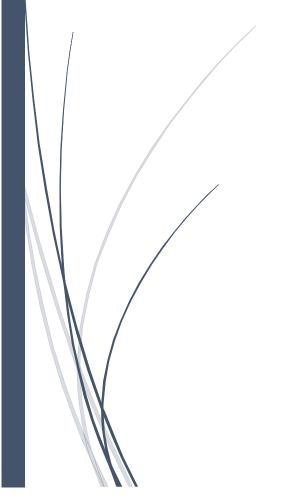06/06/2023

Jeff Bezos' API Mandate

but for Government (Version 1.0)

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BIUS WORKING PAPER NO 11
(THIS DOCUMENT DOES NOT REFLECT THE VIEWS OF SCOTTISH GOVERNMENT)

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1   Introduction

1.1   What is Jeff Bezos' API Mandate?

Back in 2002 Amazon changed direction. It has established itself as the biggest online shop – but it wanted more. The Bezos API Mandate – a direction handed down by Jeff Bezos – fundamentally altered how Amazon organised themselves internally – and put Amazon on the course to dominate digital tech.

Amazon provide the technology platform – Amazon Web Services – which is it not an exaggeration to say the world runs its tech on. Everyone, everywhere is moving services to the cloud – and AWS is, for most companies, the cloud.

This paper is not about making government a cloud provider – but it is about making a fundamental transition. Scotland can go from a digital also-ran to best-in-world, and this paper is part of that journey.

Being a first mover, like Amazon or Estonia is complicated-difficult. The future must be laboriously invented.

Second mover advantage is that the journey is only fiddly-difficult. Easier to do in the state sector as Scotland doesn't have to compete with Estonia in the way some new company would compete with Amazon.

We know that it can be done, that is one major hurdle knocked down. The challenge is to not be seduced by the facile. "In Silicon Valley they eat pizza and have ball pools at work, if we eat pizza and get ball pools…". The work, the successes, the grunt of the first mover must be studied in "crack their bones and suck the marrow" detail.

Bones having been cracked, marrow having been sucked, let us sketch out a second mover roadmap.

1.2   Who are you?

You are an MSP, Minister or Spad, a think-tanker or policy person, somebody in delivery trying to build out or drive joined-up government.

1.3   Why should you read this?

You should read this if the analysis of the problem in Working Paper X – *The heart of the beast* and the proposals to fix it in Working Paper 0 – *The locus of change* haven't convinced you – or if you are charged with implementing the new institutions and want better to understand how to do so.

2 The Blus Project

This is Working Paper No 9 of *Blus - 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 X – *The heart of the beast* (published)
Working Paper 0 – *The locus of change* (published)
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)
Working Paper 8 – *An Enabling Act* (published)
Working Paper 9 – *Reading legislation with a non-functional eye* (forthcoming)
Working Paper 10 – *Immediate Hygienic Measures* (published)
Working Paper 11 – *Jeff Bezos' Memo for Government* (this document)

Blus 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.

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

3   Jeff Bezos API mandate

3.1   What it was

It's the historian's coming nightmare, a document with world impact has been lost to history, like the Emperor Claudius's lost history of the Etruscans. Except this one is from 2002 - only 22 years old – in the modern, the most modern of all eras, written with the most modern tools. Jeff Bezos's API Mandate has joined the ranks of the immortals.

Perhaps a fragment shall be found in the stuffing of an embalmed crocodile, as part of the great and mostly lost poet Sappho's immortal legacy has come down to us? We can but hope.

Steve Yegge's recollection[2] of it goes like this:

1. All teams will henceforth expose their data and functionality through service interfaces.

2. Teams must communicate with each other through these interfaces.

3. There will be no other form of interprocess communication allowed: no direct linking, no direct reads of another team's data store, no shared-memory model, no back-doors whatsoever. The only communication allowed is via service interface calls over the network.

4. It doesn't matter what technology they use. HTTP, Corba, Pubsub, custom protocols — Bezos doesn't care.

5. All service interfaces, without exception, must be designed from the ground up to be externalizable. That is to say, the team must plan and design to be able to expose the interface to developers in the outside world. No exceptions.

6. Anyone who doesn't do this will be fired.

The first thing to note is that this document specifies a set of non-functional[3] requirements for Amazon systems – and in very few words - 129. It doesn't mention *what* they do, but only *how* they do it.

The second thing to note is that it grants different parts of the business autonomy on their internal technical matters – do what you like.

The third thing to note is that it enforces decoupling – different parts of the business only know of each other through the interfaces they publish and maintain.

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[2] https://gist.github.com/chitchcock/1281611
[3] Working Paper X – *The heart of the matter*

The fourth thing to note is the outward turn – every service might at some stage be exposed outside the company and must be designed to do that from the ground up – integration is not a specific feature that that some teams might *do*, it is a capability that all services *have*.

3.2   Why it matters

It matters because it represented a fundamental change in direction for Amazon. The company had built a dominant e-commerce franchise since its foundation in 1994 and had started breaking decisively out of its home market – books.

If you were simply doubling down on where the money came from you would make selling more stuff – the functional side of the business – the core focus. Instead the focus switches to capability – the capability to expose, to reuse, to integrate, to externalise, to decouple.

Some of this drove change on the functional side – more capability meant the ability to sell more stuff – and some transformed the functional side. Things that had previously just been day-to-day work, costs and not values, became products.

Amazon took databases and turned them into storing-data-as-a-service – and sold it at thick margins. And monitoring servers, and deploying software updates, and using queuing managers, and providing web servers and creating security zones, and managing users, and, and, and a whole bunch of services that only technical people know exist and are needed for web activities at scale.

One of the tropes of the age is that software eats things. Once you would have had an address book, and a paper calendar, and a phone, and a camera, and a record player, and a notebook, and a dictionary, and an A-to-Z, and a train timetable. And now you have a phone.

Amazon Web Services is software eating software and software eating companies that write and use software.

The mandate was issued in 2002 – and the services it enabled, Amazon Web Services (AWS) emerged 4 years later in 2006. Currently AWS generates all of Amazon's profits – every other service runs at a loss[4].

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[4] **Caveat Lector/Reader Beware**: Amazon is still aggressively expanding to individual products and product lines might be cohort-profitable with aggressive re-investment in growth and marketing bring a particular operating element into loss.

4   What would a Government Mandate look like?

4.1   Taking a stab

Lets have a pop at it.

1. The state shall design all services to be externalisable, self-describing and multi-client (with sandboxes and public test infrastructure) from the ground up, no exceptions.

2. Organs of the state that provide services to each other will do so over defined interfaces.

3. All state-written software will be open source and open available for download.

4. The state will publish appropriate registers that are machine readable and traversable and that state servants will be obliged to maintain, to wit:
    - a Register of Powers that are used to grant state servants the power to store and process digital data
    - a Register of Data Sharing Powers between different state organs cross-referenced to the Register of Powers
    - a Register of Services that the state provides and the URL space they cover. It will cross reference the Register of Powers

5. Registers will have the form provided for in statute[5].

6. All state administrative data will be written in ledgers[6] which will have the form provided for by statute.

7. Services will be accompanied by a change log in the form of a ledger that will provide a comprehensive history of when they changed and why – it will cross reference the register of powers.

8. Servants of the state will use the same login and identity system as citizens when using state systems.

9. The state will make all services available online to:
    - citizens directly
    - persons delegated to act on citizen's behalf
    - persons delegated by persons delegated to act on a citizen's behalf

10. All state technical standards will be discussed and adopted in public.

4.2   What are the consequences?

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[5] in an Interpretation Act – see Working Paper 5 – *Law Reform For Data* (forthcoming)
[6] see Working Paper 1.1 – *Data and the rule of law*

Now I claim in the introduction that this paper is meant to be readable by the generally interested citizen – and here I am chucking down technical stuff and expecting you to unroll the consequences, so lets rewrite this mandate in non-techie terms.

1. **The state shall design all services to be externalisable, self-describing and multi-client (with sandboxes and public test infrastructure) from the ground up, no exceptions.**

When you use a website the client (your browser) runs a load of code and makes calls to a service (the server) and then builds your user experience. There is two ways you can do that – messy and clean. In a messy implementation the developer goes "yah, my webfront end is the only client, Billy Bodger and down the pub". This mandate says "Uh, no. Design it to be multiclient".

In a multiclient world the Citizen's Advice Bureau can say "UC's front end is rubbish, 90% of our queries are about this aspect of Benefit X, lets write our own app" and then do.

If you pop developer tools in your browser you can look at the messages that whizz about between the web page and the back end. Some of them are totally cryptic, `{0, 1, "up", "down", "top", "quark"}`. The meaning and acceptable values of each of the data items will be described somewhere, in documentation, in a developer notebook.

Self-describing just means that that documentation is integrated with the service – so the social security servers emit data – and the documentation about what the data means. Its no good saying the CAB can write a GUI if you don't give them the documentation to do so. Ditto sandboxes and testing infrastructure – it is not in the state's interest for other people's GUI's on state services to have bugs.

Now the technical capability to write a GUI is non-functional – but whether for this system, at this moment in time, the state allows someone to write a GUI, or what category of organisations that the state so allows, well that is a different question – and not one the technical element of the state has a privileged opinion on.

2. **Organs of the state that provide services to each other will do so over defined interfaces.**

This is the no-cheating provision – if different parts of the state are allowed to dodge Mandate 1 then they will. This is called making you eat your own dogfood.

3. **All state-written software will be open source and open available for download.**

This just means that if Glasgow develops a bit of software to manage, I dunno, taxi licenses, then Perth can download and use it. It happens already a bit. UK.Gov open-sources software that Australia users.

4. **The state will publish appropriate registers that are machine readable and traversable and that state servants will be obliged to maintain, to wit:**
   - a Register of Powers that are used to grant state servants the power to store and process digital data

- a Register of Data Sharing Powers between different state organs cross-referenced to the Register of Powers
- a Register of Services that the state provides and the URL space they cover. It will cross reference the Register of Powers

One of Lord Bingham's eight principles of the rule of law[7] is:

The law must be accessible and so far as possible intelligible, clear and predictable.

State computer systems concretise, and make real, law and regulation – and at the moment the legal basis of them is obscure, smeared across many statutes and not available easily to citizens. This mandate doesn't fix problem, but is an important part of it. The ability of citizens to reason about the state in its totality is a key part of the rule of law.

For further discussion of this please see:
- Working Paper 1.1 – ***Data and the rule of law***
- Working Paper 5 – ***Law reform for data***

5. **Registers will have the form provided for by statute.**

Registers and ledgers are data formats with a long, long heritage. Ledgers took their form in the 11th century, and the oldest Scottish register dates from 1617.

Both formats are deeply entwinned with the rule of law. In the early days of computing when both memory and disk space was expensive they were considered a luxury and we moved away from them. Hitherto we have neglected to return to them – and we should. See the discussion in Working Paper 1.1 – ***Data and the rule of law***

Renormalising them would reduce costs and improve access to, and reduce the costs of, justice.

6. **All state administrative data will be written in ledgers which will have the form provided for by statute.**

See the discussion on the previous mandate.

7. **Services will be accompanied by a change log in the form of a ledger that will provide a comprehensive history of when they changed and why – it will cross reference the register of powers.**

Going back to Bingham and the rule of law is. Knowing exactly how decisions are taken now is only one side of the story, knowing how decisions were taken then is another. State systems (which embed legal decisions and processes inside themselves) are mutable and fast changing in a modern software development world. Citizens and their advocates must be able to reason about changes to software systems.

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[7] T Bingham, *The Rule Of Law*, Allen Lane, 2010

Again the change logs exist already, but inside the developers tools or private work books. The production of change logs can be built into deployment systems.

Automating processes and making them self-describing is a super-power of Silicon Valley behemoths and one that is cheaply and easily available to governments – with the appropriate investment in tooling – tooling which can be shared across all departments, all local governments and abroad as well.

8. **Servants of the state will use the same login and identity system as citizens when using state systems.**

The internet is a perfect example of the paradox of decentralisation. In order to have the enormous decentralisation and autonomy of the internet, yet retain its ability to connect wildly disparate communities and products, it is necessary to have centralisation – think IP address allocation, DNS names, website security certificates, etc. The key is to keep that centralisation to the minimum while enabling maximum decentralised autonomy.

This mandate rather opaquely defines one of those required centralisations. And it appears to the public not as the bland statement here, but in a flexible, refocussable state – which is far from obvious on a plain reading of it. See Working Paper 4 – *The remixable state* for more details.

9. **The state will make all services available online to:**
   - **citizens directly**
   - **persons delegated to act on citizen's behalf**
   - **persons delegated by persons delegate to act on a citizen's behalf**

This mandate is even less clear that the previous one, but flows from the same well spring. Please see the discussion in the previous mandate.

It is important to note that like in Mandate 1 it only mandates that systems have the capability to have delegated access. The terms on which access could, would or should be delegated is not a matter for the technical communities – it is a matter for operational departments, ministers or parliament as appropriate.

10. **All state technical standards will be discussed and adopted in public.**

The salience of technical standards has been slowly rising since the foundation of the International Telegraph Union in 1865 and the Universal Postal Union in 1874. These both once independent international organisations were absorbed into the UN in its early years.

The internet has made the modern world, the world of standards. Technical standards are one of a small set of organising principles that have remade the world by virtue of their core characteristic: co-ordination without communication.

The arrival of written law allowed the nascent state form of the late bronze age to expand from a township and the territory within walking distance of the lawgiver to a group of cities, a land a country, an empire. Co-ordinated law without continuous comms. Likewise the price mechanism which flows around economies enables co-ordination autonomously without communications.

Technical standards have these properties because while they are not law, they do rhyme with it.

The purpose of adopting a standards-first approach is to drive co-ordination without communication into state functions.

Traditional public sector reform approaches have tried to use co-ordination-by-communication – a strong central organisation, and iron hand that makes the scattered tribes squeal and conform.

The purpose of this mandate is to make it impossible to forge standards into a command and control, centralised cudgel. Standard setting bodies should be a parliament of standards.

Parliaments are devices for maximising agreement and ensuring losers consent among a community – they are only accidentally democratic if their community is the demos. They can be oligarchic, partriarchic, feudal.

A parliament of standards is not a democratic parliament (though it should certainly be under the supervision of one) but technocratic. The wider issues about a Parliament of standards are discussed in Working Paper 0 – *The locus of change*.

4.3   Why would it matter?

Fundamentally joined up government and data sharing are non-functional requirements. Government is all set up around functional requirements – it passes functional laws which are implemented in functional departments overseen by functional ministers. Without a counterbalancing force the state will production siloed functional systems.

Jeff Bezos enforced his mandate with his iron will – that is the way of private companies which are, to a degree, a tyranny, a tyranny of will certainly.

That is not the way of states, of democracies. To be implementable, to survive, to have public trust, a public sector mandate would need to be implemented in institutions, both of will and action and of oversight – the executive and the legislature.

The point of this document is to show the small size of the starting point. A good starting point, a sound starting point, can grow into a fine thing, but small it must start.

4.4 How would it fail?

The journey outlined in this document will fail in a number of ways.

The first way it will fail is if it lacks the equivalent of Bezos's No 6:

6. Anyone who doesn't do this will be fired.

And I don't mean that in the fatuous and frivolous sense captured by the plain text – the American method, an actual tyranny of a workplace unencumbered by labour laws and social norms, hiring and firing like drunken sailors.

But there must be consequences (political, organisational, reputational) for failing to follow the mandate.

The institutional structure of the state (departmental delivery) strongly steers towards siloed outcomes. The mandate needs enough teeth to hold against that steer. Departmental avoidance (we will do what is required for joined up government tomorrow, always tomorrow, because today, always today, there is a more immediate problem) is not a personal choice with this institutional structure. It is not a choice but a structural pressure, a systematic behaviour.

It will fail if it is turned into a fife-and-drums parade, big teams, big plans, big central control, if it inverts the plan – to enable decentralised autonomy, to eliminate communications by co-ordinating via standards, to build consensus and losers consent – and instead makes a procrustean bed, a regime of clubs and sticks, to compel adherence to centralised, top down, circumstance-ignoring fantasy and utopian implementation plan.

The gap between Jeff Bezos issuing the mandate and AWS being offered to customers was 4 years. A government mandate would be immediately transformative for the Scottish state – *on a hundred year timetable* – on an electoral cycle, not so much. Trying to ram this through for narrow political gain, without bringing the opposition and wider Scotland with you, would run the risk of the mandate being killed before it was able to flower.