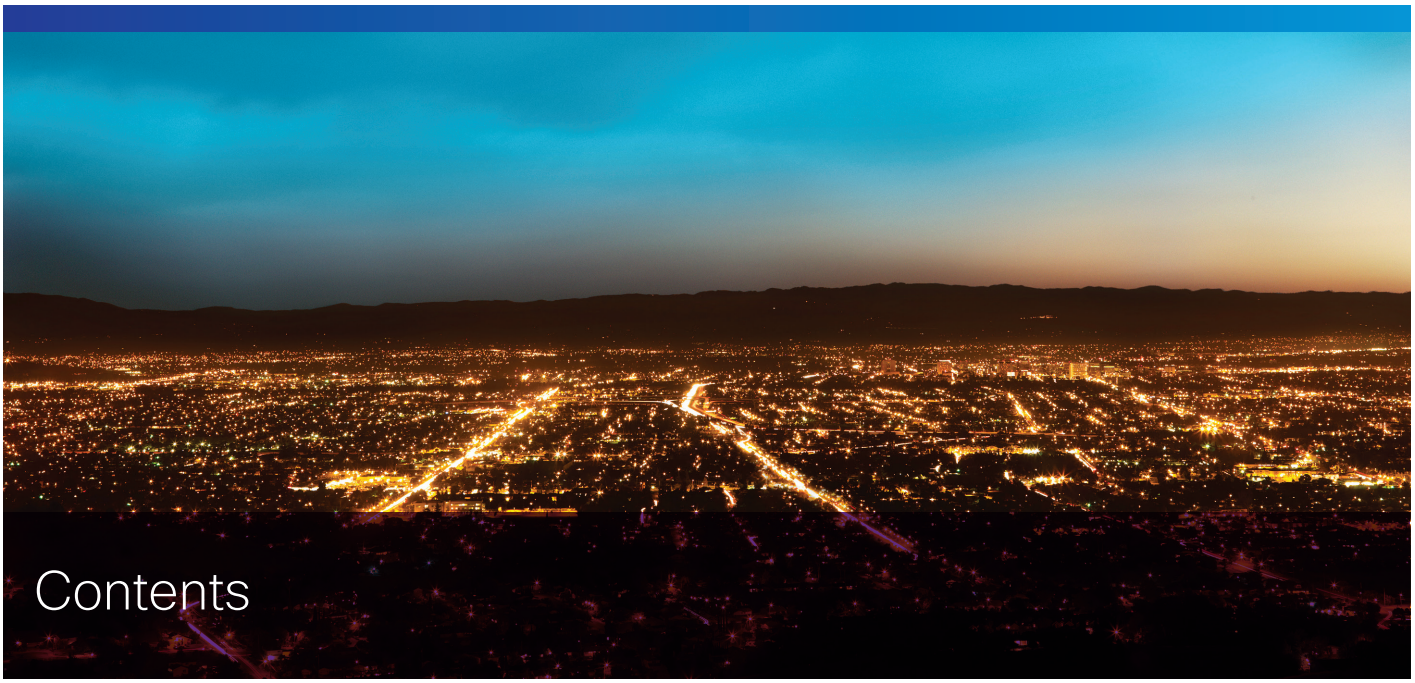
The Intercloud

Understand how the Intercloud elegantly meets Public Sector IT requirements.



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Setting the context of Government Cloud

Public Sector IT departments have traditionally been focused on managing technology and keeping operations running smoothly. Today, they must expand their scope beyond just running the overall IT environment. IT must align with the needs of government leaders and offer tailored services with a range of options for cost, security and performance.

If IT departments fail to meet this need, there is a new generation of Public Sector leaders increasingly willing to launch new IT initiatives on their own, leading to the rise of 'Shadow IT'. The result: a significant amount of waste, as well as risk, governance and security challenges.

IT represents a significant cost for most organisations. In a recent study (UK Public Sector ICT Overview & Forecast – 2014/15), Kable estimates that costs are, on average, 3% of overall budgets, but the figure can be as great as 20% in some compute-intensive organisations (e.g. statistics).

There is a strong consensus that the Public Sector can best realise IT cost savings through buying IT in a different way – as metred services (operational costs) rather than hardware and software assets (capital costs).

It is in this context that Government Cloud finds its real significance.

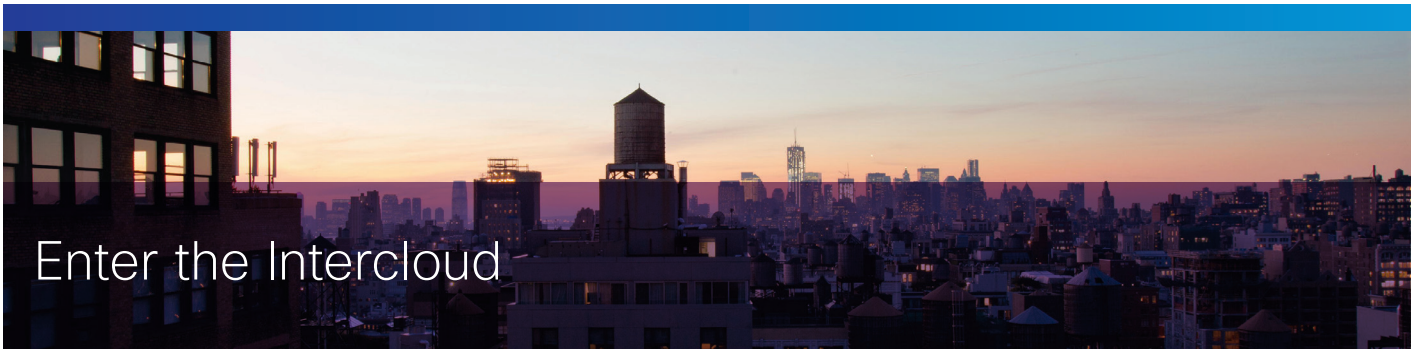
The impact of cloud is unquestionable. In Estonia, for example, the availability of integrated e-solutions has created an effective, convenient interface between citizens and government agencies. This not only saves time and expense for both the state and the citizen, it also makes the citizen feel more of a partner in the civic process.

But cloud is presenting as many challenges for IT departments and service providers as it is opportunities.

Today, the lack of ability to connect public clouds, and to move IT applications and associated policies between clouds, coupled with an inability to manage public and private clouds together as a single domain, prevents Government IT organisations from buying cloud services from any vendor they choose and managing these services as if they were part of their own extended private cloud.

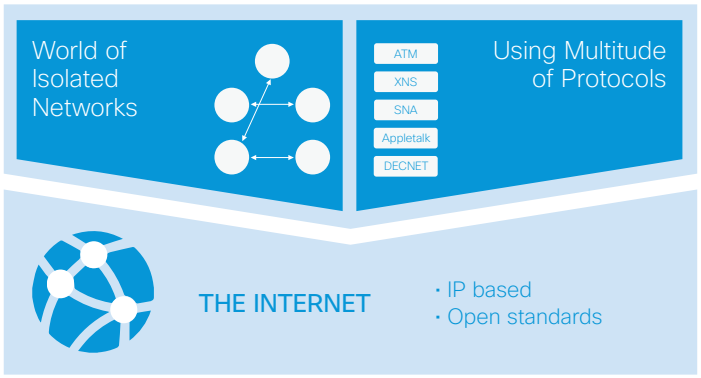
IT departments also need to operate within the constraints of national and regional regulations governing data privacy, security and sovereignty. Today's largely global (but not local) cloud solutions don't provide this either.

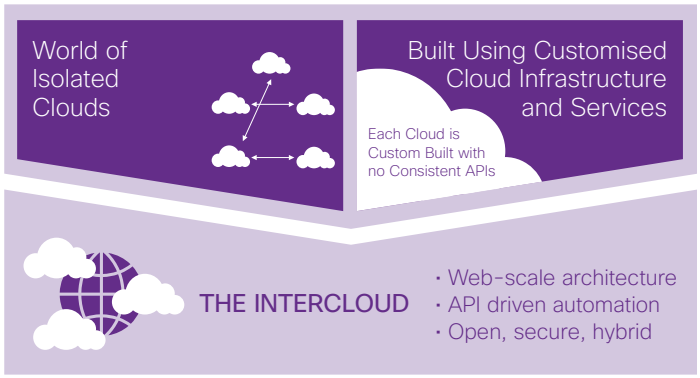
> "Government cloud is [...] an ongoing and iterative programme of work which will enable the use of a range of cloud services, and changes in the way we procure and operate ICT, throughout the public sector. [...]
>
> The government will push ahead with its agenda for data centre, network, software and asset consolidation and the shift towards cloud computing. It will mandate the reuse of proven, common application solutions and policies. These solutions must balance the need to be open, accessible and usable with the growing cyber-security threat and the need to handle sensitive information with due care."
>
> UK Government Cloud Strategy, March 2011



Enter the Intercloud

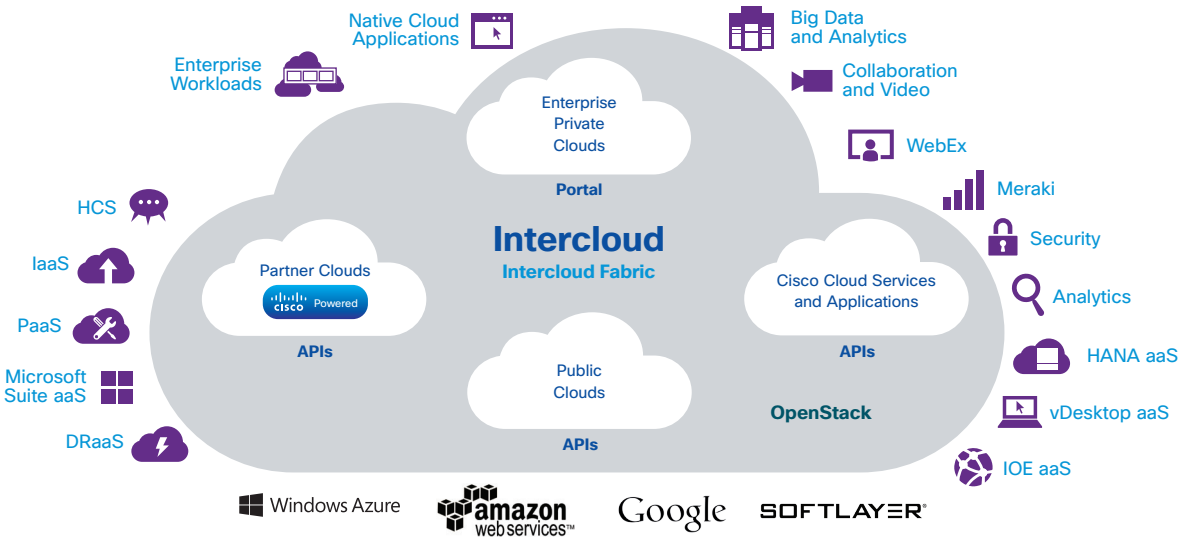
In 1984, Cisco came to market with a strategy to connect previously isolated, heterogeneous networks, which led to the rise of the internet as we know it. Thirty years later, Cisco is embarking on a journey just as ambitious: the connection of multiple isolated clouds, leading to the creation of the Intercloud, an interconnected cloud of clouds.

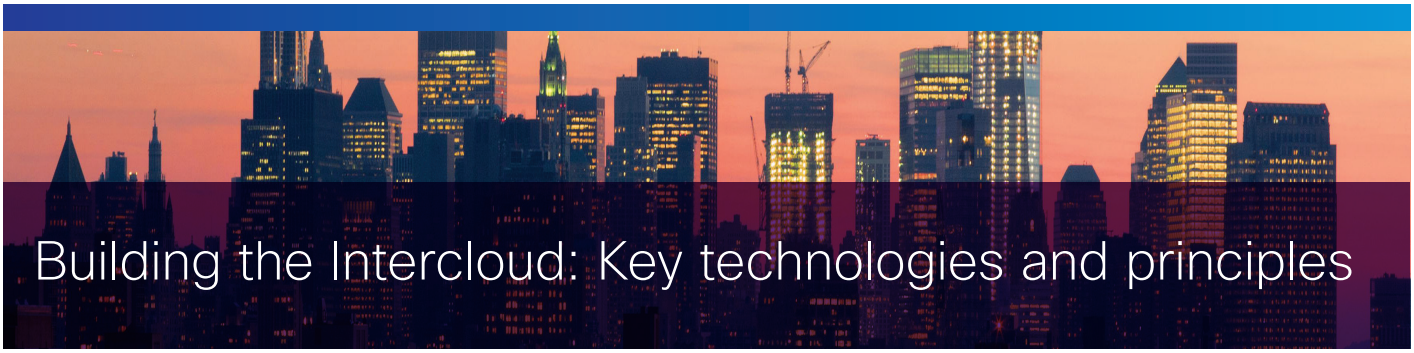




As the line separating the different cloud types (private, virtual private and public) continues to fade, it becomes clearer that:

- Hybrid cloud and more broadly hybrid IT (inclusive of traditional on-premises IT applications) is the new normal.
- The ability to move cloud services across heterogeneous environments with consistent network and security policies is a key foundation for long-term, industrialised consumption of cloud services.
- The brokerage of IT services and cloud services becomes a core IT capability. Increased brokerage activity will lead to a 'marketplace' for cloud offerings.





Building the Intercloud: Key technologies and principles

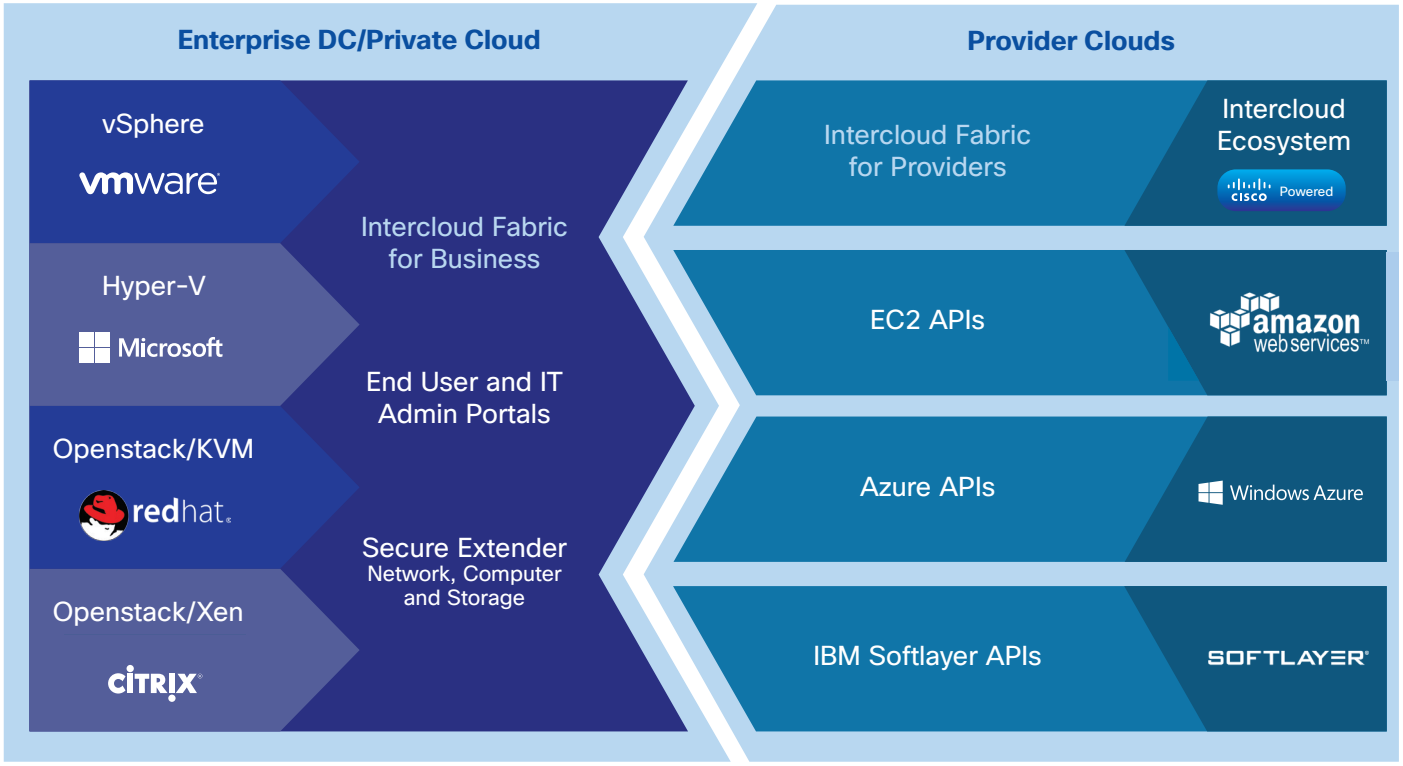
Governments need an approach based on global open standards and empowerment through local providers: a world of many clouds, where IT is delivered as a service by those able to offer a differentiated value proposition. That's why Cisco supports a partner-centric vision as the basis for building the Intercloud.

Our success has been and will be based on the success of our partners. We strongly believe that only a partner-centric Intercloud can deliver the flexibility and choice required by Public Sector customers, adequately responding to the specific context of each agency: language, culture, legislation (including data privacy and sovereignty), processes, sourcing appetite, etc. With Cisco powered solutions, you have the flexibility and choice of over 400 unique cloud and managed services, delivered by 200 certified partners worldwide.

Cisco Intercloud Fabric (ICF)

ICF is an open solution that supports multi-hypervisor and multi-cloud with the freedom to place IT applications across heterogeneous environments in private, provider and 'hyper-scale' clouds with a unified policy and end-to-end security for reduced complexity and cost.

ICF provides the capabilities for businesses and cloud providers to implement open and secure hybrid cloud environments, facilitating IT application migration across multiple clouds, thereby matching price, performance and governance characteristics with the business requirements. This capability is enabled through standardised policy contracts called 'Cloud Profiles' that capture networking, security and service requirements of one or more IT applications.



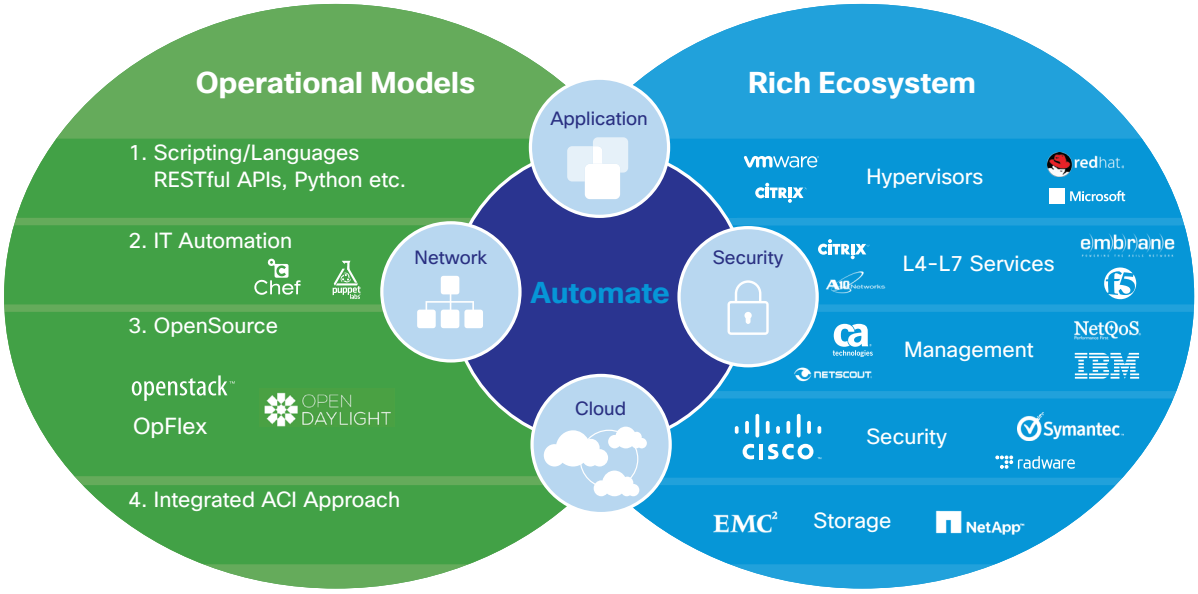
Building the Intercloud: Key technologies and principles

Commitment to Open Standards

Since Cisco's beginnings in the 1980s, we have helped shape the standards that form today's internet. Our deep commitment to open standards continues, as we lead work in more than 20 different standards bodies and help shape more than 1,600 standards initiatives. Following the same line, Cisco is committed to drive open standards such as OpenStack, OpenDaylight, Opflex and Openflow to form tomorrow's Intercloud. We are also a driving member of leading industry organisations, including the Cloud Standards Customer Council and the Cloud Security Alliance.

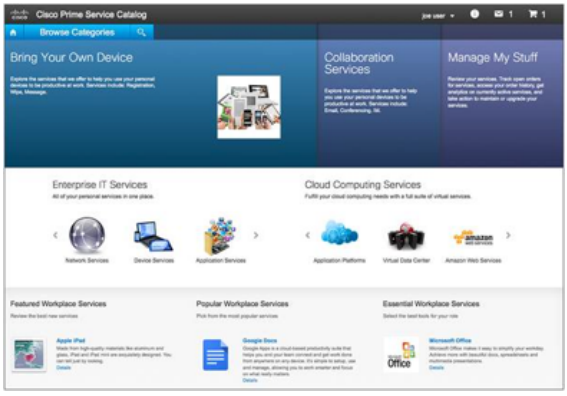
Application Centric Infrastructure

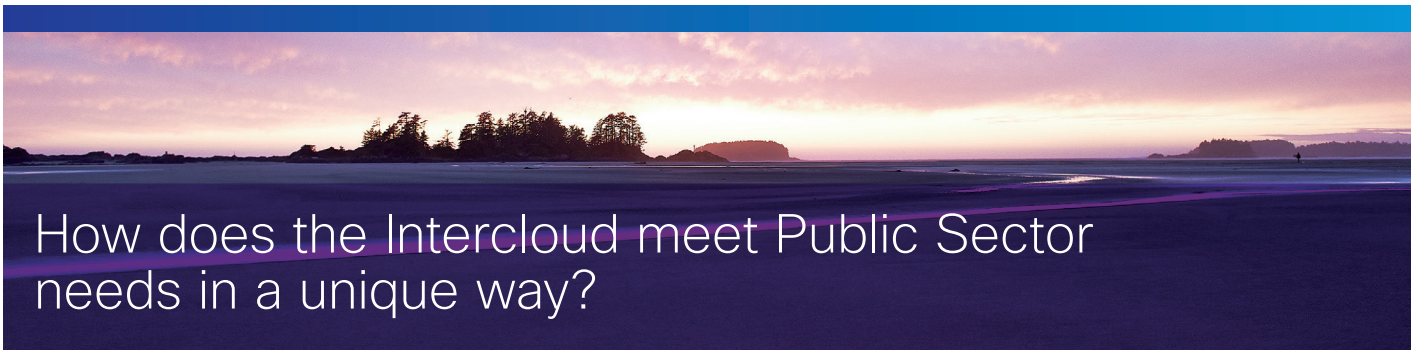
Application Centric Infrastructure (ACI) is a critical technology, supplementing existing Software-Defined Networking (SDN) concepts, which allows Cisco to implement policy control in hybrid cloud environments. ACI provides: centralised access to all data centre information; optimised configuration to match application scale and performance requirements; flexible application provisioning across physical and virtual resources.



Cloud Service Catalogue

Cisco enables cloud providers (including Government IT agencies) to offer their own, self-branded service catalogue, where they can tailor the offerings available to meet their users' needs, either proposing in-house applications or third-party services available from the Intercloud 'marketplace'.





How does the Intercloud meet Public Sector needs in a unique way?

Public Sector IT Leaders are faced with a number of unique barriers that are slowing down – or stopping altogether – their journey to the cloud. In this section, we describe nine typical challenges to a government cloud strategy, and we explain how the Intercloud is elegantly solving the issues.

Public Sector requirement #1: Data sovereignty

In our global, multi-national cloud environment, data sovereignty refers to the principle that digital information is subject only to the laws of the country where it is physically located or in which the owner of the data is legally based, and not subject to the jurisdiction of foreign governments and courts. Citizens' data privacy is of paramount importance: some governments are considering legislation that would require data (including the backup) to be located inside the country.

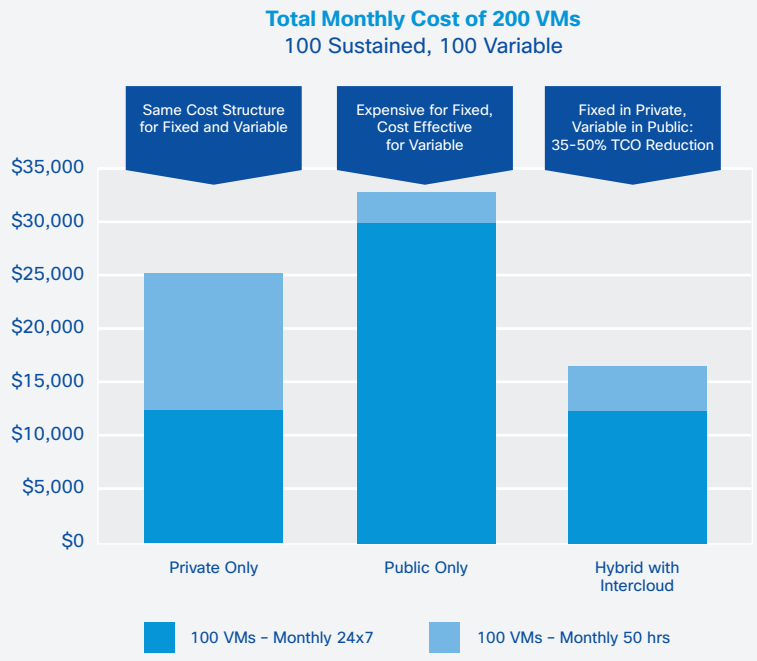
Intercloud Solution

Cisco helps public institutions deal with their specific data sovereignty needs, by enabling them to either build their own infrastructure to host their most critical data privately, or be able to leverage a local Intercloud partner with its local infrastructure, local compliance and local people. This creates an efficient and cost-effective hybrid cloud and is a key differentiator of Cisco's Intercloud.

Public Sector requirement #2: Budget reduction

Hybrid Cloud helps governments cut down the cost of IT infrastructure: you can deploy IT applications on the public cloud while – at the same time – retaining security policies and access to private databases if needed.

Intercloud Solution



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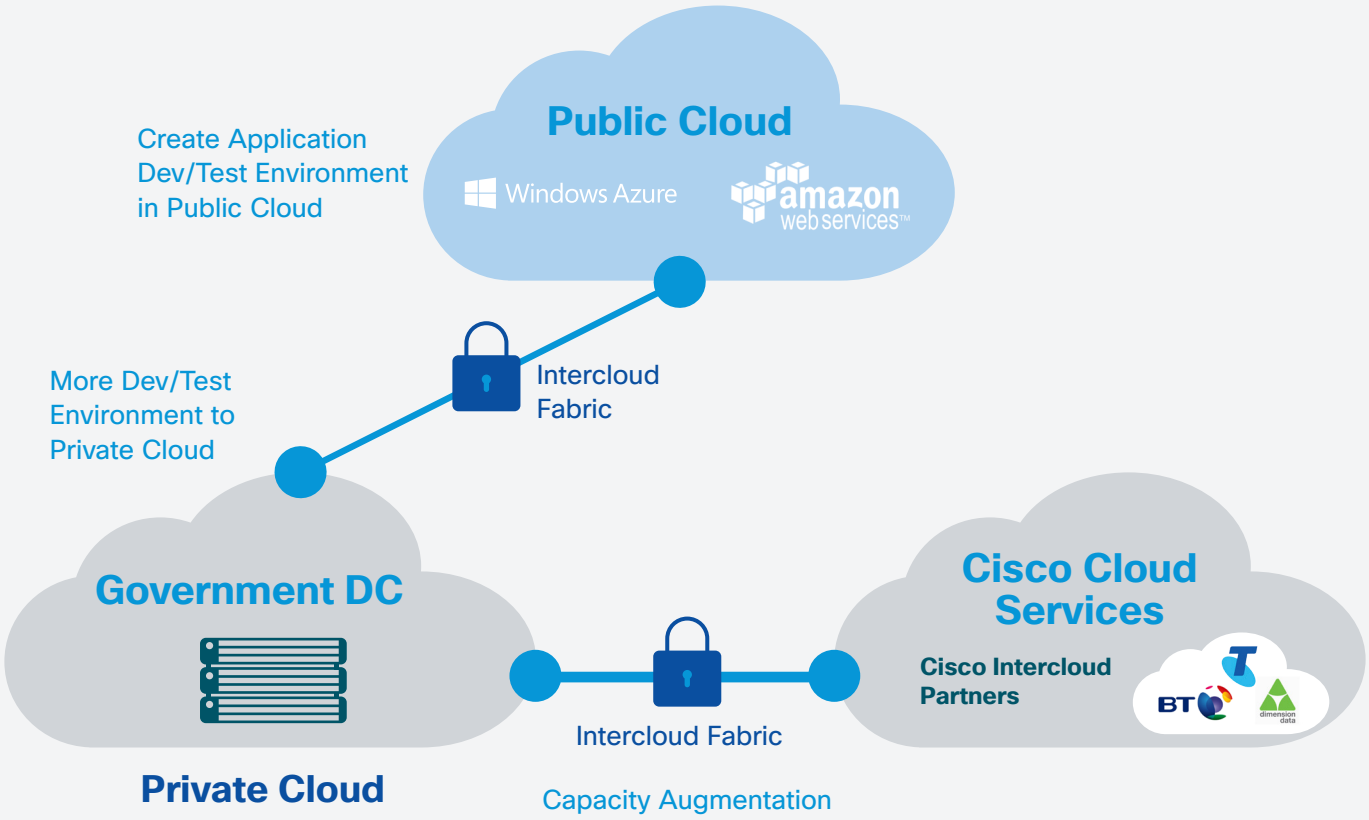
Public Sector requirement #3: DC interconnection

While all countries have identified cloud as a major opportunity for government transformation, the biggest barrier to government cloud is undoubtedly political.

In many countries, large ministries have very valid reasons for keeping their own infrastructure. In many cases, it just doesn't make sense to migrate all IT applications to a central location. However, these ministries would benefit from the capabilities of bursting to a central cloud, or for disaster recovery purposes.

Intercloud Solution

Cisco Intercloud seamlessly interconnects all DCs: those privately managed by ministries, others managed by local Intercloud providers, public clouds (e.g. Azure, AWS), or Cisco cloud. Bursting and disaster recovery are inherent capabilities. The Intercloud eases the political friction, while achieving the promises of cloud.



How does the Intercloud meet Public Sector needs in a unique way?

Public Sector requirement #4: DevOps enablement

A significant part of government IT budget goes to deploying and maintaining critical applications (e.g. HR, ERP, tax, social insurance, procurement, etc.). Significant resources (e.g. 50 IT engineers) are deployed to manually ensure that the complex constructs don't fall into pieces. Even minor changes can take weeks and maintaining security is cumbersome (e.g. 1000s of ACLs).

Public IT organisations are confronted with the siloed approach of the development teams vs. the operations teams, which have diverging performance metrics. The result is a tug of war between both departments.

DevOps offers an alternative to the legacy waterfall SW development models, whereby service owners are responsible for both the development of an application as well as its operations.

Intercloud Solution

Cisco Application Centric Infrastructure (ACI) – a core component of the Intercloud – helps dissolve IT silos for application deployment, security, network services, and network configuration personnel by enabling all of them to collaborate through a common platform, which spans private and public cloud. The main benefits include:

- Application velocity – any application, anywhere.
- Operation simplicity, with common policy, management, and operation models across application, network, and security resources (and computing and storage resources in the future).
- Systems architecture that enables a holistic view of applications, with centralised application-level integrated visibility and real-time application health monitoring across physical and virtual environments.

Public Sector requirement #5: Cyber Security

With more and more official data being digitalised, Cyber Security is at the top of government CIOs' list of headaches. In some cases, critical data (such as land registries) is only available in digital format, posing a very serious national security threat in case the data is compromised. CIOs need a flexible IT framework that allows them to control and manage risk.

Intercloud Solution

The Intercloud can be used to support the differing needs of government (information assurance), healthcare (patient identifiable data), and education and research (securing IP). Particularly sensitive data should be kept on the private infrastructure. Such information should generally be managed by government IT staff and not generally accessible by external suppliers. Cisco cloud services are consistent with the requirements of ISO27001 and Cisco is completing the process of ISO27001 certification with respect to its Intercloud data centres. The Intercloud will include leading cloud service providers from around the world to meet best in class security standards.

How does the Intercloud meet Public Sector needs in a unique way?

Public Sector requirement #6: Public worker re-skilling

Governments are often suffering from a skill gap: engineers find it difficult to keep up with the ever-increasing rate of innovation. As a result, government IT departments often find themselves operating legacy architectures (e.g. with siloed compute, storage, and network) at great cost and without preserving enough resources to innovate where it makes a difference (i.e. the IT services actually offered to end users and the business). It is challenging and expensive to integrate a broad portfolio of internally and externally sourced IT and business services.

Intercloud Solution

Cisco Intercloud comes with a full suite of professional services, in order to design, build, operate and optimise the cloud infrastructure, either for the government directly, or for the (local) service provider.

Public Sector requirement #7: Supplier agility

What happens when you move from contract to contract?

A common problem to overcome – in particular for bigger public administrations – is the captive relationship that some departments have with IT providers and outsourcers.

Governments are always concerned about vendor lock-in: once the RFP is won, it may be difficult or impossible to move to another provider. This means the government has little leverage and commercial conditions may deteriorate over time.

Intercloud Solution

ICF enables easy application portability between different hypervisors (e.g. VMware, Microsoft and Linux) and between different clouds (operated by government, by a local integrator, by a public cloud provider, or by Cisco). ICF gives the Public Administration the capability to more easily change any IT services they receive from any particular vendor, to another vendor present on the Intercloud marketplace.

Public Sector requirement #8: Cloud Service Brokerage

The role of IT departments is moving from pure provider to IT broker, proposing a full range of consumption models for cloud services to meet the specific needs of government. The type of cloud solution best for you may depend on the applications you are using, total cost of ownership (TCO), security needs, and service-level agreement (SLA) requirements. In turn, this will reduce Shadow IT by offering compelling alternatives.

Intercloud Solution

Cisco Service Catalogue provides the interface for local IT administrators to pick and choose which IT services they will offer to their organisation.

These services may originate from their own DC, from an Intercloud partner, or from the public cloud. The IT administrator can make sure that the services are government-compliant and benefit from centralised procurement.

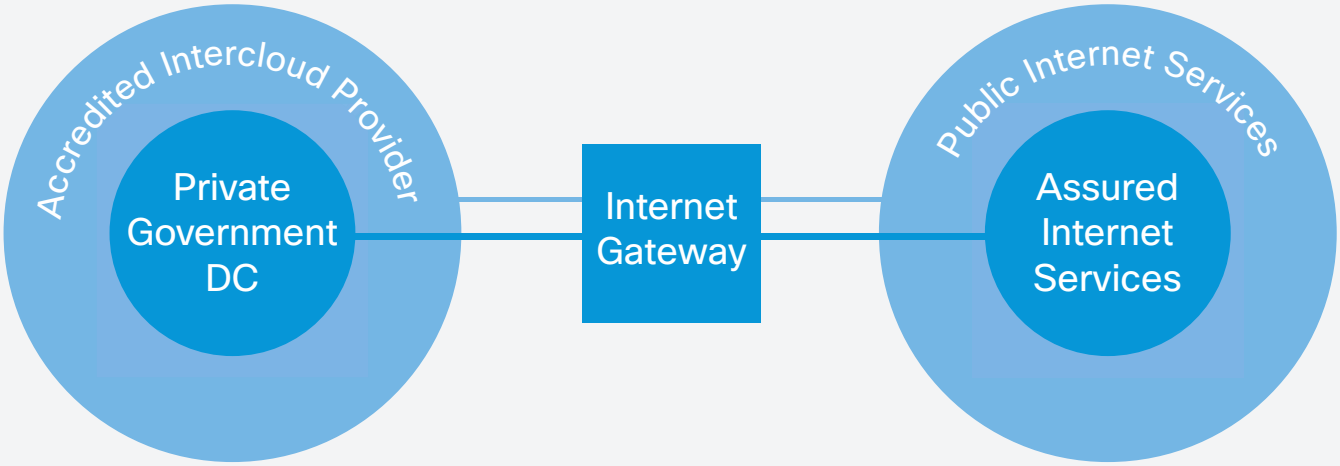
How does the Intercloud meet Public Sector needs in a unique way?

Public Sector requirement #9: Transparency and Trust

Transparency and trust is a very important topic for Public Sector organisations. Despite official statements made by IT suppliers, how can government be assured that the services they subscribe to are complying with all regulations (e.g. data sovereignty)?

Intercloud Solution

Cisco works very closely with our selected Intercloud providers on a consistent set of architecture and contractual access requirements that enhance transparency and trust in Cisco's security and data sovereignty related measures. Obviously this impacts the data centre build out, the devices stored inside as well as the applications running on those devices, whether Cisco or non-Cisco, which all has to be reviewed in detail.



Cloud Type	Example	Assurance Level	Network	Data Sovereignty
Private Gov DC	HR, ERP	Highest (Gov. Accredited)	GovNet	Yes
Accredited Provider	Tax Backend Application	High (ISO27k)	GovNet	Yes
Assured Internet Services	Unified Comms	Medium (ISO27k)	Internet (VPN)	Maybe
Public Cloud	Public Information Portal	Low (self-assured)	Internet	No

The Intercloud: Typical use cases

Government DC Consolidation & Shared IT Services	
Use case description	In these initiatives, a group of Public Sector agencies attempt to optimise IT resources by joining forces/budgets.
Examples 	**Netherlands:** Government IT is consolidating to four large shared services organisations, each having a shared DC for government use (including private cloud applications). **Spain:** Administracion General del Estado (AGE) is the central government agency that is transforming Spanish Government IT to a shared model, with the intention to move from about 100 DCs to no more than 10. Cost efficiency is the goal.
How the Intercloud would help	Government entities using the Intercloud would have access to a global service catalogue including their own private cloud services, other government DC services, the Intercloud partner offerings, and public cloud offerings such as Azure. Government agencies could choose the most effective solution, depending on the criticality and confidentiality of the data.

Mutual Capacity Augmentation and Disaster Recovery	
Use case description	Public Sector agencies often have valid reasons to keep their own DC, but planning for disaster recovery and capacity augmentation (during peak periods) can be very expensive if it requires to build a second (or third) DC. Cloud offers a solution – but it is important to consider how to maintain the same security posture wherever data resides.
Examples 	**European Institution:** Directorates are sometimes legally obliged to operate their own IT systems, but maintaining redundant infrastructure for each agency is too expensive. How could the EU agencies work together to mutualise their resources? **Switzerland:** There is a long-term vision of building a common cloud environment for higher education. The main challenges to overcome are cost structures and assigning responsibility for different parts of the cloud – infrastructure as well as data.
How the Intercloud would help	The Intercloud addresses many of these concerns by allowing each institution to build its own cloud and federate them into a 'Community Intercloud'. If capacity levels are exceeded earlier than anticipated, applications can move to the DC of another department or to an assured/compliant Intercloud provider. No change to the application, networking or security would be required and agencies could securely extend their DC with consistent policies.

The Intercloud: Typical use cases

Dev/Test	
Use case description	Today, many organisations utilise public cloud offerings for early stages of development but then need to rebuild those environments and pay charges for data removal from the public cloud.
Examples 	**Estonia:** The government routinely uses the public cloud to host non-critical applications (e.g. touristic portals), as well as Dev/Test environments. However, they need to ensure that they can securely access data located on the private government infrastructure, as well as easily migrate the application newly developed back to the production infrastructure.
How the Intercloud would help	ICF would enable the cloud service to be repatriated whilst avoiding rebuild and data movement costs.

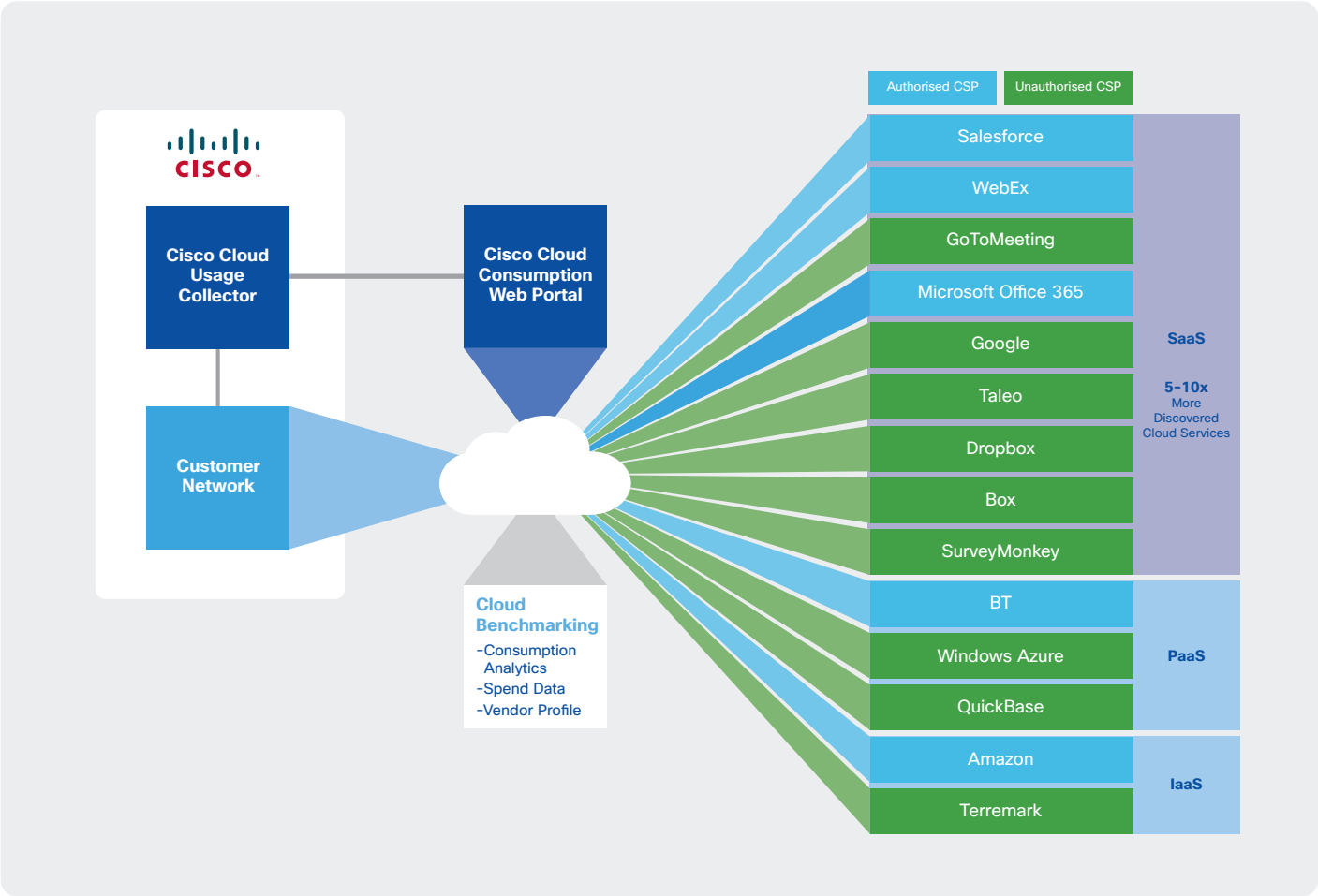
Digital Marketplace or Government Cloud Store	
Use case description	Significant savings in time and money can be generated by the reuse of applications that are built/bought by one department and re-used by many. A central buying structure seeks to generate these economies of scale by centralising the procurement of IT expenditure and making it available through a Government Cloud Store, or Digital Marketplace. This makes sense since Public Sector agencies have many similar IT needs.
Examples 	**UK:** G-Cloud is the Government's initiative to encourage the adoption of cloud services across the whole of the UK Public Sector. The aim is to simplify how the Public Sector buys and delivers services by creating a marketplace of pay-as-you-go commodity services that can be easily scaled up or down, based on changing needs. **Italy:** The government is building a Cloud Service Delivery platform, outsourced to a specific service provider who delivers cloud services (IaaS, PaaS, SaaS) to the Public Sector community cloud over a dedicated network. A Cloud Store will be the unique access point to acquire services from a set of qualified providers.
How the Intercloud would help	Cisco Service Catalogue provides the interface for local IT administrators to pick and choose which IT services they will offer to their organisation. The public procurement process is vastly streamlined, since the Central Buying Structure has pre-selected the winning bidders. And all IT services present on the catalogue comply with the security regulations and standards, which significantly decreases each agency's risk.

Next Steps: Paving your road to the Intercloud

Over the last decade, many Public Sector organisations have embraced the opportunity to join forces with seasoned experts from Cisco. We offer a blend of business and technology expertise, which enables us to understand your business requirements and link them with tangible IT projects. Our philosophy is to support your own strategic management plan by identifying both quick ROI projects, as well as long-term structuring programmes.

Cisco Cloud Assessment Services

Cisco Data Centre Assessment for Cloud Consumption Service is a one-time assessment that reveals what cloud services are being used in your business and clearly details your cloud usage, costs and risks. A sensor appliance is installed to discover authorised and unauthorised services:



Our cloud experts will help you identify and manage cloud security risks and compliance issues. They will also help you determine what you're really spending on cloud services and identify ways to save money. Finally, they will provide suggestions on new processes and best practices for managing cloud vendors.

Next Steps: Paving your road to the Intercloud

Government Cloud Workshop

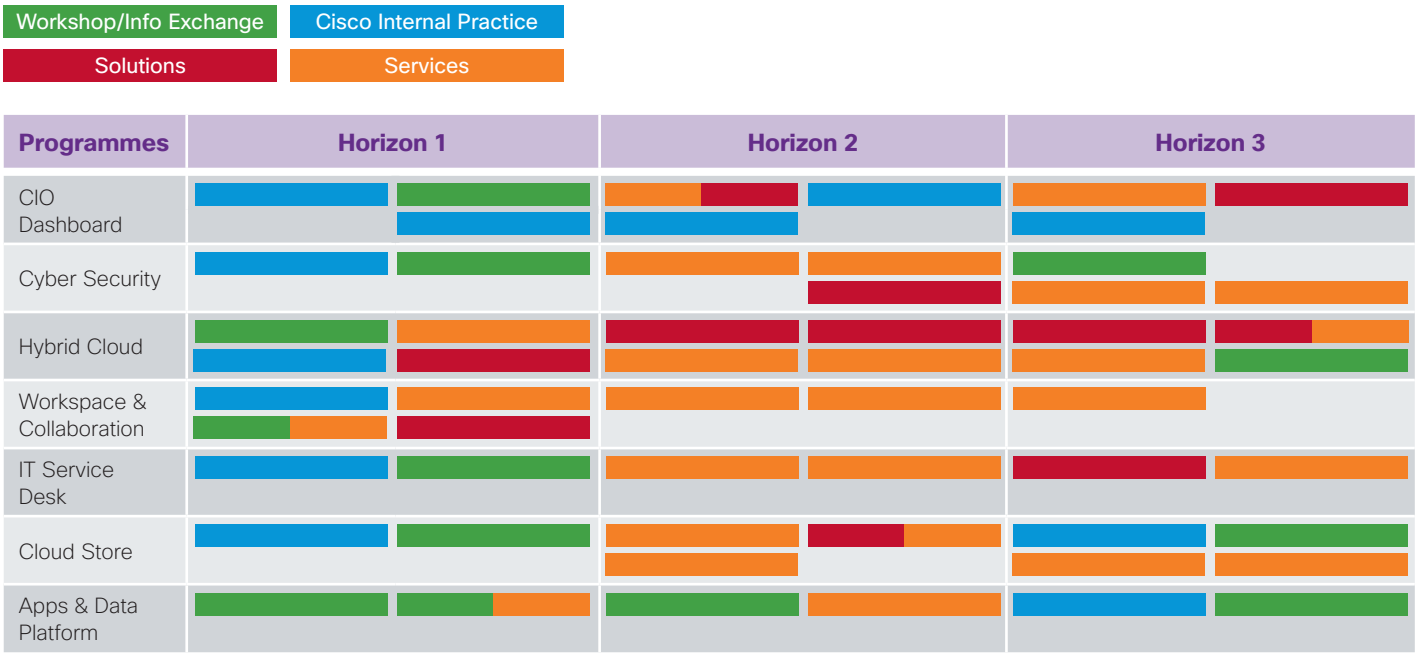
Cisco can organise a half-day workshop dedicated to your team, covering:

- Best practices from peer government organisations that are evolving their IT operating models and modernising the IT delivery platform.
- State-of-the-art Government Cloud Stores: from the online XaaS catalogue to the automation of underlying processes, from required approval chains to granular billing.
- Cisco's internal IT's own experience on developing a catalogue of IT services (including creating a robust IT Service Taxonomy), available from a unified user portal, and integrating flexible charge-back mechanisms.

Strategic IT Roadmap (SITR)

Cisco has perfected a three-phase methodology for Public Sector IT organisations looking to align their IT strategy to their business plans:

- Phase one: Clearly identify and document strategic drivers and pain points – from the business and end user perspectives.
- Phase two: Build the IT Value Map to demonstrate the key capabilities of the IT organisation, where value can be delivered and how results should be measured.
- Phase three: Based on phases one and two, identify and prioritise the key programmes and projects that will deliver the biggest impact, enabling a successful execution of the IT Management Plan.



Why Cisco?

1. **Leverage best practices.** Partnering with Cisco will make your road to success shorter and less risky. We've perfected a set of proven methodologies across many engagements with your peer government agencies.
2. **The roadmap is just the start.** While other consultants might consider the roadmap creation as a goal in itself (and bill you for it), we view it only as a means to an end: your success.
3. **No strings attached.** Strategic IT Roadmap (SITR) is a Cisco-funded service for government organisations and builds on our global resources and expertise. We have no hidden agenda, only a desire to drive your future success.

This document was co-authored by a multi-national team of cloud experts and Cisco solution architects responsible for Public Sector agencies in EMEA: Alexander Stoklasa, Atanu Roy, Beat Baumberger, Chris Blenkhorn, Frank De Groot, Greg Page, Holger Müller, Jerome Paquay, John Johnson, Luca Lironi, Luca Relandini, Patrick Bikar, Shawn Dawson Troutt, Vernon Thaver, Viktor Hagen.

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