Your partner in the fight against (cyber)crime

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Towards Sovereign AI Architectures for Complex Digital Investigations

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What we'll cover

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What is the big deal?

What can be done?

Practitioner perspective from 10+ years of implementing secure digital forensics platforms at scale across government and enterprises

What is the big deal?

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- AI as Investigative Infrastructure
- AI misconceptions
- Scale + Fragmentation Crisis
- Adversarial Acceleration
- External AI Dependency Risk
- The Monolith Problem
- The Trust Boundary Problem

AI as Investigative Infrastructure

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AI is already becoming embedded across:

- Data ingestion
- Translation (machine ↔ human)
- Summarisation and reporting
- Analytical workflows

= AI is becoming part of the investigative substrate

- The role of AI should be:
  - Transformation and interpretation
  - Not evidential authority

…But is at risk of being used and perceived differently

Misconceptions: AI & “Agentic” in LE

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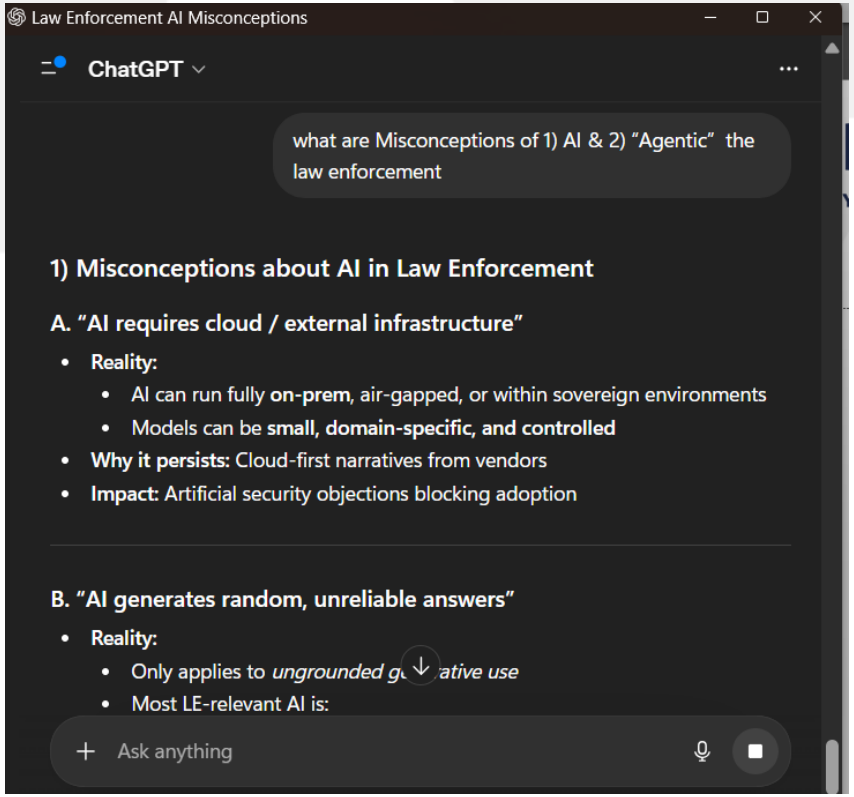
- **Assumption**
  - AI = cloud and huge frontier models
  - AI = Generative random answers
  - Agentic = autonomous LLMs
- **Consequence**
  - “AI cannot use AI due to security reasons”
  - “We risk putting the wrong people in jail”
  - Prolific use of *Shadow AI*



Scale + Fragmentation Crisis

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- Investigations now involve:
  - Multi-domain, multi-format data
  - E.g. unstructured, structured, sensor data, feeds, etc.
  - Ever increasing legal complexity
- Tooling:
  - Broad set of valuable tools
  - Specialised but disconnected

- **Result:**
  - **Manual stitching of workflows**
  - **Loss of context and tempo**
  - **Backlogs**

Adversarial Acceleration

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- Criminals use AI:
  - Automated fraud
  - Identity fabrication
  - Scalable deception, and much more…
- Accelerated by:
  - Vibe-coding, serverless, agentic automation, open source scripts, etc.
  - Ie. adversaries operate as integrated AI systems

Key question:

- **Should we embrace scalable patterns used by adversaries?**

External AI Dependency Risk

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When trying to do embrace adversarial AI capabilities…

- Reliance on external AI services:
  - API-based access (OpenAI, Anthropic, Microsoft Copilot, etc.)
  - Foreign infrastructure risk
  - Vendor-controlled execution

- Risks:
  - Data leaves investigative boundary
  - Unclear vendor monitoring / logging / debugging layers exist
  - Limited transparency on access and handling

Control over AI processing becomes decoupled from investigative control

The Monolith Problem

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Emergence of **large, integrated intelligence platforms**

- Common narrative:
  - “We need close and locked-in partnerships with only the best vendor(s)”
  - “No one else can do what they can”
- Reality:
  - These systems are:
    - Compositions of standard components
    - Wrapped in tightly coupled architectures
- Risks:
  - Vendor lock-in
  - Limited portability
  - Difficult to integrate best of breed

Monolithic systems centralise capability - but also centralise control with the vendor

The Trust Boundary Problem

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- Common law enforcement and intelligence scenario:
  - **limited AI use today**
  - Primarily embedded in:
    - existing software platforms
    - small-scale LLM pilots / PoCs

- However, AI adoption is accelerating through:
  - Hidden inside tools
  - Ad hoc experimentation
  - Shadow AI

- As AI becomes embedded:
  - Processing may occur:
    - inside vendor-controlled components
    - or external infrastructure layers

- Your visibility into…
  - execution
  - data handling
  - model behaviour

  …becomes limited

Conclusion: The trust boundary is beginning to shift - before it is fully understood or deliberately designed

The big deal? In conclusion.
The risk of how will AI be introduced

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Risk trajectory:

- fragmented control
- unclear data flows
- architectural lock-in

Required shift:

- Move from vendor-controlled AI adoption → to **sovereign architected AI integration**

Objective:

- Ensure AI is introduced within systems that are:
  - Controlled
  - Auditable
  - Designed for sovereignty from the outset

Transition:

- The need for **sovereign AI architectures as a design principle**

The issue is not that agencies are already dependent on AI.

It's that they are about to become dependent, but unintentionally.

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What can be done?

What can be done?

- **Defining Sovereign AI Architectures**
- **Getting it right: Perception of AI**
- **Sovereignty vs Monoliths**
- **Reference Architectures**
- **Example: Agentic + Controlled Workflows**
- **Operational Requirements**

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Defining Sovereign AI Architectures

- Systems where institutions retain control over:
  - Data
  - Models
  - Execution environments
- Key characteristics:
  - Modular
  - Interoperable
  - Replaceable components
  - Auditable by design

Anchor:
Open, sovereign architecture principles

Getting it right: Perception of AI

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- **Assumption**
  - AI = cloud and huge frontier models
  - AI = Generative random answers
  - Agentic = autonomous LLMs
- **Consequence**
  - “AI is not allowed here
  - “We risk putting the wrong people in jail”
  - Shadow AI

- **Reality**
  - Open-source/weight models
  - Runs on-prem / private infrastructure w. GPUs
  - Proper use cases (extraction, summaries, syntax, computer vision, etc.)
  - Human in the loop
- **Agentic AI systems**
  - More about workflows + scripts
  - Deterministic pipelines and search
  - LLM = small component
- **Implication**
  - No dependency on cloud
  - No need for frontier models
  - Fully controllable systems

(hoping for more chipmaker diversity)

Sovereignty vs Monoliths

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Monolithic Platforms	Sovereign Architectures
Vendor-controlled stack	Institution-controlled stack
Tight coupling	Modular components
Limited portability	Replaceable components
Opaque processing	Auditable pipelines
Strategic dependency	Strategic optionality

Sovereignty is achieved through **architecture, not vendor selection**

Reference Architectures

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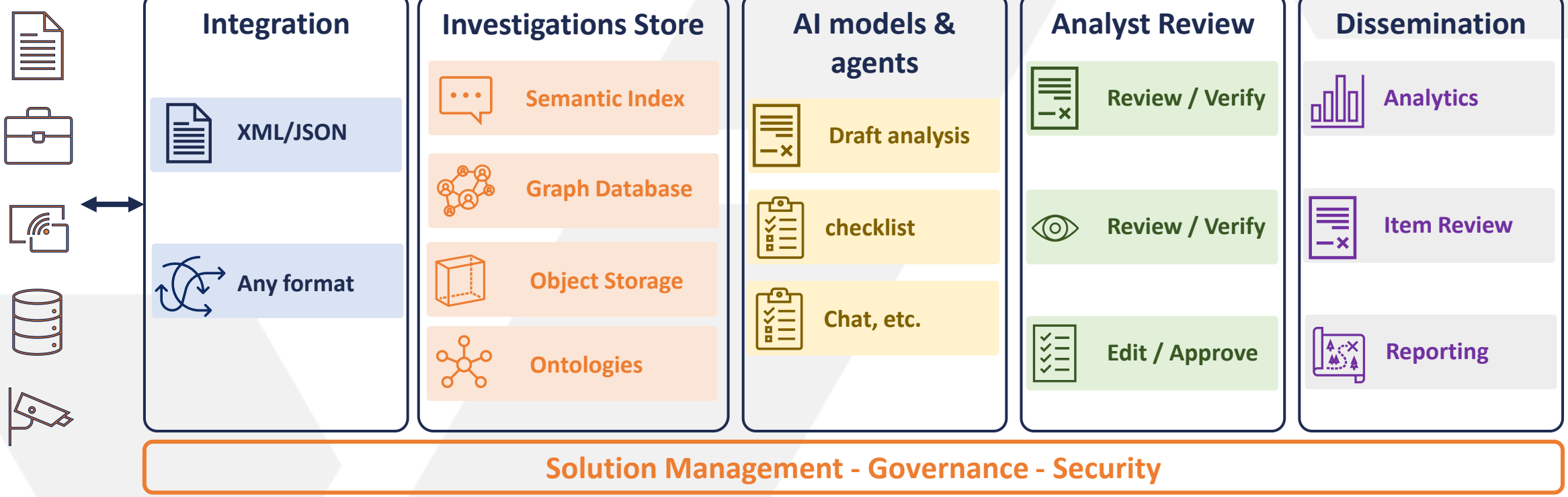

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Example: Agentic + Controlled Workflows

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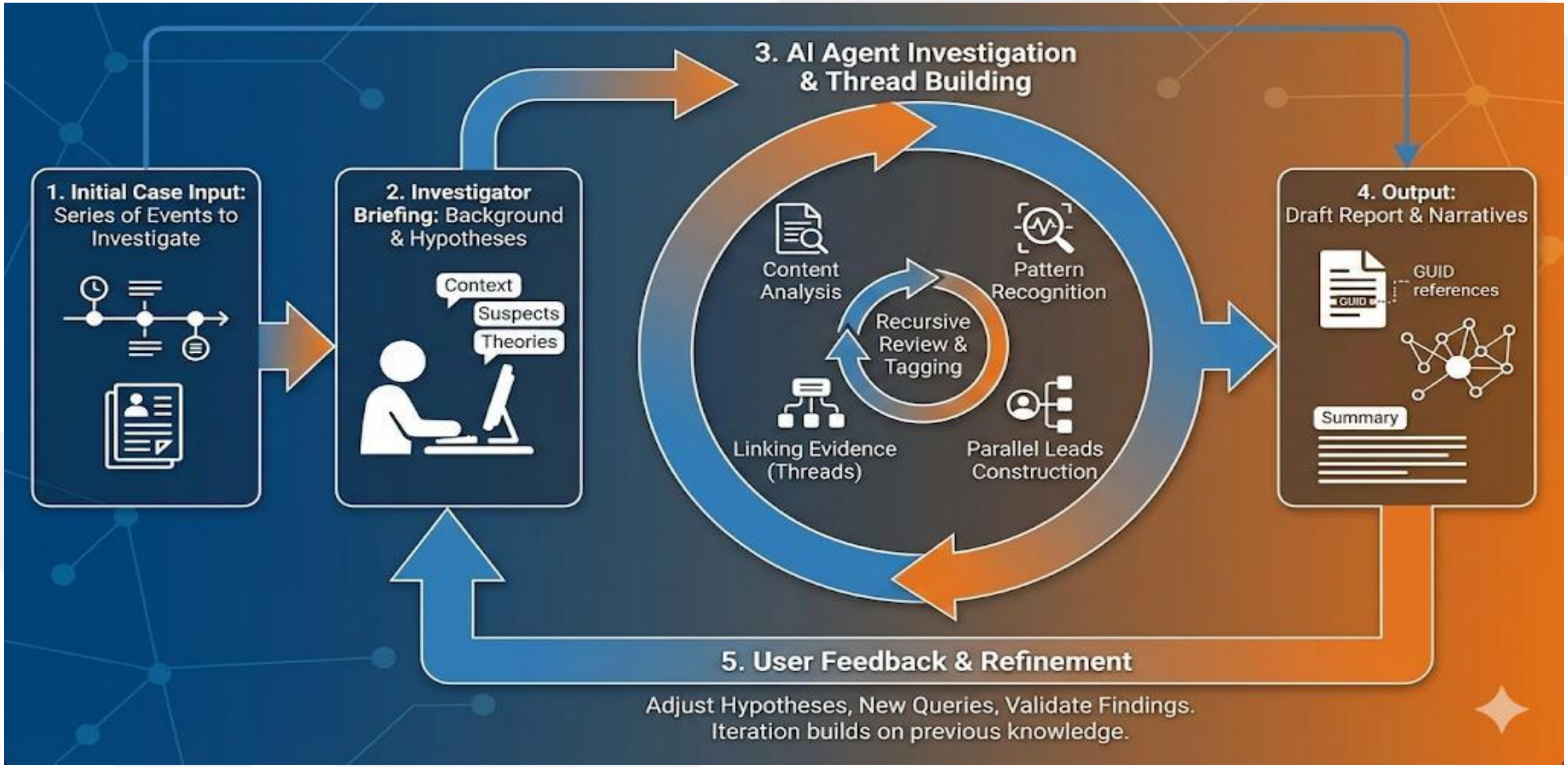

Operational Requirements

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Non-negotiable:

- Audit trails
- Data provenance
- Explainability
- Reproducibility

- Alignment:
  - ISO 17025, ISO9600, ISO2700x
  - EU regulatory frameworks

In summary

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- Investigations are becoming **architectural challenges**
- AI introduces **new trust boundary risks**
- Monolithic platforms introduce **strategic dependency**

- **Sovereign AI architectures** enable:
  - **Control**
  - **Transparency**
  - **Long-term adaptability**

Questions?

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