

## A Service Delivery Architecture for Government

### Purpose

- 1 This paper provides an update on the evolution of the service delivery architecture that was first described in the [e-government strategy \(Dec 2001\)](#). It outlines the e-government environment, describes the architecture in greater detail, highlights the implications of this evolution and discusses how to implement the architecture.

### Background

- 2 The government needs a service delivery architecture to provide a framework for a common understanding about how government services are delivered, in particular through the use of information and technology to deliver services electronically. The current e-government strategy features a [four-layered model](#), describing it as “a first attempt to show how [the] whole-of-government approach will translate into an operational [architecture] supporting delivery of e-government goals”.
- 3 The four layer architecture shows how integrated service delivery drives a need for a more homogenous all-of-government operational environment made up of:
  - common foundations (all-of government standards, shared data and technology etc.).
  - agency business infrastructures (data resources and information systems);
  - agency business processes; and
  - access channels (portals, offices, call centres etc.)

### *The environment we are in*

- 4 The government is focusing on outcomes – achieving results – and is applying continuing pressure on agencies to work together to deliver the “right things at a fair price and in a spirit of service.”<sup>1</sup> E-government is an enabler of this.
- 5 The e-government strategy recognises the potential for the Internet and associated technologies to have a profound effect on the way government, business and people interact. It emphasises delivering information and services in ways that better reflect what people need or want from government, and are less constrained by how government agencies are structured.
- 6 The e-government programme is about managing this process of change within the public sector. The main objectives for e-government are:
  - Better services – more convenient and reliable, with lower compliance costs, higher quality and value.
  - Cost effectiveness and efficiency – cheaper, better information and services for customers, and better value for taxpayers.
  - Improved reputation – building an image of New Zealand as a modern nation, an attractive location for people and business.
  - Greater participation by people in government – making it easier for those who wish to contribute.
  - Leadership – supporting the knowledge society through public sector innovation.

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<sup>1</sup> [State Services Commission Statement of Intent 2002](#)

The Government has also stated that it wishes e-government to lead to three characteristics of government in future – [convenience and satisfaction, integration and efficiency, and participation](#).

- 7 [Recent research](#) has confirmed that New Zealanders are looking for government services to be delivered:
  - Seamlessly - “with one search” and “in one place” (interested 60-70%);
  - “Quicker/faster” (44% of e-govt users); and
  - “Self service” (33% of e-govt users).
- 8 Also, the report of the [Ministerial Panel on Business Compliance Costs](#) (the ‘Dunne report’) confirms New Zealand businesses are keen to see compliance costs reduced. E-government is one way of achieving this. The way that agencies design and deliver their services, and configure and deploy underlying information and communications technologies, is central to the quality of that achievement.
- 9 Business delivery systems in government are heterogeneous, reflecting the wide range of services and users. This diversity reflects the complexity of the environment in which agencies operate. Diversity has also been encouraged by the approach to public management introduced by the State Sector Act 1988. While encouraging autonomy and focus by agencies, it has not provided any significant incentives to consider integrated delivery, or shared use of information and technology.
- 10 This is now, however, a vital requirement for effective government. If they are to meet the Government’s objectives, agencies’ business delivery systems need to allow quick and effective linking and unlinking, integrating where required, but without driving towards integration at all costs. There needs to be an increasing focus on integrating sets of data (and business applications) for particular clusters of agencies, sets of government functions, or communities of interest (COIs). As this occurs, systems will be less confined by organizational boundaries and will instead be bound by the scope of the business or consumer need being addressed.
- 11 The business systems environment which will support these emerging pressures and requirements, must address:
  - a requirement to work together more collaboratively;
  - the integration of service delivery;
  - the need for more flexible configuration;
  - an ability to support more complex outcomes (requiring more complex delivery mechanisms/systems); and
  - the need to maintain, and even improve, efficiency of resource allocation and usage in the public sector.

## A Service Delivery Architecture

- 12 E-government, with its citizen-centric focus and the focus on technology-enabled business transformation, provides the opportunity to improve government service delivery. An architecture, already part of the e-government strategy, allows us to plan and manage the change effectively. Experience has shown, however, that the existing architecture in the e-government strategy needs more detail to make it more usable.
- 13 Also, if we are to retain the benefits of agency focus and management efficiency gained from the decentralisation of public management, while pursuing more collaborative, outcome-oriented delivery of results, then we need to have an approach to government service delivery that allows an all-of-government view. The architecture incorporates the strengths of both centralised and decentralised approaches to public management but which relies largely on local, not centralised, implementation. It recognises the business focus achieved by giving chief executives and boards discretion over the way they use information and technology, and reflects the advantages of using common assets, processes, and standards to achieve results.
- 14 It allows an all-of-government view of how information and technology and common standards can best enable this. The best way to achieve this is through evolving the current architecture to what is best described as a “service delivery architecture”, reflecting its essential purpose from a public perspective. It shows how agencies should aim to make best use of the surrounding e-government information, technology and standards environment in building their future information systems and service delivery processes.
- 15 An architecture provides a strategic level view of the components we need for a business system/process to operate, and what is expected of the components – their role, how each operates and how they work together. The purpose of an architecture can be summarised as:
  - a description of how service delivery can be achieved more consistently across agencies - planning, managing, implementing and managing change to the environment; and
  - a mechanism for communications among stakeholders, by encouraging common understanding of business challenges and available technology enablers.
- 16 According to Gartner (2001), over the next two years “70 percent of governments that do not develop an e-government architecture will duplicate efforts and infrastructure, and will fail to meet constituent expectations for service delivery, resulting in complaints and wasted public funds”.<sup>2</sup>
- 17 This warning points to the two main functions of an all-of-government service delivery architecture. First, it enables better decisions to be made about investment in information, technology and business processes, based on the simple logic of “build once, use many times” (note: only where this makes strategic sense). Second, it enables agencies to do a better job of delivering services in ways that are proven to be successful, and therefore suitable for leveraging to best effect (e.g. taking a best practice approach to online delivery of licences, or delivery of secure e-correspondence). An architecture is

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<sup>2</sup> Kreizman, G and E. Fraga, *E-Government Architecture: Development and Governance* (TG-14-6799) October 2001

therefore an important component for business operations: its role in enabling business operations, flexibility and growth needs to be fully appreciated.<sup>3</sup>

- 18 This architecture will allow weaknesses of the decentralised approach (e.g. unnecessary duplication of investment and effort, and incompatible systems and processes) to be avoided, without needing to take the risks associated with over-centralisation (e.g. creating single points of failure, constraining innovation, and driving inappropriate levels of standardisation). It brings perspectives of the centre and agencies into balance.
- 19 The architecture takes account of, and co-exists with, agency business, and business system operating environments. This virtually guarantees a distributed environment which can build on the benefits of the situation as it currently exists, while introducing mechanisms to allow and encourage cooperation and better delivery of more user-focussed services
- 20 The architecture is **not**:
  - a plan for a hard-wired common infrastructure – either at a business process or ICT level;
  - a set of standards – it does not replace the e-GIF, but rather it will embody it; or
  - a quick fix to existing problems.

### **Design of the architecture**

- 21 The revision of the architecture builds on the current model, and provides a view of how e-government can be put into practice. It lays out the various components that will allow the system, in this case the entire business system for the delivery of government services, to work effectively. Like components of the architecture have been grouped into categories for ease of understanding and analysis.
- 22 In the architecture we have classified the components into six categories or building blocks. The categories are a useful construct to identify the required business functionality in a generic service delivery process, together with the components that need to exist to provide that functionality. These categories are:
  - user access;
  - user services and guidance;
  - service enabling tools;
  - connection tools;
  - business delivery systems; and
  - the surrounding e-government environment - governance, policy and management regime.
- 23 The building block approach to design of the architecture provides sufficient flexibility for the government to develop business systems without many of the risks associated with having a prescribed architecture (listed above). In particular, it allows quicker and more effective linking and unlinking of business systems and processes as need dictates
- 24 The design of the architecture highlights the front office, back-office view of e-government. It also indicates which part of the architecture is oriented toward the

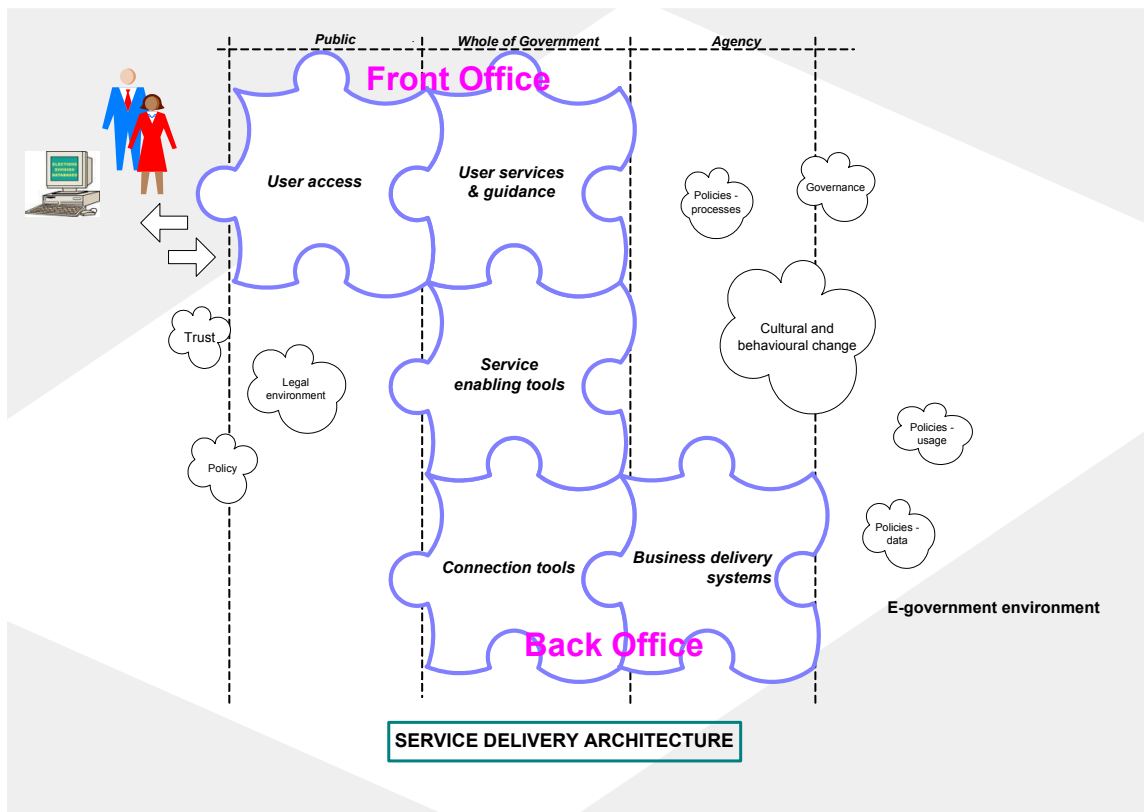
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<sup>3</sup> For two credible sources see M. Broadbent and P. Weill, *Leveraging the new infrastructure: how market leaders capitalise on information technology* (Boston: Harvard Business School Press, 1998; and Gartner Group

customer, which parts should be viewed from an all-of-government perspective, and where the business systems of individual agencies feature in this expanded view of service delivery.

25 The architecture requires that some elements of agencies' service delivery will in future be developed from an all-of-government perspective (i.e. 'develop once, use many times'). In particular, there are benefits to having a common architecture for:

- how services are presented to people (User services & guidance);
- how service delivery is actually electronically enabled (Service enabling tools); and
- how agencies connect to one another and their customers (Connection tools).



26 This is because many aspects of agencies' service provision are or will become generic (e.g. 'accept an electronic payment', 'authenticate an individual', 'change address', 'deliver a secure e-mail') and therefore are best done in a standardised manner by all agencies. This does not mean that agencies will all share exactly the same information and technology. Instead, the architecture will be comprised of:

- shared components: components developed and implemented only once, and used by many or all agencies (e.g. the Portal);
- generic components: standardised components that support a generic activity, but are implemented locally (e.g. a technology solution for handling an online registration process that can be incorporated into different business processes in different agencies); and
- unique components: components that are specific to a particular agency, function or service (note: these will still need to be [e-GIF compliant](#)).

- 27 Traditionally, agencies' business systems have tightly coupled the front and back office i.e. they have been vertically integrated. This design views the different components of the business system as separate elements and thus offers the ability to implement separate components in both a vertical and horizontal fashion.
- 28 The architecture is recursive. The same pattern is repeated at the all levels of government, i.e. public sector, agency cluster, agencies, business unit and so on. Each detail describes the business at a number of levels, from the individual business process to the whole organisation through to all of government. Each level is exactly the same as the whole.
- 29 The architecture has been designed so that it applies to the public sector (all of government), individual organisations, or business units within organisations. The architecture can scale as required. The design of the architecture allows service delivery to be structured in many ways, without "hard-wiring" business systems together.
- 30 Having deconstructed the generic components of service delivery processes, we can more clearly define the role of different actors in these processes. Any service delivery process comprises all five "boxes", from user access through to business system. In a loosely coupled environment different actors may have different roles for defining and providing the different boxes. They may come from separate agencies.
- 31 The overall implication of this architecture for government is increased flexibility in the way services are delivered. It will allow single agencies to potentially provide more varied services than they do today (say, by providing over the counter or web-based access to services provided by other agencies). It will also allow new types of integrated services to be delivered by groups of agencies working together to make use of the components that will be built to support the architecture (e.g. using a standard "make a payment to government" module, or connecting systems together with [e-GIF](#) compliant interfaces and approved XML schemas).
- 32 In an all-of-government environment, user access can be provided by any number of service providers, not necessarily limited to public sector organisations. Provided the rules of working with User Services & Guidance box are followed, anyone can be a User Access-box service provider. Clearly individual agencies will have responsibility for the Business Delivery Systems box, as they currently do.
- 33 The middle column of "whole-of-government" boxes is the domain of government to collectively decide what these components will be and how they will work. Primarily the interest is to define the business requirements, standards and/or business rules in each of the boxes, with a last resort being to decide who will provide various elements/components required for implementation of that box. An example of such collective decision-making is the [e-GIF](#).

### **Implications for the State sector and organisations**

- 34 A successful e-government architecture is one that is used by all of the public sector. In aligning with the architecture, agencies will need to take a long-term view and make the architecture part of their overall strategy development and allow the strategy to be influenced accordingly.
- 35 In addition, for agencies the architecture means:
  - a new set of design principles and associated change in culture;
  - lower costs and better results;

- easier and improved decisions (i.e. reaping the economic benefits of standards);
- lower risk, especially of incompatibility;
- reduced autonomy; and
- direct ownership, and maintenance, of the architecture.

36 For the “centre”, adopting the architecture implies:

- better ability to evaluate investment proposals;
- ability to leverage sector and all-of-government components;
- improved likelihood that the Governments’s objectives will be met; and
- a need to ensure ongoing ownership, and maintenance, of the architecture by all agencies.

37 For service users (people, businesses etc), having agencies implement the architecture means:

- achievement of e-government goals; better service, cheaper, faster; and
- better value for money.

## Risks

38 There are a number of risks associated with having, or not having, an architecture. The key risks of having an architecture are:

- potential for constraining thought and limiting the development of solutions – according to Gartner “architectural choices and guidelines, imposed on all government agencies to conform to a single “portal house style,” may constrain innovation by the most advanced agencies”<sup>4</sup>;
- falling into the trap of “one-size-fits-all” approach; and
- the need for an architecture is misinterpreted and is perceived as a threat by some agencies, and they act against it.

39 The key risks of not having an architecture are:

- development of government’s service delivery infrastructure is haphazard, lacks consistency and cannot be leveraged at a cluster or all of government level.
- leads to poor planning, such as:
  - o wrong dependencies and wrong initiatives with no link to required outcomes;
  - o resources are wasted through duplication of effort and resource; and
  - o time is waste and lost.
- government is unable to leverage the overall investment.

## Implementation

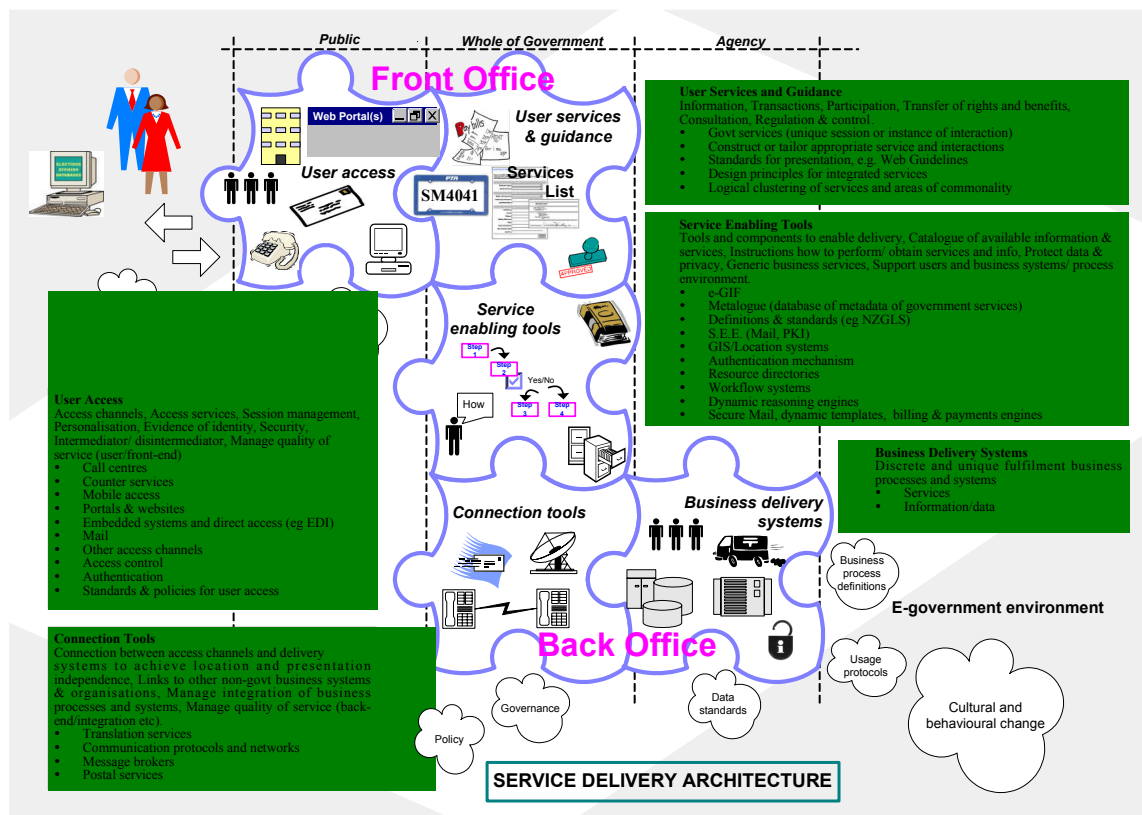
40 The architecture is integral to the e-government strategy. Alignment with the strategy requires alignment with the architecture. Use of the architecture is enhanced by a clear understanding of the requirements and obligations on agencies, EGU, and central agencies to collaborate in making it work.

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<sup>4</sup> A. Di Maio (2001), *E-Government in Europe: An Unlikely Gold Rush*, SPA-14-6518

- 41 Parts of the architecture are already technology standards in the [e-GIF](#). The [e-GIF](#), as a framework of standards, has been developed or implemented by individual and joint agency e-government initiatives. Implementing the architecture is progressive, not retrospective. Agencies need to align their new initiatives accordingly.
- 42 In the short term, implementation steps now needed are:
- 1 Finalise the initial design.
  - 2 Gain necessary understanding and buy-in - educate agencies in the architecture, including providing an easy to use architecture document, using pictures and succinct examples that describe principles, standards and processes
  - 3 Establish the governance arrangements - service delivery architecture cannot exist in a vacuum. A strong governance structure is essential to the development and implementation of an enterprise e-government architecture. Strong executive support; concise, updated documentation; and close alliance with the governance process are critical to successfully implementing the e-government architecture.
  - 4 Embed the architecture into key decision processes, such as Treasury decision making on investment proposals – the decision process must use the architecture as part of the e-government project approval process. Architectural review and compliance ensures that projects adhere to the architectural principles and standards and use shared services – that is, moving away from silo-based development of duplicative infrastructure.
- 43 This will be achieved using a reference group drawn from the state sector. Their role will be to finalise design and governance arrangements and assist with helping the sector to understand and use the architecture. This group will be composed of senior department business leaders, education, external business representatives and CIO's. In addition, consideration would be given to including advocacy groups such as citizen advocacy group(s) and business users group(s) in order to tie architecture development to customer needs.
- 44 In the longer term, the implementation steps are:
- 1 Progressive implementation at agency level - There should be a set of procedures to follow for architectural review, compliance certification and the waiver process. However, primary responsibility for evaluating compliance should be on the system builder, not an oversight group. This also encourages builder feedback to the architecture group, which in turn drives positive changes to the architecture itself.
  - 2 Maintenance of and evolving the architecture - Create a process to evolve and maintain the architecture, including a process for different agencies to cooperate on architectural frameworks and delivering components (current and new) that will enable future e-government initiatives, or both (depending on budgetary constraints and other political and operational priorities).

## Appendix A: Detail and description of the architecture



### User Access

- 1 **User access** is a point of contact or channel between the service provider (government or its agents) and services user. The different channels are a means for service users to access all government services, whether they are online or offline. They are the points of entry to request and receive services, and present the public face of the “local” service provider.
- 2 Each agency will use a different mix of access channels, depending on local priorities and specific customer preferences. Access channel strategies will make use of available methods of interaction: face-to-face (e.g. one stop shops), telephone (call centres/SMS) internet-based (websites, or web services); and traditional postal services.
- 3 Implementation of an appropriate mix of these channels leads to increased choice and convenience of service access for the service user.

### User services and guidance

- 4 **User services and guidance** is the interface between the service user, having “entered” via a channel (user access), and the underlying service fulfilment systems. The function of this building block is to present service users with government services in an easy and seamless way.
- 5 The services are the external views of the service together with the necessary guidance for the user. This may simply be a list of all the services government provides, through to a highly personalised set of services for a specific user.

- 6 The services and guidance describe the different types of interaction between service user and providers of access to these services. In an electronic world this is the face of government.
- 7 We currently have the government web portal as an early asset of the e-government programme. Portals aggregate into one place information and services from many sources, and present it in an accessible, user-friendly way. They can aggregate from a broad range of interests (general portals), or specialise in a particular topic or service area (specialist portals). One benefit to service users of using a specialist portal is that it removes the need to understand the underlying structures and locations of the various service providers.

### ***Service enabling tools***

- 8 The tool boxes, **service enabling tools** and connection services, are the “glue” of the architecture.
- 9 In an electronic environment e-enabled transactions are about passing data between service users and service providers (agencies). The flow of this information needs to be managed effectively - data needs to be routed and tracked with speed and accuracy. The technologies and data management approaches in this part of the framework make the effective management of this flow possible.
- 10 New technologies and approaches in these areas enable agencies to make effective use of modern access channels, and underpin the service improvement opportunities that implementing e-government offers. The [e-GIF](#) would be part of this box.

### ***Connection services***

- 11 **Connection services** are the final link between access channels and delivery systems. They consist of a number of communication mechanisms, such as postal services and telephone and data networks. They offer functionality for routing transactions securely to, from or between government organisations. In the electronic world connection services achieve independence of location and presentation.
- 12 To conduct transactions via e-enabled channels, secure and trusted connections must exist between the channels and the business delivery systems (which hold the data required to deliver services). This part of the architecture is about providing the required connectivity that underpins all e-enabled transactions. This component is a crucial piece of the e-government architecture/infrastructure.

### ***Organisation business delivery systems***

- 13 These are the fulfilment business processes and systems. At the business level these agency business systems are the business processes that deliver the associated services. At the technical level they are the processes and applications that make this happen.

### ***E-government environment - Governance, policy and management regimes***

- 14 These regimes make up the **e-government environment** within which government operates, and the rules by which the architecture will function. They cover many aspects of the public management system, including the frameworks for adopting and maintaining standards, and the way in which shared inputs and outputs are governed, as well as the various constitutional, legislative and cultural requirements and principles that help define the relationship between the government and the people.

- 15 Policy needs will be addressed to support implementation of the architecture. The role of e-government will be to ensure standards and policy issues in the all-of-government components of the architecture are addressed.
- 16 E-government and the implementation of the architecture will drive change. It will transform the way government delivers services and organises business delivery processes and systems. The success of e-government, in delivering real improvement outcomes, hinges on the effective management of the changes.
- 17 There are two elements to managing change, implementing change successfully, and changing the culture of government. People are at the heart of e-government. Realising the full benefits effective e-government can bring, such as better service user relations and improved business efficiency, requires organisational transformation.
- 18 Implementing e-government, and the services architecture, needs to be delivered through structured programmes and projects. The techniques of programme and project management are central to the success or failure of local e-government.

Category/ Building block	User access	User interaction	Enabling services	Connection services	Organisation business delivery system
Functions/ Functionality	Access channels Access services Session management Personalisation Evidence of identity Security Intermediator/ disintermediator Manage quality of service (user/front-end)	Information Transactions Participation Transfer of rights and benefits Consultation Regulation & control	Tools and components to enable delivery Catalogue of available information & services Instructions how to perform/ obtain services and info Protect data & privacy Generic business services Support users and business systems/ process environment	Connection between access channels and delivery systems to achieve location and presentation independence Links to other non-govt business systems & organisations Manage integration of business processes and systems Manage quality of service (back-end/integration etc)	Discrete and unique fulfilment business processes and systems
Components	Call centres Counter services Mobile access Portals & websites Embedded systems and direct access (e.g. EDI) Mail Other access channels Access control Authentication Standards & policies for user access	Govt services (unique session or instance of interaction) Construct or tailor appropriate service and interactions Standards for presentation Design principles for integrated services Logical clustering of services and areas of commonality	Definitions & standards (e.g. NZGLS) GIS/Location systems Resource directories Workflow systems Dynamic reasoning engines Secure Mail, dynamic templates, billing & payments engines	Translation services Communication protocols and networks Message brokers Postal services	Exposed services
Generic components <sup>5</sup>	Legal environment Authentication Usage protocols	Cultural/behaviour change for public service Brand issues Data standards	Compliance with leg., such as human rights, privacy etc Interoperability frameworks	Trust Business process definitions & naming standards	

<sup>5</sup> Those components that don't fall easily into any of the categories or fall into more than one, often policy type requirements or components that underpin many of the areas or building blocks

