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The locus of change

From transformation to capability

(Version 1.0)

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BIUS WORKING PAPER NO 0
(THIS DOCUMENT DOES NOT REFLECT THE VIEWS OF SCOTTISH GOVERNMENT)

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1 Introduction

1.1 What is meant by the locus of change?

Up to now digital transformation has followed a common pattern. A set of goals are announced by members of the wider political class: cost savings, targets around some output, social and cultural aspirations. These targets are to be met by rubbing some tech on it: variously e-government, the internet, social media, big data, blockchain or artificial intelligence. There will be a programme do to it (the rubbing) onto the civil service that will in some unspecified way 'transform' government.

The BIus project takes an orthogonal view. 'Transformation' is a by-product of applying technology to administration and communication. This application should be approached as a question of capability – and the task now becomes *how to we increase the capability of the state apparatus for the digital age*.

It might seem counterintuitive, but switching the focus from transformation to capability will see more and not less transformation – because capability compounds like interest. And capability, like muscles, grows with being exercised. The emphasis has to be on the capability of the state in the whole, not in the part. Centralisation weakens.

Digital systems bring opacity and complexity to the heart of the administrative state. That complexity needs to be encapsulated and separated from high politics. This encapsulation empowers technical experts to get on with doing 'the good stuff'. This is the locus of change moving.

But whilst the private sector must woo with honeyed words, the public sector can compel with bayonets. Any and all public servants must be appropriately overseen in a constitutional manner – they are creatures of law. Civil servants may propose changes to *policy effect*, but *policy intent* must remain the preserve of elected politicians. Technical standards are a form of weak law, and they must be developed in public, in the open, in a parliament of standards.

The model of explicit transformation has as its twin a CapEx (capital expenditure) funding model. By contrast the BIus approach has an OpEx (operational expenditure) focus.

There is a saying *data ages like wine and code ages like fish*. Data is a strategic asset of the state – and the digital systems that engage with it require constant maintenance.

In parliamentary terms we have two regimes – oversight of law and oversight of money. And parliament votes government the legal authority to do something and the money with which to do it separately.

Data (and the digital systems built over it) are strategic assets (and liabilities) and should be managed as such – and part of that management is constitutionally-appropriate oversight.

Moving the administrative state to the digital administrative state is a constitutional moment as well. Governments come and governments go but infrastructure pertains.

There are precedents as to how to manage disruptive and opaque technologies in the public sector – the management of atomic energy being one example considered here.

1.2 Who are you?

You are someone who cares about the administrative state. You might be minister or parliamentarian, a civil servant or worker in the 3rd sector, a journalist or public intellectual, or simply a citizen and voter.

1.3 Why should you read this?

You need to read this to understand the constitutional and institutional changes required to make the modern state fit for purpose in the modern world.

The discussion is general, but the examples are taken from the UK and Scottish states.

2 The BIus Project

This is the foundation working paper, Working Paper No 0, of *BIus - Basic Law-Making For Legislative Computer Systems* which is a research project looking systemically at how the state creates the digital systems underpinning its services.

Working papers are being released gradually for comment:
Working Paper 0 – ***The locus of change*** (this document)
Working Paper 1 – ***Data and the rule of law*** (published)
Working Paper 2 – ***Rules as code*** (published)
Working Paper 3 – ***The Lego state*** (published)
Working Paper 4 – ***The remixable state*** (published)
Working Paper 5 – ***Law reform for data*** (forthcoming)
Working Paper 6 – ***A solera for data cleansing*** (forthcoming)
Working Paper 7 – ***Experimental digital legislative processes*** (forthcoming)

BIus working papers are designed to stimulate discussion about key elements of the relationship of the state to digital systems and their delivery. Your feedback, input, and particularly criticisms of this paper are most welcome. Feel free to distribute it however you wish.

Working papers are published via the *Digital Policy* SubStack.

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The author is an independent Research Fellow at Scottish Government under the First Minister's Digital Fellowship programme. The views of this paper do not represent the views of Scottish Government.

[1] https://digitalpolicy.substack.com/

3 The complex state

Back in 1911 Lloyd-George masterminded the general election and created the basis of the welfare state. He wrote the legislation, designed the administration down to the Lloyd-George cards and oversaw its roll-out. That world of a wholly comprehensible major government programme, conceived, designed and directed by a single mind is long gone.

Digital systems are opaque and hard to reason about at the best of times. Under fortnightly releases and constant change, doubly so. *Contra* popular belief this opacity extends to technical experts and people who work in the field – nobody is blessed with some magical x-ray vision to peer into the abyss and see the skeleton, muscles, tubes and organs of large digital systems. It is not for nothing that the dominant technical methodologies focus very heavily on getting things to a state where actual people can start using them as quickly as possible, no matter how limited their functionality. The actions of people when using digital systems are far more comprehensible that the underlying systems themselves. Engineers only know what they are building when they can watch people using them.

Complexity didn't arrive with the digital revolution. But digital takes complexity from the margins of the state into the centre.

The good news then is that managing complexity isn't unprecedented - it is a challenge that modern states have risen to repeatedly.

The solutions and arrangements that we need for the digital state should be easily found. If not exact solutions, certainly ones that rhyme with those we need.

It is worth revisiting the introduction of a semi-tangible discontinuous technology and its associated complexity into the modern world – atomic energy – which is discussed later as a precedent.

4 On capability

The purpose of this proposal is to increase the capability of the state to do strategic rearchitecting of state institutions to better deliver the desired outcomes of the government of the day by leveraging the opportunities that technology offers.

In its first phase it will involve a large degree of activities to deliver quite low-level technical hygiene. The technological changes will be enabling of change at the higher level, and not as ends in their own right.

The problem of digital in the state currently is not the inability to *conceptualise* how technology might change things, its is an inability to *do* the work, or more properly to *co-ordinate* the doing of the work by taking strategic decisions and methodically implementing them in a programme of continuous improvement.

There is a very strong expectation that at Westminster a new government is à-comin in. The thinktanks of Whitehall are pullulating with plans and schemes for the new regime to implement. Oftentimes they share a presumption that *if we can conceive the future then all we need do it is will it* – and that the will[2] needs[3] to be stiffened[4] by a strong centre.

By contrast this proposal calls for a ***weak centre*** with a capability and not a delivery focus – concentrating on ***habit***, ***tooling*** and not ***will***. An organisation is what it habitually does.

State digital systems need to be capable of:

- being found
- being understood
- interoperating
- being extendable
- being composable
- emitting desired outputs and interfaces automatically through tooling
- being able to be reasoned about
- being able to be consolidated and improved
- being able to be measured and assessed

The mechanisms for driving these capabilities are standards – which are a mechanism for shaping and making habitual working practices such that disparate and autonomous delivery organisations can achieve harmony without direct communication and control structures. Standards embed ways-of-working in culture. Loose-coupling is a core organisational architectural attribute that we need to work towards.

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[2] https://www.institute.global/insights/politics-and-governance/new-national-purpose-ai-promises-world-leading-future-of-britain *Boosting how Number 10 operates, dissolving the AI Council and empowering the Foundation Model Taskforce by having it report directly to the prime minister.*

[3] https://www.ippr.org/research/publications/the-smarter-state *The centre of government should be made stronger and redesigned around the missions* and *Prime ministerial commitment: These Cabinet committees tend only to be successful if there is sufficient PM attention and political capital invested. If attendees know that they need to show up prepared and with results, they can be effective.*

[4] https://www.hks.harvard.edu/sites/default/files/centers/mrcbg/files/Final_AWP_216_2.pdf *Many interviewees argued that support for regional growth requires strong and united leadership in Westminster and the enthusiastic backing of the Prime Minister – a high bar to clear, which explains why regional policy has struggled to gain traction.*

In precedential terms this is a General Staff[5] model. The central general staff lay out grand objectives and the field commanders (in this case Senior Responsible Owners in the various departments and projects) retain day-to-day autonomy and flexibility in how best to meet those objectives. In career terms personnel move between delivery roles to the centre to learn about planning standards and how-we-do-things and then rotate back as key advisors to the SROs. The proposed central organs more closely resemble the EU or the Holy Roman Empire[6] than GosPlan[7].

This model is critical because the driving motor of continuous improvement must be funded via operational expenditure/daily work (OpEx) and not the old fashioned big-programme approach of capital expenditure/central programmes (CapEx). The centre sets strategic standards and approaches (but can flash steel if required to make the departments comply) but the delivery and in-service teams have responsibility for the *when* – the weaving of change into their daily work. The sheepdog cares that the sheep go through the gate, but each sheep makes it's own path, jostles as it sees fit.

The Senior Responsible Officer has obligations beyond delivering to standards, and work in dynamic circumstances where external events happen that need to handled. At the core of this approach is the recognition that any and every system that involves software and data has a maintenance budget – some organisations recognise this, some try and pretend they don't. The key is to spend that in a way that brings the required harmony.

During the work of the BIus project I have not found any instance of lack of individual or team capability – there are not missing functions in the public sector that are found in the private, nor are the civil servants unqualified for their jobs. The capability that is lacking is on a state/organisational level – and it is this that needs to be addressed.

[5] *pace* Dominic Cummings, ooh-la-la

[6] *Beter wordt het niet; een reis door de Europese Unie en het Habsburgse Rijk* http://www.carolinedegruyter.eu/#books-2

[7] https://blogs.lse.ac.uk/politicsandpolicy/gove-ditchley-lecture/

5 Precedent 1 – taming atomic technologies

To say that politicians don't understand the details of atomic energy is an understatement. The mysteries of quantum mechanics, the smush of neutrons and protons and the meson family, the charm of quarks, flavoured as up, down, strange, charm, top and bottom, is quite the mystery to them. You might say most people don't even know the αβγ's of it.

So how did we handle this abrupt intrusion? And what can we learn about how to handle digital?

In 1946 the UK passed the Atomic Energy Act 1946[8]. This gave the Ministry of Supply over all radioactive minerals and powers regarding plans for atomic energy.

This roughly corresponds, rhymes as you might say, to the relationship of the state to the digital world now. Ministers control it, undifferentiated.

Then with the Atomic Energy Authority Act 1954[9] which created the United Kingdom Atomic Energy Authority, a process of encapsulation began. Atomic energy would not be directly controlled by politicians but indirectly by experts with a skeleton of oversight erected over it.

The UKAEA was to have a membership of between 7 and 10, plus a chair. At a minimum 3 of the ordinary members were to be experts in atomic energy, one in finance and one in organisation of workers - ie a trade unionist.

So in the encapsulation it was made clear: technology is too important to be left entirely to the technologists. Non-technologists and non-technological disciplines must be brought to bear.

And the normal constitutional discipline of separation of powers was applied. The Nuclear Installations Act 1965[10] created Inspectors whose job is not to do, but to monitor.

In this case both the UKAEA and the Inspectorate were creatures of the Government and not the Parliament - appointed at the pleasure of Ministers and acting under their direction. The Minister had only an obligation to consult before acting.

It is worth looking at the timelines as well: 1946, 1954, 1965. The process of managing complexity was a learning process - no discontinuous jump from this world to that world.

Atomic energy is integrated into the energy sector by a set of technical and financial contracts. The money ones cover price per Kilowatt and things like that. The technical contracts handle things like adding or removing a nuclear power station from the grid. These technical contracts are shared with other power suppliers, the hydro, the gas-powered, the wind turbines.

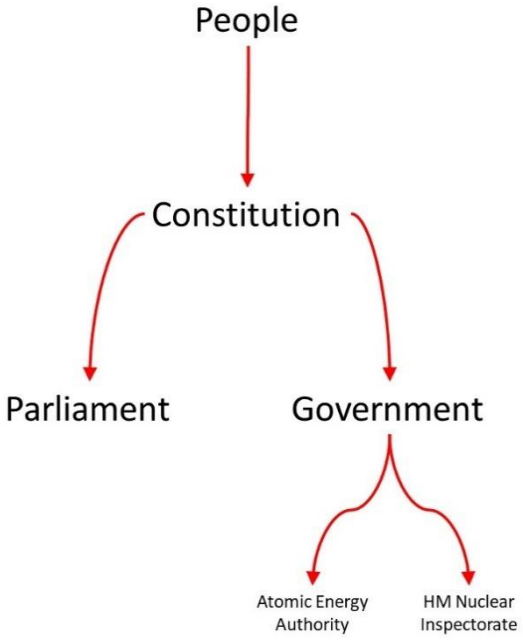
[8] https://www.legislation.gov.uk/ukpga/Geo6/9-10/80/contents
[9] https://www.legislation.gov.uk/ukpga/Eliz2/2-3/32/section/1/enacted
[10] https://www.legislation.gov.uk/ukpga/1965/57/enacted

The ability to smoothly ramp up and down power generation to meet load is a critical national function. It is only overseen by the democratic apparatus indirectly - as it should be. The democratic apparatus puts in place the structures and divisions of responsibility and lets the technical experts negotiate with each other under that aegis, and subject to those restrictions.

And this national apparatus of supervision is itself wrapped in an international one.

The UK was a founding member of the International Atomic Energy Agency in 1957. As an observer but not participant in the Treaty of Rome process the UK didn't join that other 1957 child Euratom until its accession to the EEC in 1973.

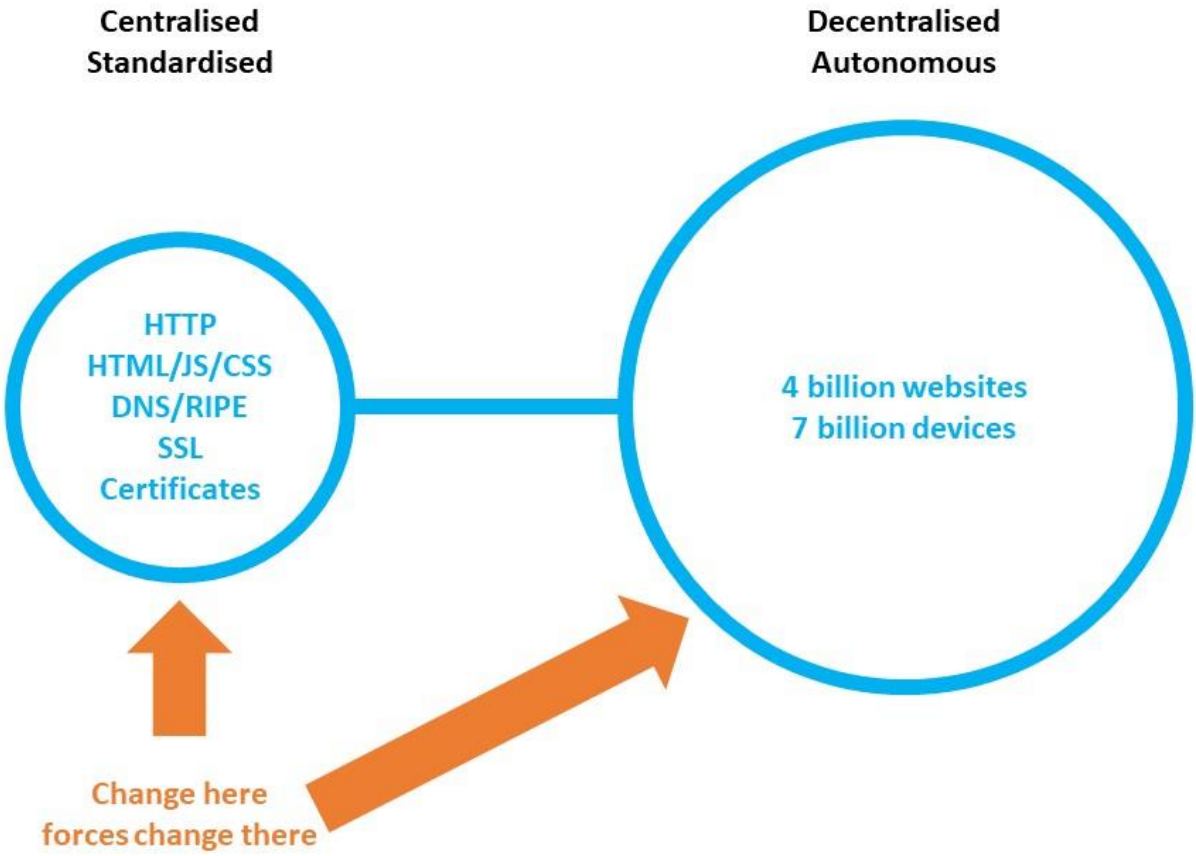
The constitutional architecture is:



Personally I would put the inspectorate on the other side, but when there's bombs involved governments can get a bit snippy about oversight.

6 Precedent 2 – web governance, a parliament of standards

Technical standards are a form of weak law – they are clearly not law in the parliamentary and political sense, but they rhyme with it. There are lessons to be learned from internet governance – which is a global paradigm of a weak centre, with a parliament of standards establishing effective governance frameworks and infrastructure that empowers distributed and uncoupled organisations. The web follows a dumbbell pattern common to decentralised systems.



On one end of the dumbbell there are centralised services and standards – on the other end are a mass of decentralised autonomous websites, services and business.

There is no decentralisation without centralisation – and changes on the centralised end forces changes at the other end. Design decisions at the centralised end are 100 year decisions – the world will be living with them for a long time.

And it is worth recapitulating the size and growth of the *corpus acquis* of the new web developer. The very first version of the world wide web had two standards: HTTP and HTML. HTTPv0.9 was 528 words and the earliest codified HTML was about 4,100 words.

By 1995 the HTTP standard was 17,000 words and HTML grew explosively – in 2023 it comes in at 650,000 words. Other standards grew alongside it - a 280,000 word spec for Javascript and a tangle of hundreds of thousands of words across a maze of documents for CSS.

The vast majority of things that you use your computer for depend on these standards, these weak laws, with no police to enforce them – just habit, convenience, tooling and the value of interoperability.

Web standards are written in public with the circulation of Requests For Comment (RFCs) and consolidation and approval processes. They are consensual rather than adversarial processes. They focus on *effect* and not *intent*.

The critical element to grasp is the necessity to start from the simplest working version. Gall formulated his famous law back in 1975:

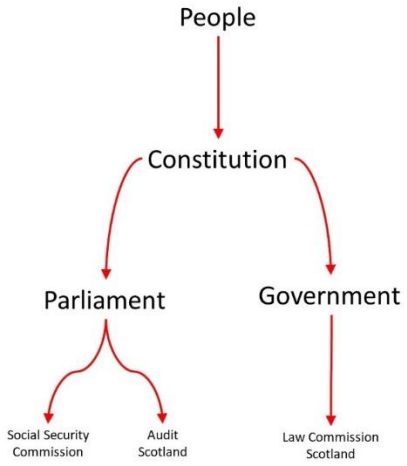
> *A complex system that works is invariably found to have evolved from a simple system that worked. A complex system designed from scratch never works and cannot be patched up to make it work. You have to start over with a working simple system.*

In the development of the proposed structures in this paper the start must be made small by design and from a proper working start rich standards can be developed.

To get a real sense of the simplicity of the early life of a complex system it is worth taking a look at Appendix 1 which describes the technical standards that governed the first 5 years of the World Wide Web and which still structures it today – and will continue to do so over the centuries.

7 Precedent 3 – separation of powers in the Scottish Parliament

The relevant constitutional architecture of the Scottish Parliament looks like this:

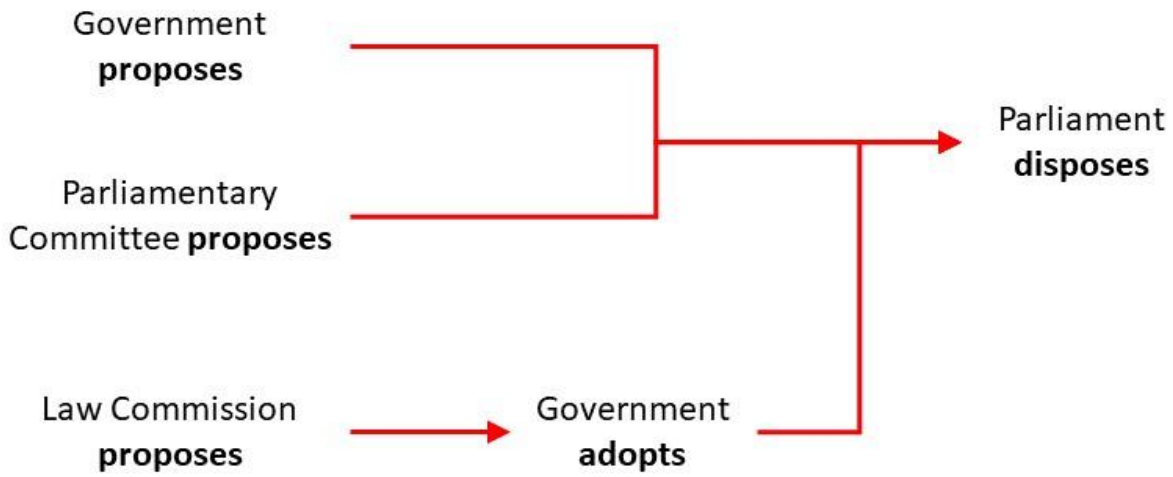


When considering the Social Security Commission and Audit Scotland it is important to understand that these two parliamentary bodies are different in action.

The Social Security Commission is broadly reactive. It examines technical Ministerial Orders on behalf of the parliament.

Audit Scotland by contrast is broadly proactive – it decides who and what it wants to audit, can call for documents and evidence and state bodies have a duty of co-operation – as well charge government bodies for auditing them.

We can see the differences between the three bodies most clearly by examining the legislative routes through the parliament for public bills[11]. This is the picture for primary legislations (Bills, becoming Acts):



[11] There are a range of bill routes not shown here – members public bills, private bills, hybrid bills and so on.

The Law Commission is a body that proposes legislation – the Government has a veto on it – the Commission has a limited right of audience with the parliament and no right to lay legislation. There is no barrier on a Parliamentary Committee freelancing on law reform.

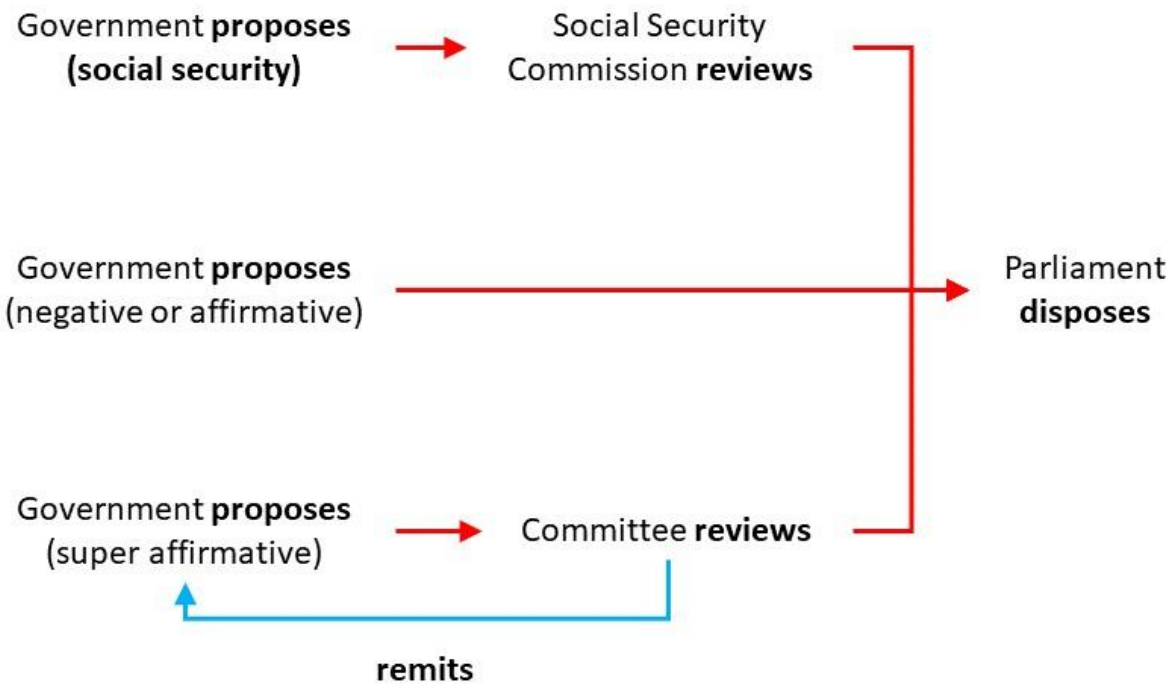
The Law Commission can propose 5 types of legislation:

- Law Reform Consolidation bills
- Consolidation bills
- Codification bills
- Statute Law Repeal bills
- Statue Law Revision bills

Each of these types have their own procedures[12] (9.17a, 9.18, 9.18a, 9.19, 9.20) for handling them in the Scottish Parliament.

There are pertinent additional restrictions on major bill types. In particular Standing Order 9.16[13] which defines budget bills – these cannot be introduced by committees but only Scottish Ministers – and they have their own proper form and bill pack.

The Social Security Commission has a different role – in relation to secondary legislation (Ministerial Orders). The legislative routes for orders are:



I am drawing a distinction between the operations of lead committees as the *reviewers* for super-affirmative route – which happens pre-laying and their behaviour after laying during the *disposition* of the legislation.

[12] https://www.parliament.scot/about/how-parliament-works/parliament-rules-and-guidance/standing-orders/chapter-9-public-bill-procedures#topOfNav
[13] https://www.parliament.scot/about/how-parliament-works/parliament-rules-and-guidance/standing-orders/chapter-9-public-bill-procedures#topOfNav

It is worth reviewing the legal basis for these bodies.

The Auditor General and Audit Scotland. The Auditor General is a position under the Parliament and not the Scottish Government under the Scotland Act 1998[14]. The Audit Commission is a corporate body[15] under the Public Finance and Accountability (Scotland) Act 2000 with which public bodies have a duty of co-operation – and which it can charge for its work.

The Public Finance and Accountability (Scotland) Act 2000 also imposes statutory obligations on civil servants – creating the Principal Accounting Officer and departmental Accounting Officers who are responsible to parliament. At Westminster Francis Maude created a parallel accountability structure – adjusting the Osmotherly rules[16] and the Ministerial Code of Conduct[17] - making Senior Responsible Owners directly responsible to the Westminster parliament. In particular, he transferred responsibility for setting go-live dates on major software projects from ministers to civil servants implementing them. This was a major lesson learnt from the debacle of the first 2 times Universal Credit went on the merry-go-round.

The Social Security Commission. The Social Security Commission was created by the Social Security (Scotland) Act 2018[18] to scrutinise Ministerial Orders and Scottish Ministers have a statutory obligation to consult them before laying such orders[19]. The statute makes the point about separation of powers crisply:

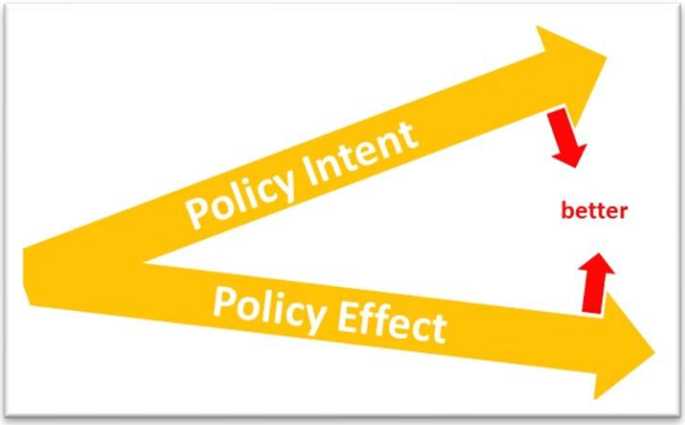
> *In performing its functions, the Scottish Commission on Social Security is not subject to the direction or control of any member of the Scottish Government[20].*

It has an obligation to report to parliament things which it thinks violates the Social Security Charter.

The Scottish Law Commission. The Scottish Law Commission was created by the Law Commissions Act 1965[21]. Its members are appointed by Scottish Ministers. The law commission can propose legislation, and if the Ministers accepts it, it is placed on the legislative programme. The commission must also write a report which Ministers must lay before the Scottish Parliament. Ministers don't have the right to edit the report but do have a right to decorate it with comments.

[14] https://www.legislation.gov.uk/ukpga/1998/46/section/69
[15] https://www.legislation.gov.uk/asp/2000/1/part/2/enacted
[16] Not an AI hallucination dear readers furth of Blighty https://www.gov.uk/government/speeches/osmotherly-rules-statement-on-updated-guidance
[17] https://assets.publishing.service.gov.uk/media/63a4628bd3bf7f37654767f2/Ministerial_Code.pdf
[18] https://www.legislation.gov.uk/asp/2018/9/section/22/enacted
[19] https://www.legislation.gov.uk/asp/2018/9/section/97/enacted
[20] https://www.legislation.gov.uk/asp/2018/9/schedule/1/enacted
[21] https://www.legislation.gov.uk/ukpga/1965/22/section/2

The Scottish Law Commission is 'constrained' by the policy scissors. *Policy intent* is what the government hoped to achieve with a law, and *policy effect* is what actually happens. Invariably these are not the same – and the gap varies on a case-by-case basis:



Throughout the BIus project – the word 'better' is used in this narrow sense only – closing the gap in the policy scissors.

The Scottish Law Commission can propose law reforms to meet a particular policy intent at the request of the government and suggest work that would have a policy effect under their own recognisances – and has a right of audience with the parliament for those suggestions.

The distinction between the two blades of the scissors is clear on paper and considerably more murky in the real world. For good constitutional reasons the government has a monopoly of intent and it must adopt law reform proposals if they are to proceed, they are not automatic.

The rational for laying out these architectures, parliamentary routes, accountability lines, rights of audience and remits is that the new bodies, parliamentary processes, accountability lines, rights of audience and remits proposed to handle complexity in the digital state rhyme with them.

8 Constraints

Any proposals to change how the state creates services and the digital systems they depend on must understand the constraints that exist on the end-to-end systems holistically.

At the moment the Scottish Parliament processes about 22 Bills and 400 Ministerial Orders a year. ***Any proposals to change procedures needs to respect those limits***.

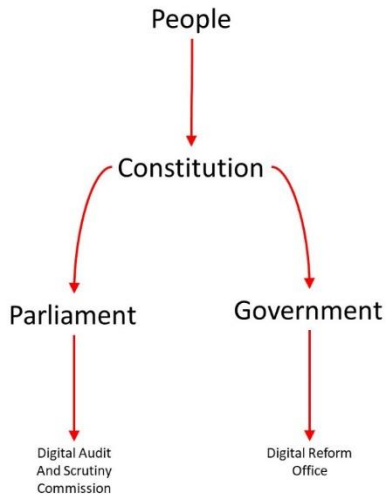
We can regard the work of the Scottish Law Commission and the Digital Reform Office as maintenance work. Currently the work of the Commission leads to about 1 or 2 bills per session – roughly 5% to 10% of statutes are maintenance work.

In its early years the Digital Reform Office would likely be generating a quantity of changes to primary legislation, either directly to create new institutions or to knock-out barriers to transformation via an Enabling Act. Thereafter the workload should shift to Ministerial Orders. ***These proposals constitute a low-touch programme approximately the size of the Law Commission Reform process in the early years before slipping back***.

9 Future state

This paper proposes a schema that rhymes with the current state of separation of powers in the Scottish Parliament.

On the parliamentary side a Digital Audit & Scrutiny Commission and on the Government side a Digital Reform Office.



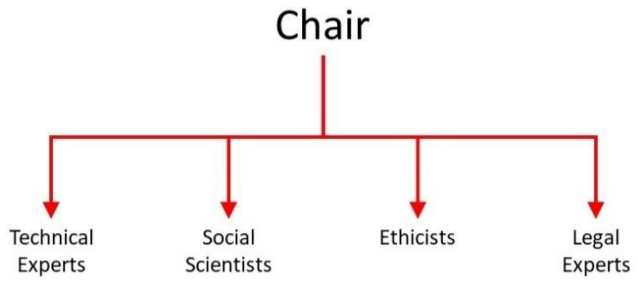
The Digital Audit & Scrutiny Commission has two functions (as the name suggests) – scrutinising ministerial orders that pertain to digital and pro-actively auditing activities within Scottish Government.

The Digital Reform Office proposes programmes of work on the digital side that rhyme with law reform.

Law reform properly is only concerned with primary legislation, Acts of Parliament (and common law offences) whereas digital reform has a wider remit – covering secondary legislation (Ministerial orders) and what you might call tertiary legislation (regulations and standards).

If we are to treat digital infrastructure as serious national infrastructure then we need parliamentary oversight of digital reform whether it requires primary, secondary, tertiary legislation or just day to day work.

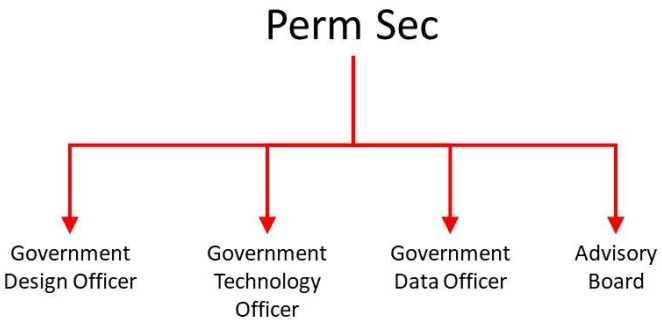
The Digital Audit & Scrutiny Commission. Like the UK Atomic Energy Authority, the DASC needs to have technical chops embedded in a wider social matrix:



It performs work in both kinds:

- Reactive scrutiny of government instruments as they pertain to technical issues (particularly standards and legislation[22] pertaining to data)
- Proactive scrutiny of government digital systems – particularly with respect to cybersecurity and resilience

The Digital Reform Office. Like the Scottish Law Commission the DRO has a measure of autonomy, limited right of audience with the parliament and a focus on policy effect. Like the Scottish Law Commission its legislative proposals must be adopted by the Government before they can progress.



It is important to understand what the DRO is – it is a core function of the civil service. But is ***not*** a central delivery organ. The creation of the Government Digital Service in Westminster was, how to put this, constitutionally organic. No great consideration was given to its impact on the structure of government, it grew from its successes. As an unintended consequence GDS turned out to be (yet another) act of centralisation in an otherwise massively over-centralised state. DRO is a standards body, and a technical leadership body. It provides a career route for the specialist to the heart of the civil service (shades[23] of Fulton, of Haldane and indeed of Maude[24]).

Whereas the Scottish Law Commission only deals with primary legislation, the programme of work that the DRO might propose may involve primary, secondary and tertiary legislation or

[22] This will be the subject of the forthcoming Working Paper
[23] https://www.civilservant.org.uk/csr-fulton_report-background.html
[24] https://www.gov.uk/government/publications/review-of-governance-and-accountability/independent-review-of-governance-and-accountability-in-the-civil-service-the-rt-hon-lord-maude-of-horsham-html

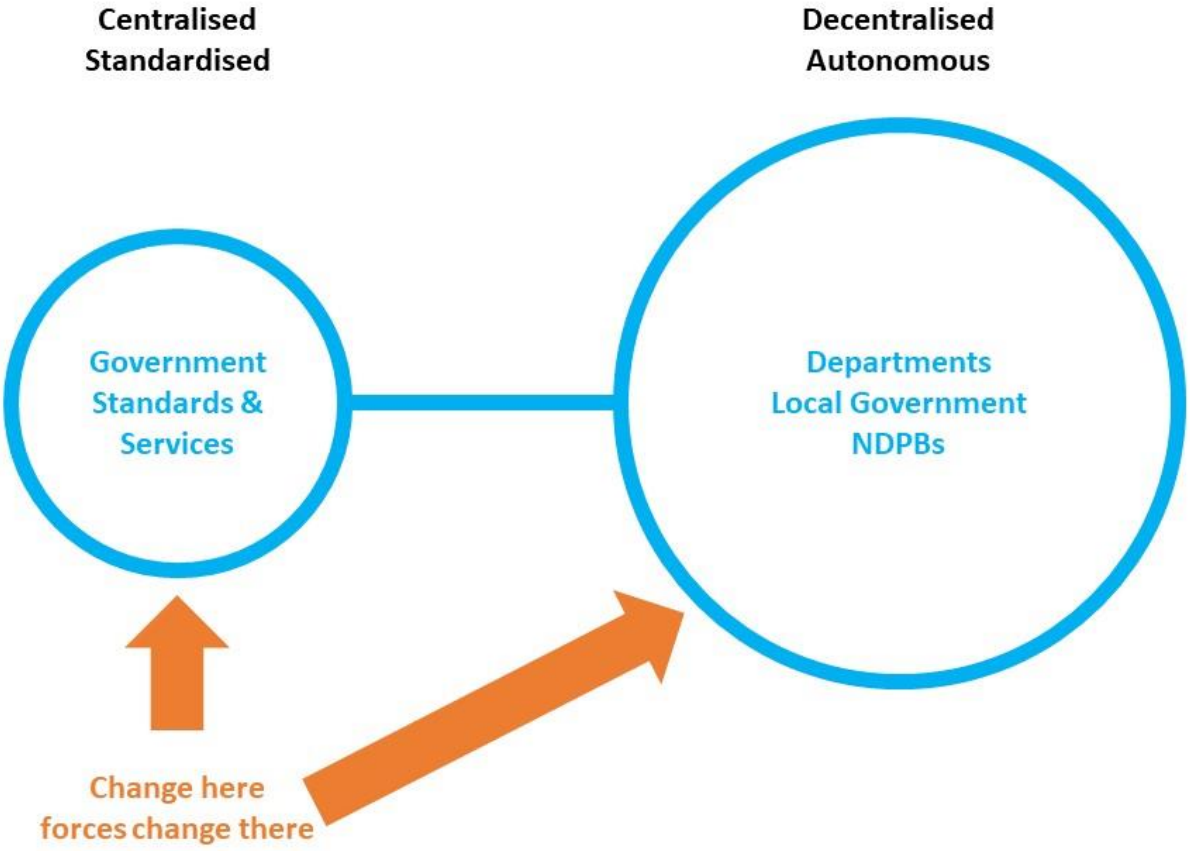
regulation. In order to bring this under the supervision of parliament it must be under an obligation as a body to lay an annual report.

In addition, the various officers as functional leaders of their professions need to answer for the work of those professions to the parliament – via mechanisms analogous to those for Senior Accounting Officers and Senior Responsible Owners.

There has been a certain amount of cosplaying in Whitehall and the Cabinet Office with the creation of posts like COO (Chief Operating Officer) and CTO (Chief Technology Officer) that are not analogous to their Silicon Valley equivalents but give the appearance of it. In my naming I have eschewed that dubious pleasure. These are civil service and public sector jobs with all the culture and responsibilities that entails.

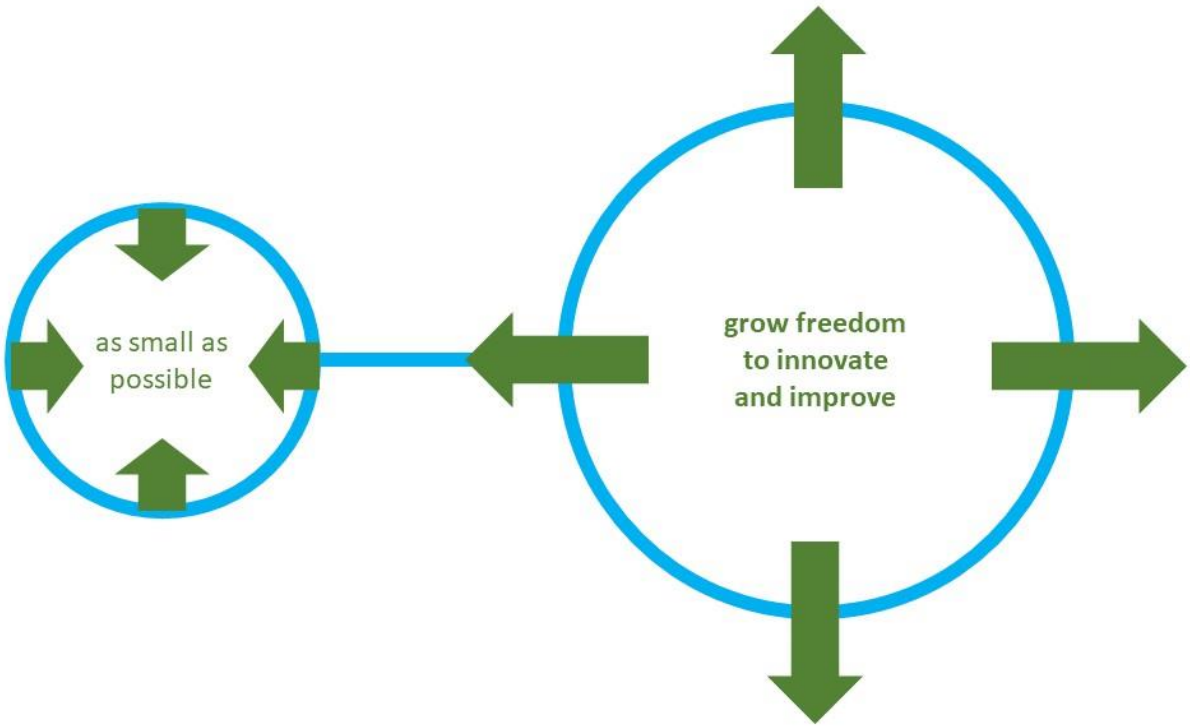
As a standards and leadership body the DRO is responsible for ensuring interoperability, joined up systems, data management. It should operate in public, like an internet standards body, issuing Requests For Comments and having open public discussions about technical standards, and generally working openly. It will be a parliament of standards – a parliament in the sense of the old St Kilda parliaments[25] - all the working people assembled and participating in the allocation of standards work.

The DRO's relationship with the departmental bodies follows the dumbbell pattern:



[25] https://www.ambaile.org.uk/asset/38917/1/

The challenge for government standards is the same as that for web standards:



The goal is to carefully design and restrict the core, shared standards, services and infrastructure to maximise the freedom and autonomy of the entire state apparatus to innovate.

Life in modern Germany is still structured by the social insurance reforms brought in by Bismark in 1889 during the Second Reich – these foundations survived Weimar, the Third Reich and the GDR/BND cleavage into the modern united BRD.

Similarly, some of the proposals[26] of this research project are 100 year decisions – which is why the parliament of standards needs to be brought into the overall constitutional settlement with bodies placed on a statutory basis and with defined parliamentary oversight.

As well as issuing RFCs and standards, the GDO needs to have a role in the oversight of open source software. Government needs new tooling and components[27]. Pushing regular working processes and outputs into tooling to automate them away is a super-power of the best of the big internet companies. A single open organisation that manages government standards and open source projects makes sense.

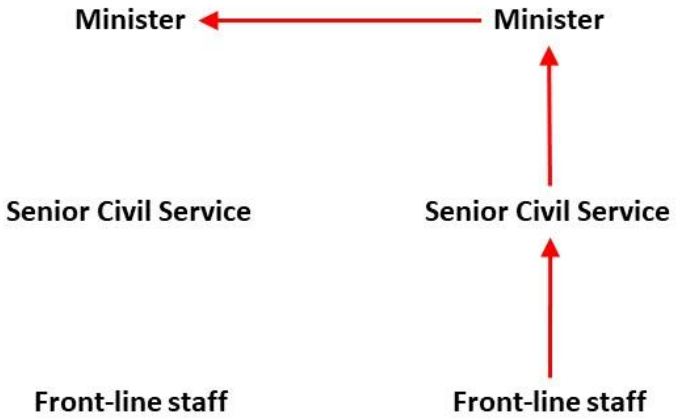
A critical element of this is closing the continuous improvement loop. Much is made of empowering and enabling people on the front line, the real experts. Genuine innovation rarely comes up a chain of command in the internet era. Organisations rightly have their delivery imperatives to focus on. Cross-cutting suggestions that require trading a negative short term impact against a super-positive long ones rarely survive going up against the flow

[26] See Working Paper 4 – ***The remixable state*** for the most obvious example, but other working papers contain 100 year recommendations too

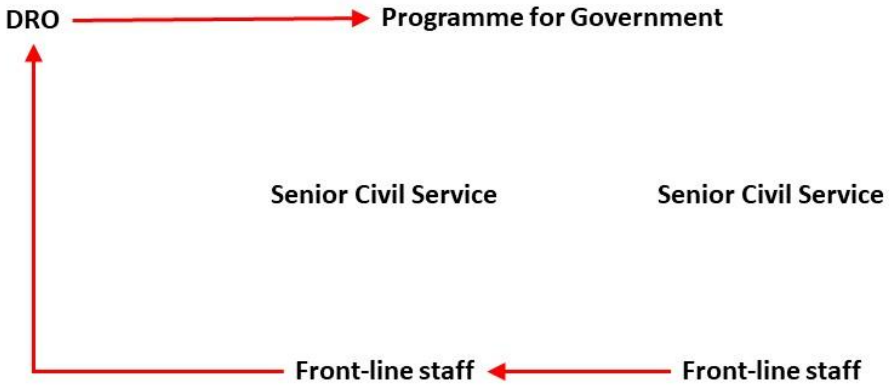
[27] See Working Paper 1 ***Data and the rule of law*** for an example – the replacement of CRUD ORMs with ones that support ledgers.

of delivery imperatives raining down. A parliament of standards, a St Kilda parliament, where the various technical specialists can raise and trash out cross-cutting ideas and express them as consensual standards is critical. And a 'parliament' that can enforce long-term behaviours – albeit with generous allowances of time to conform – is necessary. The parliament of standards needs to be backed by a genuine parliament that grants it enough muscle.

The current standardisation and innovation loop looks like this:



The future loop flows the other way round:



If we are to get serious long-term strategic technical work coming from practical experience and front-line work, we need this flow.

The DRO should co-opt external technical experts from anywhere in the world under its own recognisance. It needs a strong and defined charter with explicit measures to prevent corporate and vendor capture – an all too prevalent problem in the internet standards community. Anatole France once said *the law, in its majestic equality, forbids rich and poor alike to sleep under bridges, to beg in the streets, and to steal their bread*. A standards regime of majestic equality that lets all participate provided they live in Edinburgh and devote 5 self-funded working days a week to it will not cut it.

There are also clear points where the DRO and the Scottish Law Commission will not rhyme. The Commission is an non-departmental public body and its members are subject to a public appointments process, the DRO officials are civil servants in post. The Commission is mostly backwards looking, tidying up the garden of law. The DRO will initially be backward looking putting in place clarity and the necessary infrastructure to do genuine transformative things. Thereafter it will gradually switch into a more future facing orientation. It is expected that the

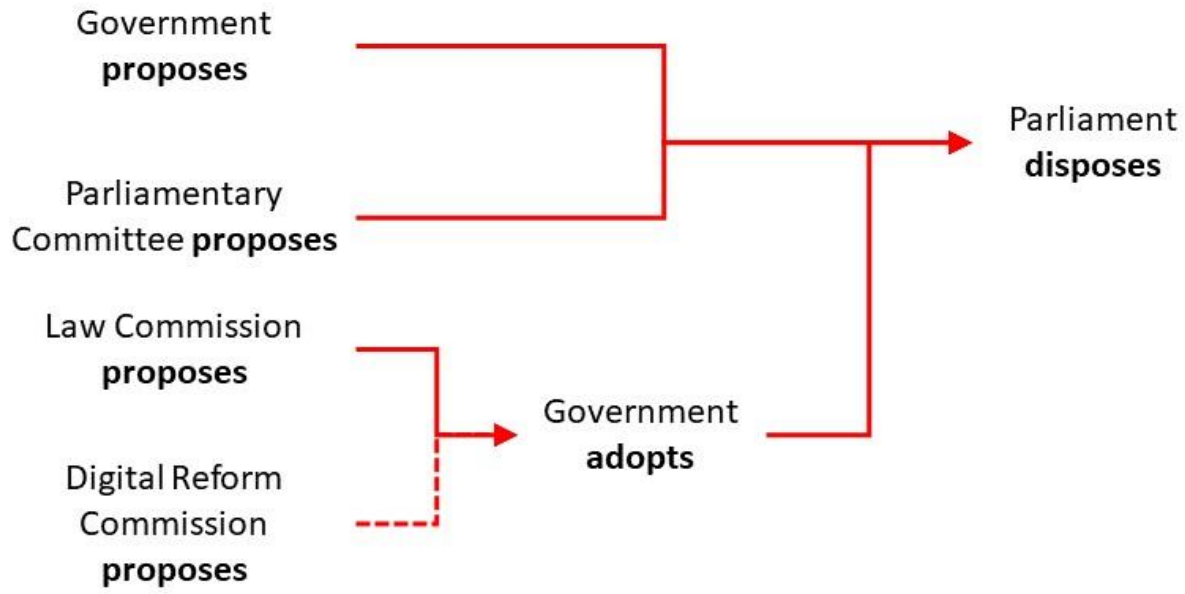
first phase will result in a higher proportion of changes to primary legislation than the latter which will tend to shift to secondary and tertiary legislation.

The Scottish Law Commission proposes programmes of work that tend to the ***vertical*** – an area of law at a time. The DRO proposals will tend to the ***horizontal*** – all use of address data, all APIs, etc.

The Scottish Law Commission stands at arm's length from the government – the DRO is much closer – one of its roles will be to work with bill teams and the programme for government team in shaping proposals pre-legislatively and helping shift the location of the centre of design (in the widest sense) from post-parliament to pre.

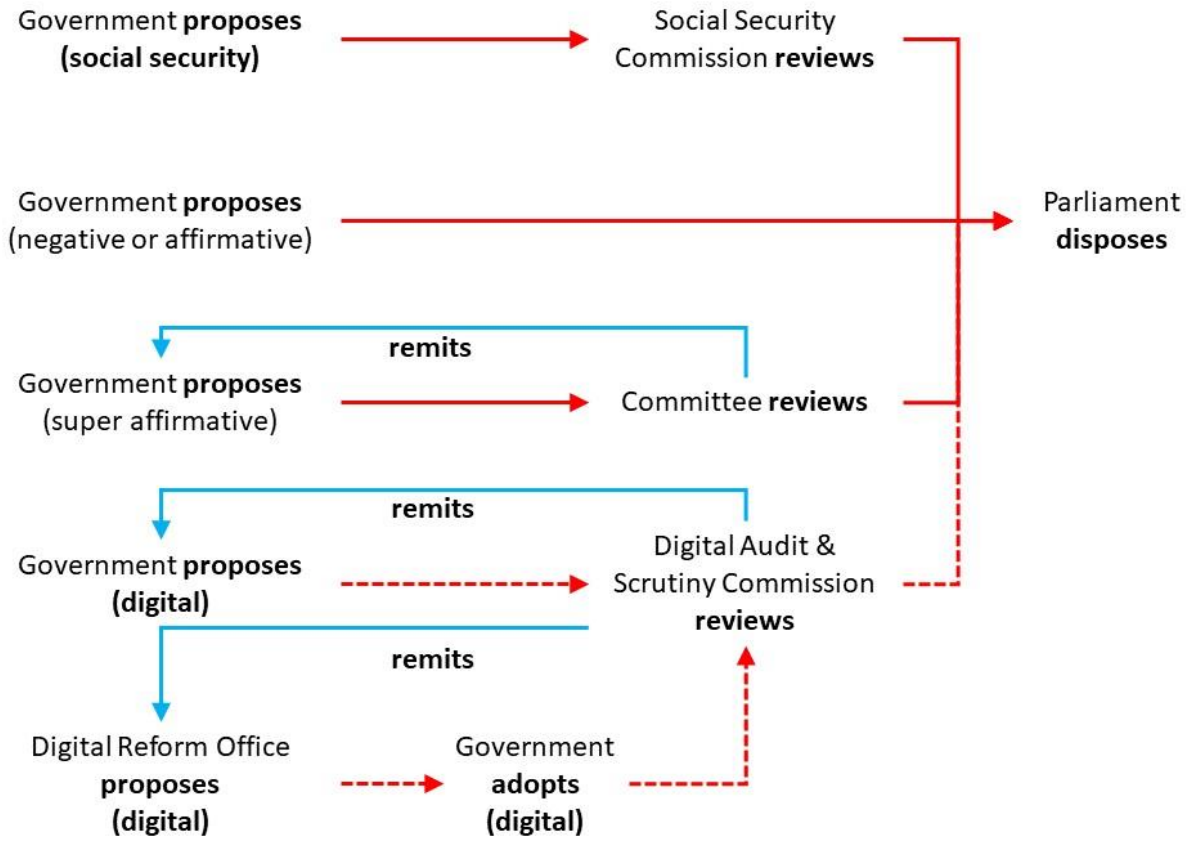
In addition, the remit of the Scottish Law Commission is very broad, covering all aspects of the law, whereas the remit of the Digital Reform Office is very narrow – concerned only with bills, or sections/clauses of bills, that touch on digital systems in state administration.

The new legislative routes for primary legislation (Bills into Acts) are shown here (dotted):



Budget Bills are reserved to the government to initiate. Until the format and shape of digital legislation is understood in greater detail it will not be possible to determine if this precedent should be applied to digital bills.

The secondary legislation (Ministerial Order) routes are:



It all seems clear. Set up the bodies, job done. Unfortunately, this is far from the case. The institutional work outlined in this paper is embedded in a wider programme of recommendations (33 at time of writing, but subject to extension, breaking out and consolidation as the research and review process comes to an end).

The territory is not the map, and these proposals are just a map. The work of actually exploring the territory and confirming (or not) that these proposals have the intended effect has to be done.

How to do that is the subject of the following sections.

10 On quality

Before laying out a roadmap it is perhaps time to take stock and consider quality. Artefacts (documents, reports, etc) do not have intrinsic quality – they get their quality from the process that produced them (who was consulted and how, how the conclusions were generated, how those conclusions were validated, etc, etc).

The BIus research followed a seagull process. A scope was defined – from manifesto and thinktank, through the programme for government, bills and bill packs, parliamentary process, design, testing, delivery and in-service. A wide range of participants have been interviewed and their interviews reviewed in context of the extant literature. The interviewee selection aimed to be a complete hand-to-hand cycle in Scotland and interesting people with things to say elsewhere. The range of skills and competencies involved means that no single person can be an expert in the complete end-to-end process.

In summary, fly in, eat your chips, shit everywhere and fly out again.

Seagull processes cannot produce outputs that are 'correct'. The implication being that they are 'wrong'. The question is in what kind and degree. Some of the recommendations of my work will simply be wrong. Some will be wrong by emphasis *we should do a, b and c* when it turns out *a is massive, b is middling and c is tiny-tiny*. Some will be wrong by interaction *when you do this to achieve this good thing, this bad thing also happens*.

If this seems very gung-ho to you, then you need to understand I am a software developer to trade. Thanks to Panko's ground-breaking work[28] we know how bad software developers are at writing software. In code reviews, co-workers will find a defect in about every 10 lines. Filming software developers writing code (as I did to myself during lockdown) shows that even with over 40 years' experience a software developer is incapable of writing more that 3 lines of code from a clean start with making an error that needs to be corrected.

The art of software development – of all the digital trades - is in the correction or errors, not their avoidance. Plan to fix. This is a map, with defects. The correct approach here is for practitioners to explore the territory and correct the map's errors.

[28] https://panko.com/ssr/index.html

11 Roadmap

So how to do that? - with an experimental process that systematically tests elements of these proposals, by:

- building shadow organisations inside the parliament and government
- choosing an uncontentious but appropriate sample bill from the programme for government
- using existing standing order powers to create an experimental legislative path confined to that chosen single bill.
- executing the experimental process
- rinse-repeat until there is consensus on a final state between the Minister for Parliament and the committee members

Having agreed a final state the shadow bodies can:

- instruct parliamentary counsel to prepare the final statutory form for the various components which the Committee can propose to parliament
- define the final state Standing Orders for the Corporate Body to adopt – this includes the standing committees that will need to supervise the Digital Audit & Scrutiny Commission and be on point for digital bills
- propose modifications to the 'proper form' for Bill Packs being introduced to parliament to the Corporate Body

The motto of the BIus project is *Explicité*, *Constitutionalité* and *Simplicité*. In the spirit of that the development of the new ways of working should be as conservative and non-disruptive as possible, using existing mechanisms and not introducing new ones.

The shadow work can be organised by using existing powers.

Shadow Digital Audit & Scrutiny Commission

The work here touches upon the work of the Public Audit committee as defined in Standing Order 6.7[29], and the Delegated Powers and Law Reform committee defined in Standing Order 6.11[30].

The parliamentary bureau should consider whether to establish a wholly new committee, a joint committee under Standing Order 6.14[31] or a joint subcommittee of one of the standing committees (Standards, Procedures and Public Appointments, Public Audit and Delegated Powers and Law Reform).

[29] https://www.parliament.scot/about/how-parliament-works/parliament-rules-and-guidance/standing-orders/chapter-6-committees#topOfNav
[30] *ibid*.
[31] *ibid*.

This new committee can then appoint advisors who are technical experts, social scientists, ethicists and legal experts under Standing Order 12.7[32]. It is then equipped to play the role of the Digital Audit & Scrutiny Commission.

Shadow Digital Reform Office

The civil service can identify staff members who have the skills and experience to be appointed to the roles of Government Digital Officer, Government Technical Officer and Government Design Officer and then assign them to the project – and use the existing provisions of the First Minister's Digital Fellowship[33] to co-opt external experts to an advisory board.

Experimental legislative path

Standing Order 17.1a[34] allows the Scottish Parliament to create a temporary amendment to standing orders based on a motion introduced by the Standards, Procedures & Public Appointments Committee - see for example Temporary Rule 5 Proxy Voting Pilot[35].

Rather than expand on the experimental legislative paths here – that work will be explored in a further discrete working paper – No 7 ***Experimental digital legislative processes***.

[32] https://www.parliament.scot/about/how-parliament-works/parliament-rules-and-guidance/standing-orders/chapter-12-committee-procedures#topOfNav
[33] https://digitalsupporthub.service.gov.scot/s/article/first-ministers-digital-fellowship-programme
[34] https://www.parliament.scot/about/how-parliament-works/parliament-rules-and-guidance/standing-orders/chapter-17-miscellaneous#topOfNav
[35] https://www.parliament.scot/about/how-parliament-works/parliament-rules-and-guidance/standing-orders/annexe-temporary-rules#topOfNav

12 In conclusion

This paper proposes a structured mechanism for changing the capabilities of the Scottish state in relation to digital. It takes a precedencial, prudential, iterative, consensual and constitutional approach to building out the institutional structures and processes required. The goal is long-term strategic institutional change. This mechanism will not work without a host of other activities not discussed here. They can be summarised as giving as much power and autonomy to the delivery and in-service engines as they require to do the job.

13 Appendix 1 – the Web 0.9 specification

13.1 Connection

The client makes a TCP-IP connection to the host using the domain name[36] or IP number , and the port number[37] given in the address.

If the port number is not specified, 80 is always assumed for HTTP.

The server accepts the connection.

Note: HTTP currently runs over TCP, but could run over any connection-oriented service. The interpretation of the protocol below in the case of a sequenced packet service (such as DECnet(TM) or ISO TP4) is that that the request should be one TPDU, but the response may be many.

13.2 Request

The client sends a document request consisting of a line of ASCII characters terminated by a CR LF (carriage return, line feed) pair. A well-behaved server will not require the carriage return character.

This request consists of the word "GET", a space, the document address[38], omitting the "http:, host and port parts when they are the coordinates just used to make the connection. (If a gateway is being used, then a full document address may be given specifying a different naming scheme).

The document address will consist of a single word (ie no spaces). If any further words are found on the request line, they MUST either be ignored, or else treated according to the full HTTP spec.

The search functionality of the protocol lies in the ability of the addressing syntax to describe a search on a named index[39].

A search should only be requested by a client when the index document itself has been described as an index using the ISINDEX tag[40].

[36] https://www.w3.org/Addressing/BNF.html#5
[37] https://www.w3.org/Addressing/BNF.html#7
[38] https://www.w3.org/Addressing/BNF.html#1
[39] https://www.w3.org/Addressing/Search.html
[40] https://www.w3.org/MarkUp/Tags.html#18

13.3 Response

The response to a simple GET request is a message in hypertext mark-up language (HTML[41]). This is a byte stream of ASCII characters.

Lines shall be delimited by an optional carriage return followed by a mandatory line feed character. The client should not assume that the carriage return will be present. Lines may be of any length. Well-behaved servers should retrict line length to 80 characters excluding the CR LF pair.

The format of the message is HTML - that is, a trimmed SGML document. Note that this format allows for menus and hit lists to be returned as hypertext. It also allows for plain ASCII text to be returned following the PLAINTEXT tag .

The message is terminated by the closing of the connection by the server.

Well-behaved clients will read the entire document as fast as possible. The client shall not wait for user action (output paging for example) before reading the whole of the document. The server may impose a timeout of the order of 15 seconds on inactivity.

Error responses are supplied in human readable text in HTML syntax. There is no way to distinguish an error response from a satisfactory response except for the content of the text.

13.4 Disconnection

The TCP-IP connection is broken by the server when the whole document has been transferred.

The client may abort the transfer by breaking the connection before this, in which case the server shall not record any error condition.

Requests are idempotent[42]. The server need not store any information about the request after disconnection.

[41] https://www.w3.org/MarkUp/
[42] https://www.w3.org/Protocols/HTTP.html#13