

Interoperability as an instrument: what the EIF review has to change

Prepared for CNLL and the EuroStack Initiative Foundation e.V., and submitted as their joint response to the Commission's Call for Evidence

Stefane Fermigier, Abilian Econ Lab · 15 July 2026 · DRAFT WORKING PAPER

This note was prepared by the Abilian Econ Lab for CNLL and the EuroStack Initiative Foundation e.V., and published as their joint response to the European Commission's Call for Evidence on the review of the European Interoperability Framework (Ref. Ares(2026)6130856), submitted on 15 July 2026. The submitted text is frozen as filed; this version carries the Econ Lab's own branding and may be revised as the file develops.

0.1 About this note

The two organisations it was written for supply the constituency the argument speaks from. CNLL represents around 300 French open-source companies, software vendors and systems integrators for whom open source is the business itself, together part of a French open-source market worth some EUR 6 billion annually. These are the suppliers an interoperability policy creates work for, or does not. The EuroStack Initiative Foundation e.V. is the industry-led initiative for European digital sovereignty.

Both treat interoperability as fundamental for what it does to switching costs. By lowering them, a mandate lets the public buyers who fall under the EIF un-bundle their estates and move to European providers piece by piece, where switching an estate whole is infeasible, releasing a demand for European supply that lock-in now suppresses. Because this market has strong network and fashion effects, each such move lowers the cost and raises the appeal of the next, so a mandate can tip demand toward European supply over time. What the review is asked for follows from that: the EIF has to stop being a statement of principles and become an instrument with breadth and teeth, serving digital sovereignty, resilience and industrial policy.

Section 1 answers the Commission's five questions and section 2 maps the recommendations onto the current EIF text. Sections 3 to 8 give the reasoning, and Annex A states the two formal results the argument relies on, with enough precision to check them.

Summary of position

The Call for Evidence describes interoperability as “a strategic enabler of Europe's digital sovereignty, competitiveness and innovation capacity.” We agree, and we take that sentence as the organising principle of what follows. Interoperability buys the goals: reversibility, composability, supplier independence, reuse, better public services, resilience. It is also the highest-leverage instrument Europe currently has, and the one it has under-used while spending on the two lower-leverage ones.

The EIF has no shortage of principles. It cannot tell a supplier who delivers interoperability from one who declares it. Both face the same commercial payoff, so the market supplies the cheaper of the two. Twenty years of principle have produced openwashing, apparent compliance, and a European public sector that can pass an interoperability test at every layer while being unable to move a single workload.

So the review's task is to change what the EIF is. It should become a lever of digital sovereignty and resilience, an instrument of industrial policy, wider in scope, and backed by teeth: verification a buyer can use and consequences a supplier will feel. The recommendations below are the machinery for that.

#	Recommendation	Q	Carried by
R1	Restore the EIFv1 (2004) open-standard definition: formalised, implementation-independent, freely implementable, royalty-free . Apply it to the specifications the EIF recommends and to the “Interoperable Europe solution” label; route the horizontal FRAND question to the standardisation file.	1, 5	EIF text + Reg. 1025/2012
R2	Adopt practitioner vocabulary: open formats, open APIs, open protocols , each carrying the R1 test.	1, 5	EIF text
R3	Enforceable interoperability: interoperability defined as a measurable outcome, with free conformance test suites, reference implementations, plugfests, and a recourse route through procurement.	3, 5	EIF + IE Board
R4	An interoperability barrier register : a public channel to log any gap between a published specification and a shipped implementation; the named supplier is invited to respond and non-response is published.	2, 3	IE Portal
R5	Specification-first procurement: model ICT clauses operationalising Article 42(4) of Directive 2014/24/EU at the level of named open interfaces.	3, 4	EIF annex + procurement directives
R6	Exit-cost disclosure on public ICT procurement: a model template in the EIF; the mandatory version routed to the next procurement review. Interface ownership, egress, tested restoration, estimated cost of leaving.	3, 5	EIF annex + procurement review
R7	Extend the target list to the systemic anchors: identity, key and secret management, orchestration, observability, event and workflow interfaces, managed data stores.	4, 5	EIF + sectoral
R8	Path-level assessment: disclose the controller set behind each shortlisted option across the stack, in place of per-layer supplier counts.	4, 5	IEA assessments
R9	Ration the requirements: a lean outcome-based regime with free test suites, in place of a several-hundred-item referential with a paid audit. Publish the SME compliance cost of any conformance instrument before adopting it.	2, 5	EIF governance
R10	Structured participation of European open-source SMEs and communities in the Board's EIF work and in the “Interoperable Europe solution” label criteria.	5	IEA governance

1. The five questions, answered

Q1. What elements of the previous EIF versions should be kept or strengthened?

Keep the four-layer model with governance across it, and the principles of openness, reusability and technological neutrality, the last strengthened to cover browsers, operating systems and devices. Above all, **restore the EIFv1 (2004) royalty-free definition of an open standard**, applied to the specifications the EIF recommends and to the “Interoperable Europe solution” label, with the horizontal FRAND question routed to the standardisation file (R1); and adopt the practitioner terms open formats, open APIs and open protocols, each carrying that test (R2). Section 4 develops this.

Q2. What are the main barriers to implementing the EIF?

The barriers others name are real: the incentive paradox (collective benefits, individual costs), skills and local capacity, legacy estates without APIs, fragmented sectoral law, procurement historically indifferent to interoperability, vendor concentration at municipal level. The barrier none of them names is that **the framework cannot tell conformance from its imitation**, so even a willing administration cannot buy interoperability. A second-order barrier follows: the EIF’s own catalogues and labels author the shortlist, and unconsidered options starve. Section 5 develops this.

Q3. What additional guidance would facilitate more systematic uptake?

The EIF should add the machinery that lets a buyer verify a claim: free conformance test suites, reference implementations and plugfests (R3); a public interoperability barrier register that publishes supplier non-response (R4); model ICT procurement clauses that operationalise Article 42(4) at the level of named open interfaces (R5); and a standardised exit-cost disclosure template (R6). Sections 6 and 8 develop these.

Q4. How can the future EIF support the next steps in the digital transformation of public administrations?

The future EIF should name the systemic anchors where lock-in actually lives and where no EU instrument currently reaches: identity, key management, orchestration, observability, event and workflow interfaces, managed data stores (R7). It should measure un-bundling rather than switching, so the policy is not scored as a failure while it is working. It should recognise that open interfaces create the European supply base, which makes the EIF the cheapest industrial policy available. And it should position itself as **screening infrastructure for the Commission’s own sovereignty instruments**, which need it in order to be verifiable at all. Sections 3, 6 and 7 develop these.

Q5. What changes or improvements would you propose for the future EIF?

We propose recommendations R1 to R10, under two design disciplines: **ration the requirements**, because verification costs compound and bulky referentials grade suppliers on size (R9); and **fix the assessment unit**, because per-layer certification does not compose into system-level independence, as the Commission’s own buyer demonstrates (R8). Section 8 and Annex A develop these.

2. Recommendations mapped to EIF 2017

The framework under review is EIF 2017 (COM(2017) 134, Annex 2): twelve principles and forty-seven recommendations. Our ten recommendations are amendments to that text, and this crosswalk gives the drafter the specific points to change.

Ours	EIF 2017 point to amend	Change
R1, R2	Principle 2 (Openness); Rec. 4 (prefer open specifications “considering market support”)	Restore the royalty-free bar; drop “market support” as the opening through which FRAND

Ours	EIF 2017 point to amend	Change
		entered; exclude FRAND-encumbered specifications from “open” for EIF-recommended specifications and the “Interoperable Europe solution” label.
R3, R4	Rec. 21 (select standards, monitor compliance, and test)	Supply the missing machinery: free conformance test suites, reference implementations, plugfests, and a public barrier register that publishes supplier non-response.
R5	Rec. 4 and Rec. 8 (avoid disproportionate technology-specific solutions)	Annex model ICT procurement clauses operationalising Article 42(4) of Directive 2014/24/EU at the level of named open interfaces.
R6	Rec. 9 (data portability); Principle 5 (technological neutrality and data portability)	Add a standardised exit-cost disclosure template: interface ownership, egress, tested restoration, estimated cost of leaving.
R7	Rec. 33 (open specifications for technical interoperability); Rec. 35 (interconnect “loosely coupled service components”)	Name the systemic anchors (identity, key and secret management, orchestration, observability, event and workflow interfaces, managed data stores) and require an open interface at each. The risk sits in interface ownership, and the “loosely coupled” framing of Rec. 35 misses it.
R8	Rec. 19 (evaluate interoperability solutions); Recs. 25-26 (interoperability agreements across layers)	Assess the path: disclose the controller set behind each shortlisted option across the stack, in place of a per-layer supplier count.
R9	Rec. 8 (proportionality); Rec. 19	Ration the requirements, and publish the SME compliance cost of any conformance instrument before adopting it.
R10	Rec. 24 (participate in standardisation); Rec. 20 (holistic governance)	Give European open-source SMEs and communities a structured role in EIF work and in the “Interoperable Europe solution” label criteria.
(with FSFE)	Rec. 3 (open source: “fair consideration”, total cost of ownership)	Make open source the default for publicly funded interoperability solutions, and price exit cost into the total cost of ownership.

3. Interoperability is an enabler, and it is the leverage point

A framework that treats interoperability as a virtue to be promoted will produce exhortation. One that treats it as an intermediate good will ask what the good buys, and can then say whether it was delivered. Naming that chain in the EIF itself turns the framework from an administrative-efficiency instrument into a strategic one.

Reversibility. Three things are routinely conflated and should be separated in the text. Portability moves data. Interoperability lets two systems work together concurrently. **Reversibility re-establishes the workload and its operations somewhere else.** A public body actually needs the third when a supplier raises its price, changes its licence terms, is acquired, or falls under an export restriction. The third is also the one that goes untested. An exit plan that has never been executed is a decayed option.

Composability, and the un-bundling of the estate. Interoperability lets a buyer assemble a system from parts, and stop placing the whole estate with one provider.

Supplier independence, priced. In switching-cost economics an incumbent extracts rents up to the customer's cost of leaving. The exit cost is the vendor's pricing-power ceiling, so lowering it transfers that rent back to the buyer. This is how interoperability shows up in a budget line. European business spending on cloud and software services runs to some €400 billion a year, roughly 80% of it flowing to US vendors; prices on that base have risen 8.7% annually over the last three years, and the inflation alone is estimated to drain €93 billion a year from the continent (Asterès for Cigref, 2026). That drain is the rent an interoperability policy is bidding for.

Reuse, better services, resilience. These are the citizen-facing payoffs: once-only, no re-keying, no media breaks, and a second source that has actually been tested. A second source on a slide is not a second source.

Aggregated, these are an **option set**, priced by three things: its *breadth* (how many alternatives exist under genuinely independent control), its *exit cost* (what re-choosing would cost today), and its *half-life* (how fast it erodes). Interoperability is the one instrument acting on all three at once.

Why this is a leverage point

Rank the levers by where they act on the system. Their cost is a separate and smaller question.

Subsidy acts on a price, and it saturates: past a point more money stops moving the market, because the customers still on the other side are there for reasons a discount does not reach. A subsidy without a standard beneath it leaves the lock-in in place: it can change who gets paid while the buyer still cannot leave.

Capacity acts on a stock: datacentres, chips, a European hyperscaler. This is necessary at the layers where no options exist at all, and insufficient everywhere else. A sovereign region running proprietary APIs leaves the exit cost exactly where it was. Geographic sovereignty is not architectural sovereignty, and the workload still cannot leave.

Interoperability acts on the rules of the system: on what a supplier must do to be eligible, on what a buyer is able to compare, on how strongly each adoption pulls in the next. That is structurally deeper than either of the above, and the modelling behind this submission puts ordinal weight on it. Across 800 draws of a measured dependency graph of the European digital stack scored on stylised intensity bands, an open-substrate mandate ranks first among all four demand-side levers in every single draw, ahead of procurement re-routing, ahead of egress and portability rules, ahead of distribution interoperability. And in the same model, re-homing the ownership of every US-controlled category in the stack, leaving the dependency structure untouched, still leaves Europe *more* exposed than the demand-side bundle achieves without transferring a single share. **An ownership transfer at continental scale buys less than getting the interfaces right.**

Nor does any of this require the Commission to bet on a geopolitical scenario. An open, substitutable interface lowers rents while nothing happens and lowers the loss when something does. In the same model, an ex-ante open-substrate mandate cuts the loss under every denial scenario, from every bloc, in every draw. Half the material scenarios are not American at all, running instead through Japanese materials, Korean memory, Taiwanese fabrication and Chinese raw-material processing. Options pay in both states of the world.

One bound: interoperability *enables* sovereignty and is not sovereignty. It buys reversibility, contestability and an option set. It does not answer who controls the option that was chosen. Section 7 returns to this.

4. What to keep, and what to restore

Keep the four-layer model (legal, organisational, semantic, technical) with governance cutting across it. It is sound and every serious respondent to this consultation says so. Keep the openness, reusability and technological-neutrality principles. Strengthen technological neutrality specifically: public services should work across all common browsers, operating systems and devices, and administrations should not be locked to one platform.

Restore the definition of an open standard. The Commission asks what should be kept from *previous versions* of the EIF. The best thing in any of them is in the first one, and it was taken out.

EIFv1 (2004) defined an open standard as a formalised, independent technical specification that any player may access and implement freely, without legal, operational or financial restriction. It required holders of standard-essential patents to license them **royalty-free** for the standard to count as open. EIFv1 also carried procurement preferences for open-source software. The EU's ICT procurement budget at the time was worth roughly \$50 billion a year, so these provisions had teeth.

EIFv2 (2010) renamed open standards as “open specifications” and admitted FRAND licensing:

“If the openness principle is applied in full [...] [i]ntellectual property rights related to the specification are licensed on FRAND terms or on a royalty-free basis in a way that allows implementation in both proprietary and open source software.” (European Commission, EIF 2.0, 2010, p. 26)

The procurement preferences went at the same time.

The reversal was lobbied, and the record is now documented

The most recent scholarly treatment (von Ingersleben-Seip, 2025), based on ten interviews with open-source policy experts, several of them directly involved in the drafting, and on the annotated EIFv2 drafts, finds that proprietary incumbents did two things. In public they spread doubt about the maturity, cost and safety of open source. In private they shaped the text. A side-by-side analysis by FSFE researchers (Gerloff and Roy, 2009) compares the July 2008 consultation draft, the comments submitted by the Business Software Alliance, a leaked November 2009 draft and a leaked March 2010 draft. The Commission adopted many of BSA's suggestions in the November 2009 draft, notably on the procurement preferences, on competition among standards, and on the definition of open standards itself. BSA and the Association for Competitive Technology commented on the July 2008 draft *before* it was released for public consultation. A document later published on WikiLeaks records lobbyists with ties to Microsoft joining the Commission's own expert group on open source in 2008 and working to alter its software strategy report. Microsoft alone spent some €10 million lobbying the Commission across 2009 and 2010.

The asymmetry in who reaches the Commission has not gone away. On the Commission's own meeting disclosures, Google, Microsoft and Amazon have held 465, 288 and 218 high-level meetings respectively, against 44 for OVHcloud, the largest European pure-play, and 14 for the European cloud-provider association. We draw no inference about anyone's motives from those counts. We draw one about process: the drafting of this review should publish the traceability from each comment to each change of text, and the Interoperable Europe Community should have a formal role in it. That is why R10 is not a courtesy.

Why royalty-free is a structural requirement

The 2010 text places FRAND and royalty-free side by side (“licensed on FRAND terms **or** on a royalty-free basis”), and claims that this allows “implementation in both proprietary and open source software.” The royalty-free branch does allow it. The FRAND branch does not, and admitting FRAND into the definition

of “open” does the damage. The objection is usually stated imprecisely, as a complaint about copyleft, and then dismissed on that ground.

A FRAND-encumbered specification **can** be implemented in open source. The code can be written, licensed and published. A royalty-bearing FRAND commitment cannot travel with the code. A patent licence runs to the implementer who negotiates it; it does not pass automatically to every downstream redistributor and user the way a copyright licence does, and royalty-bearing terms presuppose a countable, billable licensee, which a freely redistributable codebase does not supply. So the code exists, and each party who deploys it must clear the patent again on its own account. That defeats the frictionless reuse open source exists to enable, and it does so under **every** open-source licence.

Copyleft is merely the case where the failure surfaces at once, since GPLv2 §7 and GPLv3 §§11–12 forbid conveying under terms that withhold from recipients the freedoms the licence grants, so the distribution stops there. A permissive licence lets the code ship and passes the same patent exposure silently downstream to the user, who meets it on deployment. The permissive case is the worse of the two, because the exposure stays invisible until it is expensive. (Royalty-free FRAND commitments do travel, and are compatible with open source; the defect is specific to royalty-bearing terms, which “FRAND” is invoked to permit.)

A royalty-bearing “open” standard is therefore an interoperability policy that removes from the market the entire class of suppliers that interoperability exists to create. Section 7 shows, with measurements, that Europe’s independently controlled options actually live in this class.

The 2010 counter-argument, answered

The FRAND allowance was defended at the time on the grounds that a royalty-free rule would force European governments to rip out GSM, WiFi, Bluetooth and DVD (ACT, submission on the second EIF). The category error inside it has governed European interoperability policy for the sixteen years since.

The EIF governs interoperability specifications for digital public services: document and data formats, APIs, protocols at the software layer. It does not govern cellular air interfaces or consumer-electronics codecs, and no version of it ever did. In the layer the EIF actually addresses, royalty-free is the norm, and has been for decades: TCP/IP, HTTP, DNS, HTML, OpenDocument. The W3C adopted a royalty-free patent policy in 2003 for exactly the reason argued here. Restoring the EIFv1 rule, scoped to the specifications the EIF governs, obliges Europe to rip out nothing.

One caveat on scope, so the ask is deliverable. The general openness criteria for ICT technical specifications are set in Annex II of Regulation (EU) No 1025/2012, which permits (F)RAND licensing, and an EIF Communication cannot override a Regulation owned by another service. We are not asking it to. The EIF can and should apply a royalty-free bar to three things within the Commission’s own gift: the specifications the EIF itself recommends, the model clauses it annexes, and the criteria for the “Interoperable Europe solution” designation. The horizontal question, whether Annex II of 1025/2012 should still enshrine FRAND, belongs to the standardisation file, and we ask the Commission to open it there. R1 refers to the scoped version.

5. Why twenty years of principles have not produced interoperability

The other respondents to this consultation name real barriers, and we endorse them. Interoperability is a net cost in the first period and a benefit in the third. Its benefits are collective while its costs fall on the individual municipality or region, so the private incentive to invest is weak. Skills, funding and

local capacity are thin. Legacy estates lack modern APIs. Sectoral law (EHDS, the AI Act, the Data Act, NIS2) is hard to navigate and its ownership is unclear. Procurement has historically bought function while leaving interoperability aside. At municipal level one or two vendors serve each local process, so unless interoperability is embedded in national procurement policy it stays a nice-to-have.

All of that is true, and none of it is the deepest problem, which is this: **the framework cannot tell conformance from its imitation.**

The EIF is voluntary, unverified and without consequence. A supplier who implements a specification fully and one who implements it partially face the same commercial outcome. The gap between a published specification and a shipped implementation arises from ordinary bugs and from strategy, and the framework can distinguish neither and compel neither to be fixed. The pathology carries three names in three communities and is one thing: **openwashing** (FSFE's term in this consultation), **apparent compliance** through strategically partial implementations (Fermigier 2024), and, in the cloud debate, **sovereignty washing**. Its oldest documented instance is the AARD code shipped in a beta of Windows 3.1, which detected DR-DOS and produced a cryptic error.

A requirement screens only if it is both costlier to fake than to satisfy and verifiable. The EIF's recommendations are neither, and a requirement that cannot be verified is faked in every mechanism, at any price, under any audit budget. The consequence is the one that matters here: **even a willing administration cannot buy interoperability, because it cannot tell which bid contains it.** This is why the gap between guidance and implementation does not close when more guidance is added. The Commission's diagnosis of "a disconnect between high-level guidance and actual implementation" is right about the symptom and silent about the cause.

A second-order barrier is one this consultation is well placed to fix. The EIF's annexes and catalogues, the Interoperable Europe Portal and the "Interoperable Europe solution" label are shortlist-authorship instruments. An option absent from the shortlist is feasible and unconsidered, and options are maintained by being exercised: a supplier that wins no revenue exits, a fork that attracts no maintainers rots, a skill no employer hires for stops being taught. Nothing has to be denied. The unconsidered option starves, and whoever writes the shortlist therefore controls, with a lag, what remains feasible. R10 follows, and so does our support for FSFE's parallel call for transparent processes and civil-society participation in the label.

6. What interoperability must reach

The EIF's implicit model of lock-in is wrong, in a way that causes the framework to aim at the least important part of the problem.

The exit cost has two terms, and a regulator has found them independently

The cost of leaving a supplier decomposes into **data transport** (egress charges, data gravity, the time and money of physically moving state) and **logical lock-in** (a proprietary interface, plus the absence of migration tooling). The UK Competition and Markets Authority reached the same decomposition from the evidence in its 2025 cloud market investigation: a commercial barrier, egress fees, worst for customers with large stored data; and technical barriers, which "stem from the differentiation of features and interfaces."

Data portability reaches a minority of that cost, and least of it where the problem is worst. Scoring 35 services in one hyperscaler's catalogue (Amazon Web Services, taken as the best-documented instance of the general pattern) on both terms, the data-transport component is **on average 20% of the measured**

exit cost. It exceeds 30% for exactly ten of the thirty-five, and all ten are data movers sitting behind *portable* interfaces: managed relational databases, object storage, virtual machines, block storage, data warehousing, managed search, managed message streaming. It falls **below** 30% on exactly the deeply locked services that carry the policy problem. Where the interface is proprietary and tooling absent, the exit cost is floored near 0.70 on a 0-to-1 scale however cheap data transfer becomes. Annex A states this in full.

You cannot buy your way out of logical lock-in by subsidising data transport.

The Data Act's ban on switching charges (Regulation (EU) 2023/2854, Article 29, applicable 12 January 2027) is right, necessary, and bounded by this arithmetic. The three hyperscalers eliminated switching-egress fees in 2024, in its shadow, before it bound, and the CMA still measures **fewer than 1% of cloud customers switching provider in a year**. Policy has largely pulled the egress lever and left the interface lever untouched. Under 1% a year is not a contestable market. A working one would move workloads an order of magnitude faster, on the order of 10% a year, and open interfaces are the largest remaining lever for getting there, if not the only one.

Interface ownership locks a buyer in

High coupling, low exit cost: Kubernetes, Redis, object storage behind the S3 API. Wired deep into application code, and cheap to leave, because the interface is open or open in practice and several engines implement it.

Low coupling, high exit cost: identity and access management, key management. No application code imports them. They are among the hardest things in an estate to leave, and their lock-in sits at the organisational, compliance and deployment layers, where the current EIF has nothing to say.

An interoperability policy built around loose coupling and portable data targets coupling, when the variable that sets exit cost is interface ownership.

So name the systemic anchors (R7). The EIF, and every instrument downstream of it, is silent on exactly the layers where the exit cost is floored: **identity and access management; key and secret management; orchestration and infrastructure-as-code; observability and logging; event buses and workflow engines; managed data stores**. Name them, and require open, freely implementable interfaces at each. A serious interoperability framework for the cloud era contains that.

Measure the right thing, or score a working policy as a failure

The payoff of interoperability is **un-bundling the stack**, which is the feasible first step toward switching providers. A public body will not abandon a foreign productivity suite next year, kept there by user habit. Its AI models are the opposite: with new models arriving constantly and a de facto standard API, buyers already swap one for another from the same tools. Interoperability lets a buyer stop putting the *whole* estate on one provider, and reclaim the commodity and data spend sitting underneath the differentiated core. In a stylised model of the European cloud market this is worth on the order of ten points of European needs-share without winning a single differentiated workload, a directional result that holds on about six market configurations in seven and whose magnitude the model does not identify.

Provider-switching rates are the wrong yardstick: un-bundling shows up first, and full switches follow only as it accumulates, so the rates will show the EIF failing while it is working. Track un-bundling directly instead: multi-provider estates, interface conformance, tested restoration.

7. Interoperability is supply policy

Open interfaces cause European suppliers to exist

Across the layers of the European digital stack, a domestic alternative genuinely independent of foreign control exists at a layer essentially only where the substrate is forkable, or where Europe owns the moat (lithography being the standing example, ASML and Zeiss). Counting layers, the ratio of no-escape to escape is **18:4** across proprietary-interface layers and **0:3** across forkable ones, with mixed substrates between at 1:10. Service by service the same regularity appears: where the interface is an open or de facto open standard (the S3 API, Redis, OCI containers, Kubernetes), the column of European alternatives is crowded. Where the decisive layer is a proprietary control plane (identity, key management, the deployment engine), the open-source column begins with “none direct” and the European column offers federation at best.

The alternatives landscape is the option set, and the interface decides whether it is populated.

This answers the Commission’s question about strategic dependencies. Interoperability policy is supply policy, and it is the cheapest industrial policy Europe has, because it creates suppliers by removing the barrier to their existence, without paying for them.

Two out-of-sample tests make the point. Oracle acquired MySQL along with Sun in 2010; the GPL let the community fork to MariaDB, and the fork displaced the original as the default in the major Linux distributions. **Capturing the firm did not capture the commons.** And when Huawei was placed on the US entity list in 2019, the open Android core was carried forward essentially immediately, while replacing the proprietary services layer took a state-scale, multi-year effort. The same shock hit two components and produced two outcomes.

Open standards and open source are not substitutes

An open standard is an interface specification. Open source is an implementation. Mandating a specific open-source **project** in place of a **standard** re-creates lock-in in a new costume.

The governance trap. Kubernetes is open source and is governed by a foundation registered in the United States, subject to US export-control and sanctions jurisdiction. Standardising Europe’s execution layer on the project relocates the dependency without removing it. Standardise on the interface.

The complexity trap. A specification too complex to reimplement is a barrier to entry with an open licence attached. Sovereignty at the interface rests on protocol-level simplicity, because only a simple, commoditised standard lets a European vendor or a community ship a compliant engine that can actually be swapped in.

Both traps are design rules, and both are the constructive form of FSFE’s warning about openwashing.

Interoperability makes the Commission’s other instruments verifiable

Portability is not sovereignty. Exit instruments insure against harms that announce themselves: a price rise, a withdrawal, a licence cutoff, an acquisition. They do nothing about harms that stay silent, such as compelled disclosure or a compromised update stream. Exit where you can see; screen where you cannot. The EIF must not be used to retire the ownership-and-control question, and the argument “we have mandated portability, therefore ownership screening is unnecessary” should be rejected wherever it appears.

Interoperability makes those instruments verifiable. A supplier misrepresents its independence in order to capture a rent. Where an exit-and-portability mandate destroys the lock-in rents, it shrinks that

prize, which lowers the verification accuracy any sovereignty tier (the Cloud Sovereignty Framework's SEAL levels, the assurance levels of the Cloud and AI Development Act) must reach before it can screen at all. Provided those rents are a material share of what winning a sovereignty tender is worth, which the CMA's evidence supports in cloud, there is a band of verification accuracies in which the ownership screen is infeasible **without** the exit mandate and feasible **with** it. In that band the two instruments are strict complements, and neither works alone.

An EIF with teeth is screening infrastructure for the Commission's own sovereignty policy.

EuroStack

EuroStack's programme, buy, sell and fund European, puts money and demand behind European supply. Interoperability makes that money work: it removes the barrier to those suppliers existing at all, and it lowers the switching cost that keeps buyers from reaching them, so demand can move to European providers piece by piece and network and fashion effects carry the shift. The EuroStack's industrial ambition is worth exactly what the interface layer beneath it is worth, and that layer is interoperability.

8. Make it bind, without breaking the suppliers

The EIF is a non-binding Communication addressed to administrations, and it reaches suppliers only through the binding instruments around it. It cannot by itself create a duty on a vendor, run a compliance clock, or levy a penalty. So we ask it to do what is within its gift, and we route the asks that need a binding instrument to the instruments that can carry them: the procurement directives, the Interoperable Europe Act's interoperability assessments, and sectoral law. The "Carried by" column in the summary table names the route for each.

Enforceable interoperability (R3, R4)

Enforceable interoperability rests on four pillars, and they converge with what other respondents to this consultation have asked for.

1. **Define the outcome; leave the technique open.** "A customer can export its data in an open format that a third-party tool can read" is verifiable. "Shall promote openness" is not.
2. **Verify.** Freely usable conformance test suites, reference implementations, plugfests and interoperability events. This is the machinery of every standards community that has ever worked, from IETF to W3C to OASIS. The EIF has none of it.
3. **Provide recourse.** The barrier register (R4) is the intake channel: a public place, hosted on the Interoperable Europe Portal, where a buyer or an SME can log the gap between a specification and a shipped implementation. The Communication cannot compel a vendor to answer. It can do the thing that does most of the work anyway: invite the named supplier to respond and **publish the non-response**. Where a genuine duty and a penalty are wanted, for conformance tied to a public contract, they attach through the procurement route, and the EIF points to it. Today an SME that discovers a dominant vendor's "open API" does not do what it says has nowhere to go; the register gives it somewhere.
4. **Stay technologically neutral.** Impose the result; leave the implementation open.

The register borrows a proven design. Three mechanisms already supply its parts. Coordinated vulnerability disclosure supplies the enforcement logic: a named party is invited to respond within a fixed window, and silence is published rather than left unrecorded (ISO/IEC 29147). Cross-implementation conformance dashboards supply the transparency; web-platform-tests has for years published, browser by browser, where a shipped implementation departs from a W3C specification. The direct precedent

is already running under the Digital Markets Act, where the interoperability-request portals that Apple, Google and Microsoft operate under Article 6(7) let a developer log a gap and make the request public. That case is also the cautionary one: FSFE's running tally records 56 interoperability requests to Apple with no concrete solution, several of the declines contradicting Apple's own documentation. A public channel names the gap and creates the record; it does not on its own compel the fix, which is why R4 attaches recourse through procurement and does not pretend to replace it. The EIF's contribution is to generalise the pattern from three siloed gatekeeper portals to one standing, cross-supplier register on the Interoperable Europe Portal.

Give it a consequence (R5, R6)

Verification without consequence is a hobby. The consequence is procurement, which is roughly 14% of EU GDP.

Specification-first procurement (R5). A tender should say “must communicate via standard SQL and deploy as OCI containers” and should avoid “must run on Aurora” or “must run on Kubernetes”. The buyer specifies the standard and lets the product compete. Article 42(4) of Directive 2014/24/EU already forbids naming a make or source without “or equivalent”, so the principle is settled; the failure is in enforcement and in an “or equivalent” escape that is read as functional similarity rather than interface-level substitutability. The EIF's contribution is to annex model ICT clauses that operationalise Article 42(4) at the level of named open interfaces, and to have those referenced in the next revision of the procurement directives and adopted through the voluntary Interoperable Europe Agreements. The Municipality of Rotterdam is right in its own submission that specification-first buying bites only when it reaches national procurement practice.

Exit-cost disclosure (R6). Lock-in is a negative externality: the party who incurs it, a delivery team under deadline, is not the party who pays it, which is the organisation, and for public infrastructure the public. Disclosure restores the missing feedback at the point of decision, and it is the cheapest high-leverage instrument on our list. The EIF can publish and recommend the template (interface ownership, egress terms, tested restoration, estimated cost of exit); making it mandatory above threshold is a procurement-law step for the next review of the directives.

The demand lever works where options exist. The Commission's own sovereign cloud tender, worth up to €180 million and requiring a minimum SEAL-2, was awarded in April 2026 to European consortia, most of them reaching SEAL-3.

And ration the requirements (R9)

Here CNLL parts company with respondents asking for a comprehensive implementation toolkit. The design of the conformance regime decides whether the renewed EIF creates European suppliers or eliminates them.

Requirements are complements in verification cost. Each clause added to a tender raises the cost of credibly securing every other clause, because a supplier caught cheating on one loses the same contract it would lose for cheating on all of them. The cost of a mandate therefore grows faster than the number of its clauses, and past a point adding a requirement makes the entire set unenforceable. A framework with three verified requirements is worth more than one with thirty unverified ones.

Worse: a requirement that costs a small genuine supplier more than a large incumbent selects against the property it screens for. Bulky referentials sort suppliers by organisational size, and the property being certified drops out of the ranking. The receipt is French and recent. SecNumCloud v3.2 carries **278 requirements**, an average of **18 to 24 months** of instruction, audit costs on the order of

€200,000 per three-year qualification cycle, and a **65% success rate** (Sénat, rapport n° 830, 8 July 2025). It is a serious security scheme and we do not criticise it as one. As a template for an EIF conformance apparatus it would eliminate exactly the European open-source SMEs that an interoperability policy exists to create, and it would do so while displaying a certificate saying the opposite.

So we endorse the implementation toolkit and reject the conformity referential. Free test suites and reference implementations shift the compliance cost from the supplier onto the commons, which is the only burden profile an SME supply base can carry. Before adopting any new conformance instrument, publish its estimated compliance cost for a ten-person company.

Fix the assessment unit (R8)

Interoperability and supplier plurality, assessed offer by offer and layer by layer, certify a quantity that does not bound the system's actual independence. The gap opens wherever one controller appears in the option sets of two or more layers, which is the ordinary case for a bloc that supplies cloud, operating system, identity and silicon at once. Annex A states the result.

The measured witness is the Commission's own buyer. **The European public-sector demand node passes a per-layer independent-suppliers test at every required class, and its true number of independent options is one.** Every path through the EU-incorporated "sovereign" venture runs on a licensed US stack, and every path that avoids it meets the same control at the operating-system, identity or network-hardware layer. The per-layer certificate reads two, and the real number of independent options is one.

Interoperability assessments under the Interoperable Europe Act should therefore require disclosure of the **controller set behind each shortlisted option, across the stack**, in place of a per-layer supplier count. A per-layer count is factually accurate but not a bound on anything.

9. Points of convergence

We share **FSFE's** calls for free software as the default for publicly funded digital public services, for the exclusion of FRAND-licensed standards, for treating openwashing as a procurement risk buyers cannot currently detect, and for formal civil-society participation in the governance of the Interoperable Europe ecosystem. We endorse **SKR's** statement of the incentive paradox, that "the benefits of interoperability are collective, while the cost often falls on the individual municipality or region", and its call for interoperability requirements written directly onto the supply market. We back **msg's** framing of interoperability as a task of practical implementation and of procurement as the point of leverage, subject to the caveat of section 8: an implementation toolkit is welcome, and a several-hundred-item referential is not. We agree with **the Municipality of Rotterdam** that the EIF should be mandated into national procurement policy, without which it "remains nice to have", and we note its energy-sector precedent, which shows prescription is possible within existing EU competence. And we echo **the practitioner contribution** on the vocabulary of open formats, open APIs and open protocols, on the barrier inventory, and on the move from principles to verified interoperability through reference implementations, plugfests and conformance suites.

Annex A. The two results this submission relies on

Both results come from a public research programme on the economics of European digital sovereignty, whose models, verification suites and data are open.

A1. The lock-in floor

Model the cost of leaving a cloud service as $F = w \cdot D + (1 - w) \cdot L$, where D is data gravity (the stateful mass that must cross a network boundary) and L is logical lock-in, composed as $L = 1 - (1 - P)(1 - M)$ from P , the proprietary-ness of the interface specification, and M , migration friction net of tooling. L is a noisy-OR: a proprietary protocol or absent tooling is each sufficient to trap the code. The weight $w = 0.30$ is calibrated judgment, swept over $[0.10, 0.50]$ in robustness testing.

Since $F \geq (1 - w) \cdot L$, policy acting only on data movement can move at most the $w \cdot D$ term. The floor $(1 - w) \cdot L$ is the complement of the transport weight, so the point figures below move with w ; the robust result is the *ranking* of services by logical lock-in, which holds across the whole sweep $w \in [0.10, 0.50]$.

Measured on 35 scored cloud services, the data-transport share of the exit cost averages 20%. It exceeds 30% for exactly ten services, all data movers behind portable interfaces, and falls below 30% on every deeply locked service. Where $L \rightarrow 1$, the exit cost is floored near 0.70 at the calibrated $w = 0.30$. Under 2,000 draws with ± 0.15 noise on every input, 20 of 35 services hold their exact quadrant and the deeply locked corner never moves.

The scores are calibrated judgments, reconciled across two independent codings (quadrant agreement 26 of 35, Cohen's $\kappa = 0.65$).

A2. Per-layer certification does not compose

Represent a stack as required input *classes* (all needed), each offering supplier *options* (choose one), and let each option carry the set of controllers able to deny or condition it. Let N be the largest family of ways to operate sharing **no controller at all**, and N_k the same quantity on class k alone, which a per-layer certificate inspects.

Theorem. $N \leq \min_k N_k$, always, and **the inequality can be strict even when every class has $N_k \geq 2$.**

Witness: three classes whose options are controlled by $\{X, Y\}$, $\{X, Z\}$ and $\{Y, Z\}$. Each class has two independently controlled options, so a per-layer test passes everywhere. Every way of operating uses a 2-subset of $\{X, Y, Z\}$, and any two 2-subsets of a 3-set intersect, so $N = 1$. **A stack can satisfy a two-independent-suppliers requirement at every layer while a coalition of two controllers, or given a single necessary node just one, cuts everything.**

The quantity $\min_k N_k - N$ is how much a per-layer certificate overstates diversification. It is zero when no controller spans two layers, and positive wherever one bloc supplies several layers at once, which is the situation Europe is actually in.

The measured instance. The European public-sector demand node passes a per-layer independent-suppliers test at every required class. Its certificate is 2. Its true option number is 1.

All theorems are brute-force verified over several hundred seeded random instances.

References

Abilian Econ Lab research programme (working papers, models and verification suites at <https://econ.lab.abilian.com/papers/>):

- Fermigier, S. *A Two-Dimensional Taxonomy of Cloud Service Integrations: Modeling Architectural Coupling and Portability Friction in Managed Infrastructures*. Working paper. (The lock-in floor and the four-quadrant map; Annex A1.)

- Fermigier, S. *Cheaper and Losing: A Layered Model of Cloud Dependence and the Limits of Subsidy*. Working paper. (Un-bundling, the saturation of subsidy, the two frictions.)
- Fermigier, S. *Exit or Own? Portability Mandates and Ownership Screens in Sovereign Procurement*. Working paper. (Portability as screening infrastructure; the complementarity band.)
- Fermigier, S. *Screening for Sovereignty: Optimal Procurement when Compliance is Cheap to Fake and Costly to Verify*. Working paper. (Verifiability and the fake/verify condition; the anti-checklist result.)
- Fermigier, S. *Two Screenings: Why Europe Screened Huawei but not the Hyperscalers*. Working paper. (SecNumCloud compliance burden; certification and market concentration.)
- Fermigier, S. *Cuts and Options: A Theory of Strategic Autonomy in Production Networks*. Working paper. (The per-layer composition theorem; Annex A2.)
- Fermigier, S. *Path Sovereignty: Dependence, Control, and Options in the European Digital Stack*. Working paper. (The measured stack; forkability regularity; intervention rankings.)
- Fermigier, S. *Channels of Power in Production Networks: A Taxonomy for Measuring Technological Dependence*. Working paper. (Feasible / considered / exercised sets; shortlist authorship.)
- Fermigier, S. *Sovereignty as a Flow: Capture and the Durability of European Technology*. Working paper. (Governance locks; forkability as capture resistance.)

External sources:

- von Ingersleben-Seip, N. (2025). *How the European Union Fell Out of Love with Open-Source Software*. Munich Papers in Political Economy 39. <https://ideas.repec.org/p/aiw/wpaper/39.html>
- Gerloff, K. and Roy, H. (2009). *EIFv2: Tracking the loss of interoperability*. Free Software Foundation Europe. <https://fsfe.org/freesoftware/standards/eifv2.en.html>
- Free Software Foundation Europe (2026). *Apple keeps challenging its interoperability obligations under the DMA*, 20 April 2026. <https://fsfe.org/news/2026/news-20260420-01.en.html> (56 interoperability requests to Apple, no concrete solution; the running tally cited for the barrier register.)
- Fermigier, S. (2024). *Some Thoughts on Interoperability*. <https://euro-stack.com/blog/2024/12/interoperability-thoughts> (Introduces the notion of “Enforceable Interoperability”).
- Fermigier, S. (2025). *Response to the Call for Evidence on the Single Market Strategy*. <https://euro-stack.com/blog/2025/1/eurostack-response-single-market-strategy>
- Competition and Markets Authority (2025). *Cloud services market investigation: Final decision report*, 31 July 2025. <https://www.gov.uk/cma-cases/cloud-services-market-investigation>
- Asterès for Cigref (2026). *From technological dependency to economic capture: the cost of cloud & software services inflation to Europe*. <https://www.cigref.fr/from-technological-dependency-to-economic-capture-the-cost-of-cloud-software-services-inflation-to-europe>
- Asterès for Cigref (2025). *Technological dependence on American software and cloud services : an assessment of the economic consequences in Europe*. <https://www.cigref.fr/technological-dependence-on-american-software-and-cloud-services-an-assessment-of-the-economic-consequences-in-europe>
- Sénat (2025). *Rapport n° 830 (2024-2025), commission d'enquête sur la commande publique*, déposé le 8 juillet 2025. <https://www.senat.fr/notice-rapport/2024/r24-830-1-notice.html>
- European Commission (2017). *New European Interoperability Framework*, COM(2017) 134, Annex 2. <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52017DC0134>
- European Commission (2010). *European Interoperability Framework 2.0*, COM(2010) 744, Annex 2. <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52010DC0744>
- European Commission (2004). *European Interoperability Framework 1.0 (IDABC)*. <https://op.europa.eu/en/publication-detail/-/publication/a4778634-27fa-43b4-9912-f753c4fdcf3f>
- Regulation (EU) No 1025/2012 on European standardisation, Annex II. <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32012R1025>

-
- Directive 2014/24/EU on public procurement, Article 42(4). <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32014L0024>
 - Regulation (EU) 2023/2854 (Data Act), Article 29. <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32023R2854>
 - Regulation (EU) 2022/1925 (Digital Markets Act), Article 6(7). <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32022R1925> (The interoperability obligation behind the Apple, Google and Microsoft request portals.)
 - web-platform-tests. *Cross-browser conformance dashboard*. <https://wpt.fyi/about> (Per-implementation, spec-by-spec conformance transparency; the transparency precedent for R4.)
 - ISO/IEC 29147:2018. *Information technology — Security techniques — Vulnerability disclosure*. <https://www.iso.org/standard/72311.html> (The invite-and-publish-on-non-response model R4 transposes.)
-

Contact: Stefane Fermigier, co-chair, CNLL, and board member, EuroStack Initiative Foundation e.V.

CNLL, Union des entreprises du logiciel libre et du numérique ouvert, is a trade association representing more than 200 open source software vendors, OSS system integrators, OSS consulting companies, etc. CNLL's main mission is to represent the professional Open Source ecosystem to public authorities and existing national and international organisations, to ensure greater visibility of the entire ecosystem: its software and services offer, its specific assets and its needs, particularly in terms of employment and training, as well as to enable the players in the sector to recognize themselves within it, to exchange and work together to develop the market, while respecting common values. <https://cnll.fr/>

About EuroStack Initiative Foundation e.V. EuroStack is an industry-led initiative for European digital sovereignty, organised around the programme *buy European, sell European, fund European, openness as a policy*. Its aim is to reverse Europe's slide into digital dependence and to rebuild European suppliers of digital infrastructure and services. Interoperability is the layer on which that programme depends: it lowers the switching costs that keep European buyers from reaching European suppliers, so investment and demand can actually move to them. EuroStack Initiative Foundation e.V. co-signs this submission on that basis. <https://eurostack.eu/>