



## Deliverable Fact Sheet

### FlexBIT Architecture Blueprint (D1.1)

#### Objective



The Architecture Blueprint explains, in an implementation-oriented way, how the FlexBIT platform should be built and connected so it can work across very different pilot environments and national contexts.

#### Its main objectives are to:

- Provide a clear, shared architecture for all partners, so everyone builds on the same “system picture”.
- Enable interoperability between heterogeneous assets and IT systems (buildings, devices, meters, SCADA/EMS, data services).
- Ensure the platform can scale and operate reliably through a modular design (components can evolve without breaking the whole system).
- Embed security and operational robustness from the start, which is essential in real energy environments with multiple stakeholders and sensitive data flows.

#### Methodology



The blueprint was developed through a structured architecture design process, grounded in demonstrator needs and real integration constraints.

#### Key steps and principles:

- Layered architecture definition: mapping from field devices and energy assets to data acquisition, data processing, analytics, and platform services.
- Two-loop control concept: keeping fast, safety-relevant control local at each demonstrator, while using FlexBIT for slower optimisation and coordination.
- Integration via proven standards: selecting practical, widely used protocols and interfaces to reduce custom development and make cross-pilot replication realistic.
- Security-by-design: specifying secure communication, access control, and monitoring expectations as part of the architecture, not as an afterthought.
- Demonstrator-driven detailing: describing how different local systems can connect to FlexBIT while keeping local autonomy and respecting local constraints.



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### Key Findings

- **Local safety** stays local, value comes from coordination: FlexBIT is designed to support, not replace, local control systems. This improves trust and reduces operational risk.
- **A modular architecture** supports scaling and reuse: the blueprint defines components and interfaces so new pilots or services can be added without redesigning everything.
- **Interoperability** is tackled with practical integration choices: the platform is built around standard communication and interface patterns, so heterogeneous equipment can connect through adapters at the edge.
- **Data and service flows** are made explicit: the blueprint clarifies how data is collected, processed, and used for forecasting, optimisation, and user-facing services.
- **Cybersecurity and operations** are treated as core requirements: secure connectivity, controlled access, and observability (monitoring and logging) are included as architectural building blocks.

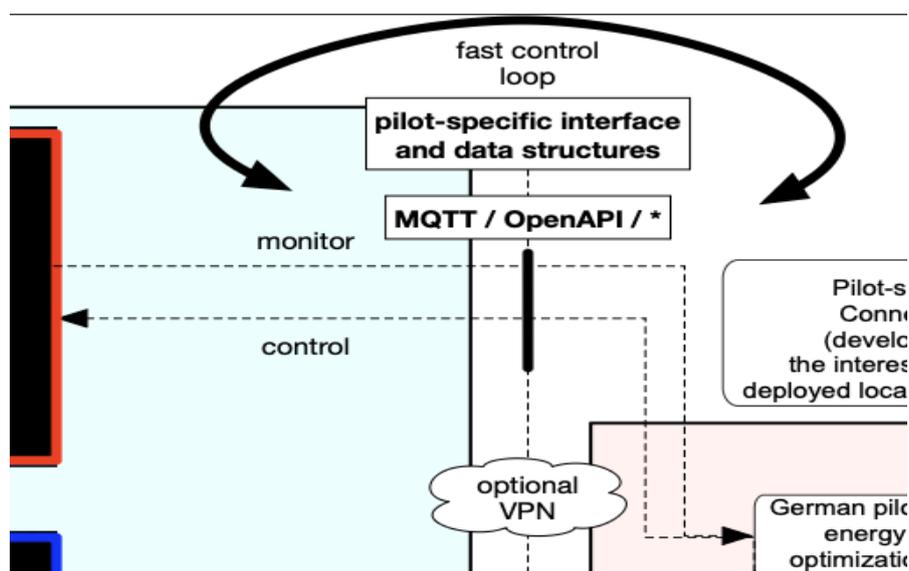


Figure 1: FlexBIT coordinates optimisation at a slower pace, while each site keeps fast local control for safe operation



## FlexBIT Architecture Blueprint (D1.1)

### Recommendations



- 1. Protect the two-loop principle throughout implementation**  
Keep fast control and safety mechanisms local. Use FlexBIT for optimisation, coordination, and decision support.
- 2. Prioritise a shared data model and stable interfaces early**  
A clear data structure and consistent APIs will save time during integration and prevent pilot-specific one-off solutions.
- 3. Standardise integration patterns, not local hardware**  
Let pilots keep their existing systems where possible. Use edge adapters and common platform interfaces so the platform stays coherent.
- 4. Design for operations, not just for demos**  
Plan monitoring, logging, and auditability from the beginning. This is what makes multi-stakeholder energy platforms dependable in practice.
- 5. Validate external interfaces country by country**  
Where integration with external market actors or data hubs is relevant, assess feasibility per national context and progressively harden the interfaces based on lessons from pilots.

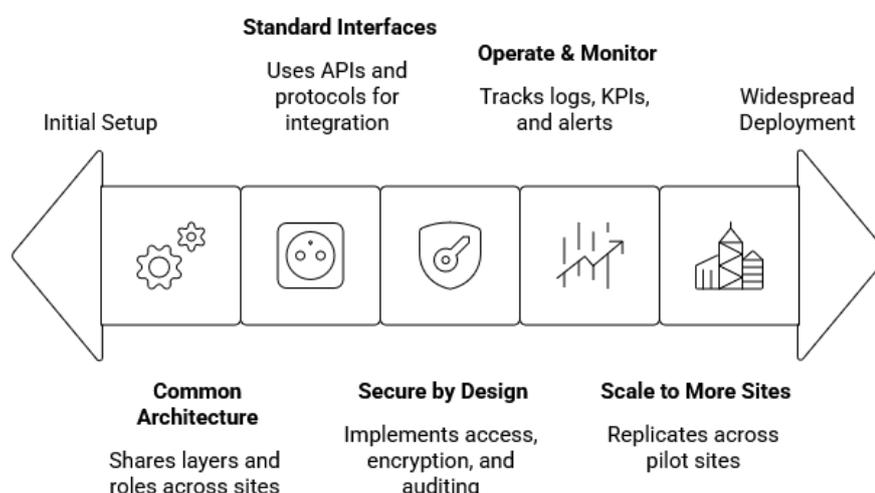


Figure 2: From Blueprint to reality



## Flexibility Exploitation for residential, tertiary and industrial buildings

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