationship management solution that will enable C-BRTA to start monitoring engagements with various operators and track complains/issues for resolution management.

To manage costs and size - it is recommended to split this work package into two releases:

- Work package 10: Improve Customer relations (R6)
- Work package 10: Improve Customer relations (R7)

## 7.20. Work package 10: Improve Customer relations (R6)

### Description:

The focus of this work package is to implement the full CRM solution for customer relationship management excluding a notification engine component.

### Key actions:

- The following business processes will need to be reviewed:
  - Assess Corridor Issues and Initiatives
  - Assess Operator Issues and Initiatives
  - Manage Stakeholder Communication
  - Engage Bus Transport Associations
  - Engage Freight Owners, Forwarders, Clearing Agencies
  - Engage SA Tourism Board
  - Engage Taxi Associations
  - Manage Operator Relationships
- Conduct a requirements analysis to understand the new requirements to enable the implementation of the following application components:
  - Complaints Management
  - Communication Management
  - Operator & Industry Relationship Management
  - Query Management
  - Incident Management
  - Relationship Management
- Identify suitable Operator Information and Transportation Support services to be updated or newly developed
- Implement and test solution (provided a solution and implementation partner was selected in the previous work package)
- Train users in using it

**Recommendations:**

- Consider the work done with regards to the stakeholder relationship management
- Consider the services from regulatory and enforcement to compliment this solution

**C-BRTA Resources requirement estimation: CRM Specialist****Order of magnitude costing:**

The potential cost of this work package is: R 1,250,000.00

**7.21. Work package 10: Improve Customer relations (R7)****Description:**

The focus of this work package is to compliment the CRM solution with a notification engine component.

**Key actions:**

- Conduct a requirements analysis to understand the impact of the Notification Engine on the implemented CRM solution
- Identify suitable Operator Information and Transportation Support services to be updated or newly developed
- Implement and test solution (provided a solution and implementation partner was selected in the previous work package)
- Train users in using it

**C-BRTA Resources requirement estimation: None specific / CRM Specialist****Order of magnitude costing:**

The potential cost of this work package is: R 1,250,000.00

**7.22. Work package 11: WP11 Implement Unified Communications****Description:**

The focus of this work package is to implement a unified communications solution that will provide:

- Instant messaging (chat)

- IP telephony
- Web & video conferencing
- Desktop sharing
- Integrated voicemail, e-mail and SMS
- Social media communications

**Business value:**

- Cost savings
- Improve internal efficiencies.
- Move towards paperless business operations
- Enhance the current IT infrastructure
- Improve synergy between divisions (breaking down silos)
- Improve customer and support service
- Improve stakeholder management

**Key actions:**

- Develop detailed requirements specification
- Select a suitable product and implementation partner for the Unified Communications component
- Implement and test solution
- Train people on using it

**Recommendations:**

- Due to the size and complexity of C-BRTA, it is recommended that C-BRTA only considers this at a later stage in the implementation roadmap.

**C-BRTA Resources requirement estimation: UC Specialist****Order of magnitude costing:**

The potential cost of this work package is: R 1,250,000.00

### 7.23. Work package 12: Implement an integration layer

#### Description:

The focus of this work package is to implement an integration layer that will enable the C-BRTA to integrate with various external entities - this will become especially important in the case of access to IoT information.

#### Business value:

- Enhance the current IT infrastructure
- Improve inter-departmental support
- Supporting “Linking Africa” initiatives
- Increase the agency’s usage of emerging trends and becoming part of the digital economy
- Assist with the implementation of alternative revenue streams
- Enhance systems process integration across the value chain
- Will provide real-time information on transport to C-BRTA

#### Key actions:

- Various permit application and accreditation processes will need to be reviewed as this ICT capability allows C-BRTA to receive real-time information. Depending on what information is available, it will have an influence on the changes to Enforcer, Regulatory, and Operator Information services.
- Conduct a requirements analysis to understand the new requirements to enable the implementation of the following application components:
  - ESB
  - Master Data Management
- Select a suitable product and implementation partner
- Implement and test solution
- Train people on using it

#### Recommendations:

- Due to the fact that C-BRTA does not have a large set of current applications and the existing CBRTS will be replaced - the need for an Enterprise Service Bus is only to enable

sharing of information across departments and outside entities to obtain IoT information. Hence this was positioned late in the transformation process.

- Due to the fact that C-BRTA will have a very good detailed Data Model when this is implemented, which can be used as a Master Data repository, the implementation of this should not be as complex and the project should come out cheaper than the estimated costs.
- It is recommended that C-BRTA not only consider stakeholder relationship management requirements but also customer relationship requirements - as the aim is to obtain one solution that will cater for both initiatives.

#### **C-BRTA Resources requirement estimation: Integration Specialist**

#### **Order of magnitude costing:**

The potential cost of this work package is: R 4,000,000.00

### **7.24. Work package 13: Integrate with RTMC (Law Enforcement)**

#### **Description:**

This work package is an extension to Work Package 12: Implement an Integration Layer. The focus of this work package is to connect with RTMC via services to obtain real-time infringement notices.

#### **Business value:**

- Enhance the current IT infrastructure
- Improve inter-departmental support
- Increase the agency's usage of emerging trends and becoming part of the digital economy
- Enhance systems process integration across the value chain
- Will provide real-time information on transport to C-BRTA

#### **Key actions:**

- Various permit application and accreditation processes will need to be reviewed as this ICT capability allows C-BRTA to receive real-time information. Depending on what information is available, it will have an influence on the changes to Enforcer, Regulatory, and Operator Information services.



- Conduct a requirements analysis to understand the new requirements to expand the implementation of the following application components or connect to RTMC:
  - ESB
  - Master Data Management
- Implement and test solution
- Train people on using it

**Recommendations:**

- This work package should be a continuation of the previous work package.

**C-BRTA Resources requirement estimation: Integration Specialist****Order of magnitude costing:**

The potential cost of this work package is: R 500,000.00

## **7.25. Work package 14: Integrate with Government Stakeholders (SARS, CIPC, eNATIS, etc)**

**Description:**

This work package is an extension to Work Package 12: Implement an Integration Layer. The focus of this work package is to connect with various other departments such as: SARS, CIPC, eNATIS, etc.

**Business value:**

- Enhance the current IT infrastructure
- Improve inter-departmental support
- Increase the agency's usage of emerging trends and becoming part of the digital economy
- Enhance systems process integration across the value chain
- Will provide real-time information on transport to C-BRTA

**Key actions:**

- Various permit application and accreditation processes will need to be reviewed as this ICT capability allows C-BRTA to receive real-time information. Depending on what

information is available, it will have an influence on the changes to Enforcer, Regulatory, and Operator Information services.

- Conduct a requirements analysis to understand the new requirements to expand the implementation of the following application components to connect to the various departments:
  - ESB
  - Master Data Management
- Implement and test solution
- Train people on using it

**Recommendations:**

- This work package should be a continuation of Work Package 12.

**C-BRTA Resources requirement estimation: Integration Specialist****Order of magnitude costing:**

The potential cost of this work package is: R 1,000,000.00

**7.26. Work package 15: Data sharing across CBRTA (Intranet)****Description:**

The focus of this work package is to implement an intranet solution within C-BRTA that will provide the portal for sharing of information across C-BRTA.

Due to current initiatives - it is recommended to split this work package into two releases:

- Work package 10: Improve Customer relations (R2)
- Work package 10: Improve Customer relations (R5)

**Business value:**

- Cost savings
- Improve internal efficiencies
- Move towards paperless business operations
- Enhance the current IT infrastructure
- Improve synergy between divisions (breaking down silos)

## **7.27. Work package 15: Data sharing across CBRTA (Intranet) (R2)**

### **Description:**

This initiative is from the ICT Strategy. The focus of this work package is to provide a single point of access to information for internal (intranet) stakeholders and take advantage of social media platforms. From a technology point of view; to provide a single point of access to existing business information systems and sources.

### **Key actions:**

- Select a Rich Internet Application Framework as standard
- Select a Web Server and Application Server as standard
- Select a Web Forum application
- Conduct a requirements analysis to understand the requirements for a portal solution given the other work packages within this release.
- Identify suitable Business Intelligence, Operator Information and Transportation Support services that could be used to provide a richer portal solution
- Select a suitable implementation partner
- Test and implement the solution

### **Order of magnitude costing:**

The potential cost of this work package is: R 200,000.00

## **7.28. Work package 15: Data sharing across C-BRTA (Intranet) (R5)**

### **Description:**

The focus of this work package is to enhance the portal by providing the internal users with an intelligence reporting capability.

### **Key actions:**

- Conduct a requirements analysis to understand the new requirements to enable the implementation of an intelligence reporting capability as part of the BI solution
- Identify suitable Operator Information, Regulatory, and Transportation Support services to be updated or newly developed
- Select a suitable product and implementation partner

- Implement and test solution
- Train people on using it

**Recommendations:**

- None specific.

**C-BRTA Resources requirement estimation:** BI Specialist

**Order of magnitude costing:**

The potential cost of this work package is: R 750,000.00

## **7.29. Work package 16: Implement a Document Management Solution**

**Description:**

The focus of this work package is to implement a document management solution that will enable C-BRTA to keep all documents in a digital format for easy search and retrieval.

To manage costs and size - it is recommended to split this work package into two releases:

- Work package 16: Implement a Document Management Solution 10: Improve Customer relations (R4)
- Work package 16: Implement a Document Management Solution 10: Improve Customer relations (R8)

**Business value:**

- Cost savings
- Improve internal efficiencies.
- Move towards paperless business operations
- Improve synergy between divisions (breaking down silos)
- Improved knowledge management
- Improved availability of documents
- Reduction of risk of destruction of physical records in case of a disaster, e.g. fire or water

### 7.30. Work package 16: Implement a Document Management Solution (R4)

#### Description:

The focus of this work package is to implement a document management solution that will complement the new iCBMS by providing an ability to store documents electronically as well as archiving these.

#### Key actions:

- Develop documents management structure
- Develop governance structure for document management
- Appoint supporting team
- The following business processes will need to be reviewed for storing of digital documents:
  - Conduct Regulatory Hearing
  - Publish Permit Application Notice
  - Verify Administrative Compliance
  - Process Freight Permit Application
  - Process Passenger Permit Application
  - Process Tourist Permit Application
  - Issue Permit
- Conduct a requirements analysis to understand the new requirements to enable the implementation of the following application components:
  - Document Management
  - Archiving
- Identify suitable Enterprise Workflow and Regulatory services to be updated or newly developed
- Select a suitable product and implementation partner
- Implement and test solution
- Train people on using it

#### Recommendations:

- Consider back scanning of relevant hard copy documents depending on the requirements, costs, and available budget.

**C-BRTA Resources requirement estimation:** Document management specialist

**Order of magnitude costing:**

The potential cost of this work package is: R 2,500,000.

### **7.31. Work package 16: Implement a Document Management Solution (R8)**

**Description:**

The focus of this work package is to expand the document management system to maintain Intellectual property and various journals - these journals could be used to generate extra income for C-BRTA.

**Key actions:**

- Develop internal documents management structure
- Expand governance structure for document management
- At minimum, the following business processes will need to be reviewed for storing of digital documents:
  - Deliver support and service
  - Conduct a feasibility study
  - Research transport industry studies
- Conduct a requirements analysis to understand the new requirements to enable the implementation of the following application components:
  - Intellectual Property Portfolio
  - Journal Publication
- Implement and test solution
- Train people on using it

**Recommendations:**

- None specific

**C-BRTA Resources requirement estimation:** Document management specialist

**Order of magnitude costing:**

The potential cost of this work package is: R 250,000.

**7.32. Work package 17: Implement Data warehouse solution****Description:**

Data warehouse is really more a service than a project. As part of the project the team needs to develop various cubes that can be analysed by a BI tool. To make this successful there is a considerable amount of up-front work required to get started.

**Business value:**

- Improved knowledge management
- Reduce the number of reporting solutions
- Reduced cost and complexity of reporting
- Easy creation of custom reports and specific user requirements
- Increase the quality of information
- Develop a sustainable future for developing Business Intelligence
- Provide a platform for both strategic and operational information
- Information customised according to the target audience

**Key actions:**

- Selection and construction of a data management committee
- Develop a data management policy
- Conduct business requirements analysis to determine initial cube requirements
- Develop an initial data dictionary
- Develop various cubes based on the requirements
- Develop various ETL (Extract Transform Load) utilities to regularly update the Data Warehouse
- Select a suitable product and implementation partner
- Implement and test solution

- Train people on using it

**Recommendations:**

- Select a combined data warehouse and BI tool
- It is recommended that this work package be done together with Work Package 18.

**C-BRTA Resources requirement estimation:** Database administrator

**Order of magnitude costing:**

The potential cost of this work package is: R 1,500,000.00.

### 7.33. Work package 18: Implement a Business Intelligence Solution

**Description:**

The focus of this work package is to implement a Business Intelligence solution that will analyse data from the Data Warehouse to extract reports.

Due to current initiatives - it is recommended to split this work package into two releases:

- Work package 18: Implement a Business Intelligence Solution (R1)
- Work package 18: Implement a Business Intelligence Solution (R2)

**Business value:**

- Move towards paperless business operations
- Improve synergy between divisions (breaking down silos)
- Improved knowledge management
- Reduce the number of reporting solutions
- Reduced cost and complexity of reporting
- Easy creation of custom reports and specific user requirements
- Access control to reports
- Increase the quality of information
- Develop a sustainable future for developing Business Intelligence
- Provide a platform for both strategic and operational information
- Information customised according to the target audience



- Timely presentation of information (real-time or semi real-time), i.e. not batched

### **7.34. Work package 18: Implement a Business Intelligence Solution (R1)**

#### **Description:**

This initiative is from the ICT Strategy. The focus of this work package is to provide an interim solution that will enable users to do queries and reports. The focus is to obtain access to one of the MS Data Analytics components from RMTC to assist business with reporting. The Profiling Unit of C-BRTA is mandated to extrapolate information from various sources (internal/external) about operators, traffic flows and tendencies including behavioural patterns. Detailed reports are then compiled and submitted to the Regulatory Committee. Therefore, there is a need for an analytical tool which will provide hidden links and visual images.

#### **Key actions:**

- Conduct business requirements analysis to determine initial reporting and analytical requirements
- Identify key informational object to be shared and sources where information will be sourced
- Develop Reporting structures and timelines
- Consider and review information from the following sources:
  - Enforcer application database
  - CBRTS application database
  - Excel spreadsheets
- Select a suitable product and implementation partner
- Implement and test solution

#### **Order of magnitude costing:**

The potential cost of this work package is: R 200,000.00

### 7.35. Work package 18: Implement a Business Intelligence Solution (R2)

**Description:**

The purpose of this work package is to implement a complete Business Intelligence (BI) solution for C-BRTA. This solution will sit on top of the Data Warehouse implementation.

**Key actions:**

- Conduct a requirements analysis to understand the new requirements to enable the implementation of the following application components:
  - Business Intelligence
  - Dashboard Management
- Based on the requirements for BI within C-BRTA develop service wrappers to extract and feed the information to the Data Warehouse
- Appoint supporting team
- Select a suitable product and implementation partner
- Implement and test solution
- Train people on using it

**C-BRTA Resources requirement estimation:** BI Support team

**Order of magnitude costing:**

The potential cost of this work package is: R 1,500,000.00.

### 7.36. Work package 19: Implement Employee performance management

**Description:**

This is a current ICT Strategy initiative. The focus of this work package is therefore to expand the current SAGE offering to also provide the “Employee Performance” component.

**Business value:**

- Breaking down silos across divisions
- Lack of systems process integration across the value chain
- Improve internal efficiencies
- Move towards paperless business operations

- Enhance the current IT infrastructure
- Enhance systems process integration across the value chain

**Key actions:**

- The following business processes will need to be reviewed for storing of digital documents:
  - Manage employee performance
  - Manage employee information and analytics
- Conduct a requirements analysis to understand the new requirements to enable the implementation of the following application components:
  - Employee Performance
- Test and implement the solution

**Recommendations:**

- Expand existing SAGE solution

**C-BRTA Resources requirement estimation:** None additional to current employees

**Order of magnitude costing:**

The potential cost of this work package is: R 500,000.00

### **7.37. Work package 20: Implement an integrated HR management platform**

**Description:**

The focus of this work package is to implement an integrated Human Resource Platform that will enable the HR Department to manage resources from the point of requirement, through employment, growth and maturing to finally exiting the organisation.

To manage costs and size - it is recommended to split this work package into three releases:

- Work package 20: Implement an integrated HR management platform (R2)
- Work package 20: Implement an integrated HR management platform (R3)
- Work package 20: Implement an integrated HR management platform (R7)
- Work package 20: Implement an integrated HR management platform (R10)

**Business value:**

- Cost savings

- Breaking down silos across divisions
- Lack of systems process integration across the value chain
- Improve internal efficiencies
- Move towards paperless business operations
- Enhance the current IT infrastructure
- Enhance systems process integration across the value chain
- Better retention of resources

### **7.38. Work package 20: Implement an integrated HR management platform (R2)**

#### **Description:**

The focus of this work package is to expand the current SAGE offering by acquiring the additional components to Manpower costing, planning, and control as well as personnel development. This functionality is currently available as separate modules from SAGE.

#### **Key actions:**

- The following business processes will need to be reviewed for storing of digital documents:
  - Develop and manage human resources planning, policies, and strategies
  - Develop and counsel employees
  - Manage employee relations
- Conduct a requirements analysis to understand the new requirements to enable the implementation of the following application components:
  - Manpower Planning, Costing and Control
  - Personnel Development
- Test and implement the solution

#### **Recommendations:**

- Expand existing SAGE solution for Personnel Development and Manpower Planning, Costing and Control.

**C-BRTA Resources requirement estimation:** SAGE HR Specialist - should the current HR capacity not be able to accommodate the requirement

**Order of magnitude costing:**

The potential cost of this work package is: R 500,000.00

**7.39. Work package 20: Implement an integrated HR management platform (R3)****Description:**

The focus of this work package is to expand the current SAGE offering to also provide the “Travel and Expenses” functionality. This functionality is currently available within the SAGE product but has not been implemented.

**Key actions:**

- The following business processes will need to be reviewed for storing of digital documents:
  - Manage employee information and analytics
- Conduct a requirements analysis to understand the new requirements to enable the implementation of the following application components:
  - Travel and Expenses
- Test and implement the solution

**Recommendations:**

- Expand existing SAGE solution

**C-BRTA Resources requirement estimation:** None additional to current employees

**Order of magnitude costing:**

The potential cost of this work package is: R 250,000.00

**7.40. Work package 20: Implement an integrated HR management platform (R7)****Description:**

The focus of this work package is to expand the current SAGE offering to provide “Recruitment” and “Organisation Management” functionality.

**Key actions:**

- The following business processes will need to be reviewed for storing of digital documents:
  - Recruit, source, and select employees
  - Manage Organisational change
- Conduct a requirements analysis to understand the new requirements to enable the implementation of the following application components:
  - Recruitment
  - Organisation Management
- Test and implement the solution

**Recommendations:**

- Expand existing SAGE solution

**C-BRTA Resources requirement estimation:** SAGE HR Specialist - should the current HR capacity not be able to accommodate the requirement

**Order of magnitude costing:**

The potential cost of this work package is: R 250,000.00

**7.41. Work package 20: Implement an integrated HR management platform (R10)****Description:**

The focus of this work package is to implement support for Industrial Relations management - to complete the full and outstanding components of an integrated Human Resource Platform.

**Key actions:**

- The following business processes will need to be reviewed for storing of digital documents:
  - Manage employee relations
- Conduct a requirements analysis to understand the new requirements to enable the implementation of the following application components:
  - Industrial Relations
- Select a suitable IR solution and implementation partner
- Implement and test solution

- Train people on using it

**Recommendations:**

- Based on existing research it does not appear that SAGE can provide Industrial Relations. For this a different solution maybe required.

**C-BRTA Resources requirement estimation:** SAGE HR Specialist - should the current HR capacity not be able to accommodate the requirement

**Order of magnitude costing:**

The potential cost of this work package is: R 500,000.00

**7.42. Work package 21: Automate internal supporting processes (BPM)****Description:**

The focus of this work package is to expand the usage of the Workflow engine to also automate non-core (i.e. supporting) business process.

**Business value:**

- Breaking down silos across divisions
- Lack of systems process integration across the value chain
- Improve internal efficiencies.
- Move towards paperless business operations
- Exploit existing IT investment
- Enhance systems process integration across the value chain

**Key actions:**

- All non-core or supporting business processes need to be reviewed for automation
- A process called: “manage business processes” exists that helps to manage internal business processes - this would be the starting point
- Prioritise the automation of these processes
- Conduct a requirements analysis to understand the new requirements to enable the implementation of the following application components:
  - Business Process

- Test and implement the solution

**Recommendations:**

- Exploit the Workflow engine that was purchased for the iCBMS solution

**C-BRTA Resources requirement estimation:** None additional to current employees

**Order of magnitude costing:**

The potential cost of this work package is: R 1,500,000.00

### 7.43. Work package 22: Provide automated Legal system

**Description:**

The focus of this work package is to implement an automated solution to support the Legal environment.

**Business value:**

- Cost savings
- Improve internal efficiencies.
- Move towards paperless business operations
- Enhance the current IT infrastructure

**Key actions:**

- The following business processes will need to be reviewed:
  - Manage outside counsel
  - Resolve disputes and litigations
  - Provide legal advice/counselling
  - Ensure compliance
  - Manage corporate governance policies
  - Negotiate and document agreements/contracts
- Conduct a requirements analysis to understand the new requirements to enable the implementation of the following application components:
  - Case & Litigation Management
  - Legal Advice
  - Legal Compliance



- Legal Forms and Documents
- Select a suitable product and implementation partner
- Implement and test solution
- Train people on using it

**Recommendations:**

- None

**C-BRTA Resources requirement estimation:** None additional to current employees

**Order of magnitude costing:**

The potential cost of this work package is: R 250,000.00

#### **7.44. Work package 23: Implement a Risk and Compliance management solution**

**Description:**

The focus of this work package is to implement an automated solution to support risk and compliance within C-BRTA.

To manage the risk of new iCBMS as well as the project costs and size - it is recommended to split this work package into three releases:

- Work package 23: Implement a Risk and Compliance management solution (R3)
- Work package 23: Implement a Risk and Compliance management solution (R4)
- Work package 23: Implement a Risk and Compliance management solution (R8)

**Business value:**

- Cost savings
- Improve internal efficiencies
- Move towards paperless business operations
- Enhance the current IT infrastructure
- Manage the risk within C-BRTA as the Business and ICT environment grows
- Ensure compliance to government policies

#### **7.45. Work package 23: Implement a Risk and Compliance management solution (R3)**

**Description:**

The focus of this work package is to select and implement an Enterprise Risk Management solution, to manage risk within C-BRTA in an automated way - hence improving risk management.

**Key actions:**

- The following business processes will need to be reviewed:
  - Manage enterprise risk
  - Manage remediation efforts
- Conduct a requirements analysis to understand the new requirements to enable the implementation of the following application components:
  - Business Risk Models
  - Risk Advisory
  - Risk Management
- Select a suitable Enterprise Risk Management (ERM) solution and implementation partner
- Implement and test solution
- Train people on using it

**Recommendations:**

- Select a suitable package that can also be used later to manage governance and compliance

**C-BRTA Resources requirement estimation:** None additional to current employees

**Order of magnitude costing:**

The potential cost of this work package is: R 500,000.00

**7.46. Work package 23: Implement a Risk and Compliance management solution (R4)****Description:**

The focus of this work package is to expand the usage of the Enterprise Risk Management solution, that was obtained in Work package 23: Implement a Risk and Compliance management solution (R3), to start managing corporate governance and compliance

**Key actions:**

- The following business processes will need to be reviewed:
  - Conduct Internal Audit
  - Perform Fraud Investigation
  - Manage compliance
  - Manage business processes
  - Manage enterprise quality
- Conduct a requirements analysis to understand the new requirements to enable the implementation of the following application components:
  - Audit
  - Compliance Reporting
  - Corporate Policy
  - Regulatory Compliance
- Select a suitable customisation partner
- Implement and test solution
- Train people on using it

**Recommendations:**

- Expand the ERM solution that was purchased previously

**C-BRTA Resources requirement estimation:** None additional to current employees

**Order of magnitude costing:**

The potential cost of this work package is: R 500,000.00

**7.47. Work package 23: Implement a Risk and Compliance management solution (R8)****Description:**

The focus of this work package is to implement an automated Enterprise Strategy Management solution to support development and execution of Corporate Strategy.

**Key actions:**

- The following business processes will need to be reviewed:
  - Assess Knowledge Management capabilities
  - Define the business concept and long-term vision

- Develop business strategy
  - Develop products and services
  - Execute and measure strategic initiatives
  - Generate and define new product/service ideas
  - Govern and manage product/service development program
  - Manage Organisational change
- Conduct a requirements analysis to understand the new requirements to enable the implementation of the following application components:
    - Corporate Strategy Management
  - Select a suitable product(s) and implementation partner
  - Implement and test solution
  - Train people on using it

**Recommendations:**

- None

**C-BRTA Resources requirement estimation:** None additional to current employees

**Order of magnitude costing:**

The potential cost of this work package is: R 500,000.00

## 7.48. Work package 24: Audit Logging

**Description:**

This is an ICT Strategy initiative. The focus of this work package is to counter-act an Audit finding that audit logging is not sufficiently done at the correct level of detail across the various C-BRTA systems.

**Business value:**

- Reduce audit finding
- Reduce fraudulent activities

**Key actions:**

- Conduct a requirements analysis to understand the new requirements to enable the implementation of the following application components:

- Security Management (Including SIEM)
- End-Point Protection
- Identify a solution for the following security controls as per the security controls reference model:
  - Audit Logging
  - Identification
  - Authentication
  - Entity Registration
  - Security Logging and Monitoring
  - Remote Access
- Implement and test solution
- Train people on using it

**Recommendations:**

- None

**C-BRTA Resources requirement estimation:** Security specialist

**Order of magnitude costing:**

The potential cost of this work package is: R 500,000.00

## 7.49. Work package 25: Implement security controls

**Description:**

As the C-BRTA moves to become a digital business, cyber security will become more of a threat. For that reason - security controls and solutions needs to increase with the various releases. This work package starts in release 2 and continues until release 10. When implementing the different security controls in each work package it is important to perform an analysis of the extent to which the controls must be implemented. It is not necessary to completely implement the controls across the landscape from the start of each work package - only implement for the immediate threat

**Business value:**

- Reduce fraudulent activities

- Prevent C-BRTA against cyber attacks
- Protects against data theft

**Release 2: Key actions:**

- Conduct a requirements analysis to understand the new requirements to enable the implementation of the following application components:
  - Security Access Management
- Identify a solution for the following security controls as per the security controls reference model:
  - Security technical design and development
    - Recommendation: Develop and agree on a Software Development Lifecycle that considers security implementations. Agree on a Security Implementation Project approach
  - Security Incident Management
    - Recommendation: Keep a clearly defined and documented plan of action for use at the time of an incident, typically covering the key personnel, resources, services and actions needed to implement the incident management process.
  - Security Configuration Management and protection
    - Recommendation: Keep an initial baseline and then maintain and verify subsequent changes made to a systems hardware, software and documentation throughout the development and operational life of the system. Systems include platforms and networks.
  - Security Administration
    - Recommendation: Allocate to the user the pre-determined levels of access and capability. The system also provides management functions such as adding new authorised users, deleting and modifying others, and changing the levels and types of permissions associated with each user.
  - Directory Service
    - Recommendation: Set up system services to identify and store unique paths for information assets to ensure that the users can locate resources and access the correct services distributed throughout the network.

- Access Control Logging
  - Recommendation: Ensure that there are suitable logging of access control and related functions within the iCBMS.
- Segregation of Duty
  - Recommendation: Divide the steps in iCBMS functions among different individuals, so as to keep a single individual from subverting the process.
- Trusted Time
  - Recommendation: Ensure that records within iCBMS indicate both the date and the time that some action occurred.
  - Recommendation: Ensures that the server reads the actual time from a reference clock and distributes this information to its clients using a computer network. Secure time server protocols, e.g. NNTP can be used.
- Implement and test solution
- Configure and update the extent of controls as the threat increases
- Train people on using it

**Release 3: Key actions:**

- Identify a solution for the following security controls as per the security controls reference model:
  - Single sign-on
    - Recommendation: Due to the fact that various systems will be used to provide a common solution - it is recommended to implement single sign-on in this release
  - Threat Modelling for System Design
    - Recommendation: develop a model to anticipate threats and to design for these threats during the design of new applications
  - Security Policy Management
    - Recommendation: Develop a security policy framework, policies, procedures, standards, and guidelines. Develop and review an inventory of all security-related technology
  - Security Asset Management

- Recommendation: keep an inventory of all security-related technology
- Digital Signature
  - Recommendation: keep a signature registry
- Digital Certificate Management
  - Recommendation: Ensure web access is secure and access is managed and monitored
- Information Access Classification
  - Recommendation: Classify data to ensure that information is disclosed only to those who are authorised to view it
- Data Confidentiality Protection
  - Recommendation: Implement mechanisms to ensure that information is disclosed only to those who are authorised to view it
- Data integrity protection
  - Recommendation: Consider some of the following:
    - Message digests and hash functions
    - Message authentication codes (MACs)
    - Message integrity checksums
    - Digital signatures
    - Hashing
- Implement and test solution
- Train people on using it

**Release 4: Key actions:**

- Identify a solution for the following security controls as per the security controls reference model:
  - Security Risk Assessment
    - Recommendation: Develop the following:
      - Risk assessment framework and programme
      - Risk assessment report



- Risk assessment procedure
- Security Risk treatment and mitigation
  - Recommendation: develop a vulnerability management programme
- Security Administration
  - Recommendation: Allocate to the user the pre-determined levels of access and capability. The system also provides management functions such as adding new authorised users, deleting and modifying others, and changing the levels and types of permissions associated with each user
- Message protection
  - Recommendation: use message encryption algorithms to protect the integrity and content of the message as it is transported
- Network and content filtering
  - Recommendation: enhance network and internet firewall by implementing filters to screen and remove or monitor potential dangerous communication or content
- Message replay protection
  - Recommendation: introduce measures to protect the integrity and uniqueness of a message by detecting data and communication inconsistencies
- Patch Management
  - Recommendation: develop a stringent process to regularly apply available patches to protect vulnerable hardware and software
- Intrusion detection and prevention
  - Recommendation: Implement Intrusion Detection measures and Intrusion Protection measures as part of the security system
- Integrity scanning
  - Recommendation: scanning of files against known healthy baselines to pick up any anomalies

**Release 10: Key actions:**

- Conduct a requirements analysis to understand the new requirements to enable the implementation of the following application components:
  - Device security management
- Identify a solution for the following security controls as per the security controls reference model:
  - Drive and File encryption
    - Recommendation: Select a solution to encrypt data stored on local drives including device encryption for portable storage devices
  - Security research and consulting
    - Recommendation: Continue with ongoing research into the security field and ensure that the security capability stays current
  - Forensics
    - Recommendation: develop a practice that can gather, retain, and analyse data for investigative purposes in a manner that maintains the integrity of the data
  - Cryptographic Key Management
    - Recommendation: introduce full lifecycle key management by incorporating Cryptographic encryption algorithms to protect access, loss or misuse of keys

**C-BRTA Resources requirement estimation:** Security specialist

**Order of magnitude costing:**

The potential cost of this work package is: R 500,000.00

## 7.50. Work package 26: Security Monitoring and testing

### Description:

This work package is the operational execution of the processes, policies, and controls that has been defined in Work Package 25. Security monitoring and testing will be done in each release using the controls defined as per Work Package 25. This work package spreads over all the releases from release 3 to release 10.

**C-BRTA Resources requirement estimation:** Security specialist

**Order of magnitude costing:**

The potential cost of this work package is: R 250,000.00 per release

**7.51. Work package 27: Implement ICT Virtualisation****Description:**

This work package is based on the project that C-BRTA has currently embarked on to do ICT virtualisation.

**Business value:**

- Cost saving with regards to infrastructure
- Enhance the current IT infrastructure

**Order of magnitude costing:**

The potential cost of this work package is: R 3,250,000.00

**7.52. Work package 28: Develop a Cloud strategy****Description:**

The focus of this work package is to develop a cloud strategy with regards to how C-BRTA will approach the following levels of cloud computing:

Infrastructure-as-a-Service (IaaS) - the provision of storage, hardware, servers and networking components to support the operations of an organisation. The service provider owns the equipment and is responsible for housing, running and maintaining it. The customer pays on a per-use basis;

Platform-as-a-Service (PaaS) - this involves renting hardware, operating systems, storage and network capacity over the Internet. The customer rents virtualised servers and associated services for running existing applications or developing new ones;

Software-as-a-Service (SaaS) - a software distribution model where applications are hosted by a vendor or service provider and made available to customers usually via the Internet. This includes Web-based e-mail services and data processing.

The figure below provides an overview of the levels of cloud computing:

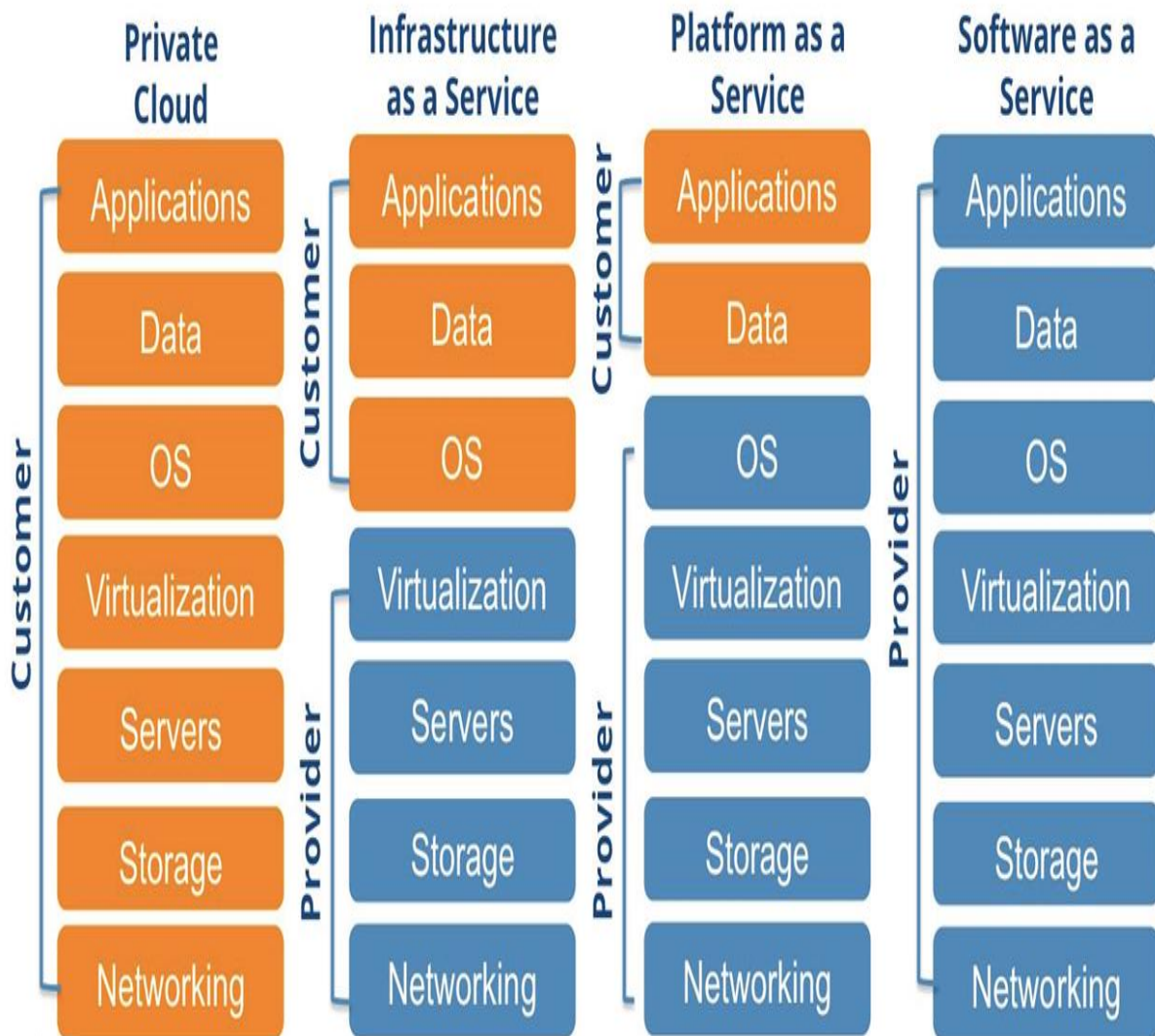


Figure 7: Cloud computing overview

#### Business value:

- Improve internal efficiencies.
- Increase the agency's usage of emerging trends and becoming part of the digital economy
- Assist with the implementation of alternative revenue streams
- Enhance the current IT infrastructure
- Contribute to a more sustainable funding model
- Ultimately can contribute to linking Africa initiatives by becoming a system to be used across SADEC
- Effective usage of resources

**Key actions:**

- Conduct an analysis of the market and the growth in Cloud services and cloud usage
- Develop a strategic approach to the usage of cloud services

**Recommendations:**

- It is recommended that this strategy should be reviewed on a regular basis to ensure relevancy due to the pace at which cloud services are changing

**C-BRTA Resources requirement estimation:** Enterprise Architect/Cloud specialist

**Order of magnitude costing:**

The potential cost of this work package is: R 250,000.00

### 7.53. Work package 29: IT Continuity Planning

**Description:**

This is an ICT Strategy initiative. The focus of this work package is to ensure business continuity by developing and implementing IT redundancy and disaster recovery measures and equipment.

**Business value:**

- Limit risk and ensure IT continuity
- Increase the agency's usage of emerging trends and becoming part of the digital economy
- Enhance the current IT infrastructure
- Contribute to a more sustainable organisation
- Improve internal customer and support service

**Key actions:**

- Identify business continuity risks and asses impact to business operations
- Develop a continuity plan and define mitigation strategies and recovery standards
- Implement continuity policies, standards, and equipment

**Recommendations:**

- It should be noted that continuity requirements must from part of all other application component implementation

- Research solutions to the following application components:
  - System backup
- Select a suitable solution provider
- Test and implement the solution

**Recommendations:**

- None

**C-BRTA Resources requirement estimation:** No additional resources

**Order of magnitude costing:**

The potential cost of this work package is: R 500,000.00

## 7.54. Work package 30: Improve IT Service Management

**Description:**

The focus of this work package is to improve the IT service management capability.

To manage costs and size - it is recommended to split this work package into three releases:

- Work package 30: Improve IT Service Management (R2)
- Work package 30: Improve IT Service Management (R5)
- Work package 30: Improve IT Service Management (R9)

**Business value:**

- Limit risk and ensure IT continuity
- Increase the agency's usage of emerging trends and becoming part of the digital economy
- Enhance the current IT infrastructure
- Improve internal customer and support service

### 7.55. Work package 30: Improve IT Service Management (R2)

**Description:**

The focus of this work package is to implement a system operations solution.

**Key actions:**

- Conduct a requirements analysis to understand the new requirements to enable the implementation of the following application components:
  - System Operations
- Identify suitable solutions provider
- Implement and test solution
- Train users in using it

**Recommendations:**

- None

**Resources requirement estimation:** None more than current IT staff

**Order of magnitude costing:**

The potential cost of this work package is: R 500,000.00

### 7.56. Work package 30: Improve IT Service Management (R4)

**Description:**

The focus of this work package is to implement an Integration Management solution.

**Key actions:**

- Conduct a requirements analysis to understand the new requirements to enable the implementation of the following application components:
  - Integration Management Solution
- Identify suitable solutions provider
- Implement and test solution
- Train users in using it

**Recommendations:**

- None

**Resources requirement estimation:** None more than current IT staff

**Order of magnitude costing:**

The potential cost of this work package is: R 750,000.00

### **7.57. Work package 30: Improve IT Service Management (R9)**

**Description:**

The focus of this work package is to implement an IT GRC solution.

**Key actions:**

- Conduct a requirements analysis to understand the new requirements to enable the implementation of the following application components:
  - IT GRC solution
- Identify suitable solutions provider
- Implement and test solution
- Train users in using it

**Recommendations:**

- Use the outcome from Work Package 31 and 32 as a basis for the requirements for this. Also, this has been placed late in the transformation as this is not a critical automation component.

**Resources requirement estimation:** None more than current IT staff

**Order of magnitude costing:**

The potential cost of this work package is: R 500,000.00

### **7.58. Work package 31: Enhance IT Governance (COBiT)**

**Description:**

The focus of this work package is to enhance the current IT governance using COBiT as the framework. Improving IT governance will be a key component to ensure structured changes to the IT environment as this transition happens.



**Business value:**

- Improve internal efficiencies.
- Govern the changes to the IT infrastructure
- Ensure a sustainable IT environment
- Government governance regulation requires a formal governance structure
- Ensure effective usage of IT resources

**Key actions:**

- Select a suitable COBIT implementation partner
- Conduct a maturity assessment
- Select suitable controls
- Implement controls
- Final assessment

**Recommendations:**

- It is recommended that an As-Needed model be followed. This can then be reviewed as the IT capability mature over time.

**C-BRTA Resources requirement estimation: COBIT specialist****Order of magnitude costing:**

The potential cost of this work package is: R 250,000.00

**7.59. Work package 32: Increase EA capability****Description:**

The focus of this work package is to sustain the Enterprise Architecture work that was done. C-BRTA has now spent money on developing a roadmap and future architecture for C-BRTA - this needs to be maintained. The focus is not to develop a full capability, but rather strengthening the existing resources that was part of this journey to be able to continue.

**Business value:**

- Ensure sustainability of the DOSA architecture
- Provides governance to ensure successful realisation of the DOSA architecture

- Ensures that the future ICT strategy is based on a well-defined Enterprise Architecture

**Key actions:**

- Attend TOGAF training courses
- Attend ArchiMate training courses
- Attend SPARX training courses
- Develop a process to sustain the work that was done
- Develop an Architecture Review Board to ensure adherence to the DOSA architecture

**C-BRTA Resources requirement estimation: Current resources****Recommendations:**

- The recommendation is not to implement a complete EA capability for the short term. It may be of value to the current resources to obtain the services of an experienced EA to assist with the development of the sustaining processes as well as the architecture review board charter.

**Order of magnitude costing:**

The potential cost of this work package is: R 250,000.00

**7.60. Work package 33: Increase ICT capacity****Description:**

This work package is in support of the various work packages within each release. The C-BRTA will need to decide on whether to grow the ICT capability - or to use consultants as and when required. In each release decisions will need to be made regarding resource requirements.

**Order of magnitude costing:**

Depending on the resource requirements

**7.61. Work package 34: Implement facility management solution****Description:**

The focus of this work package is to implement an automated facility management solution.

**Business value:**

- Cost savings
- Improve internal efficiencies.
- Move towards paperless business operations
- Enhance the current IT infrastructure

**Key actions:**

- The following business processes will need to be reviewed:
  - Plan and acquire facilities
  - Dispose of facilities
  - Maintain productive facilities
- Conduct a requirements analysis to understand the new requirements to enable the implementation of the following application components:
  - Building maintenance
  - Equipment maintenance
- Select a suitable product and implementation partner
- Implement and test solution
- Train people on using it

**Recommendations:**

- None

**C-BRTA Resources requirement estimation:** None additional to current employees

**Order of magnitude costing:**

The potential cost of this work package is: R 500,000.00