

Intelligent orchestration of mobile private networks

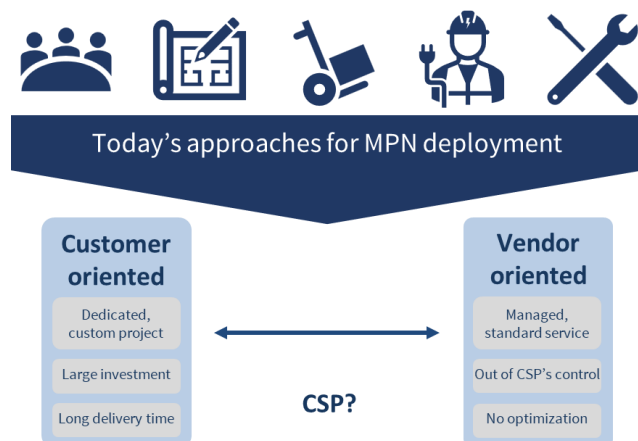
Mobile private networks lack flexibility and optimization at scale

Mobile private networks (MPNs) are increasingly seen as an enabler for enterprise digitalization and therefore represent a huge business opportunity for communication service providers (CSPs). However, CSPs face the challenge of (1) achieving **economies of scale and cost efficiency**, while (2) still requiring **flexibility** to tailor MPN deployments to **customer-specific requirements**, such as performance and security.

CSPs and their enterprise customers do not prefer a one-size-fits-all approach. Rather than deploying MPNs entirely on premise, it is favorable for CSPs to use shared infrastructure resources in a telco (edge) cloud/datacenter or the public cloud. This allows for scenarios that not only increase efficiency and reduce cost, but also create more added value for the enterprise customer, for example:

- Distribute 5G Core functions and edge applications across domains, driven by performance constraints and costs. For example, deploy the UPF on premise to achieve lower latency, while keeping the control plane in the telco cloud for lower costs or in public cloud if resources are limited.
- Dynamically migrate 5G Core functions and edge applications, e.g. to support fail-over, to optimize costs or resource utilization, or to make room for prioritized applications and premium services.

To date, MPN deployments are typically big, unique projects, involving a dedicated team to design and provision a custom solution. Despite being quite flexible, it involves a costly and lengthy process that relies on the skills of the assigned team, thus rendering severe scalability issues. On the other hand, several large vendors and hyperscalers offer MPN solutions as a managed service. These solutions address the scaling issue, but leave little opportunity for CSPs to tailor them to customer needs, or to optimize the (deployment) costs.



To achieve the desired efficiency and flexibility at scale, CSPs require **advanced and intelligent automation capabilities**. This enables CSPs to **fully automate the optimal deployment of individual MPN components and applications** from multiple vendors across on-prem, telco cloud and public cloud. This placement has to consider a variety of constraints coming from the MPN templates in the service catalog, the network and infrastructure characteristics, and the application- and customer-specific performance requirements. Furthermore, it has to take into account resource utilization to maximize cost efficiency.

Figure 1: CSPs currently have to choose between a customer-focused approach with dedicated MPN projects, or a vendor-based managed service offering.

Intelligent MPN orchestration by Arctos Labs & Inmanta

Arctos Labs and Inmanta provide CSPs with an **intelligent solution for orchestrating MPN deployments in a cost efficient way, while retaining high flexibility**. This intelligent MPN orchestration solution combines Inmanta MPN Orchestrator (MPNO) with Arctos Labs Edge Cloud Optimizer (ECO). Inmanta MPNO is a truly intent-based, multi-domain orchestrator that fully automates the provisioning and lifecycle management of different MPNs in a scalable way. Arctos Labs ECO is a flexible optimization engine that enables the intelligent placement of network functions and edge applications across the available locations.

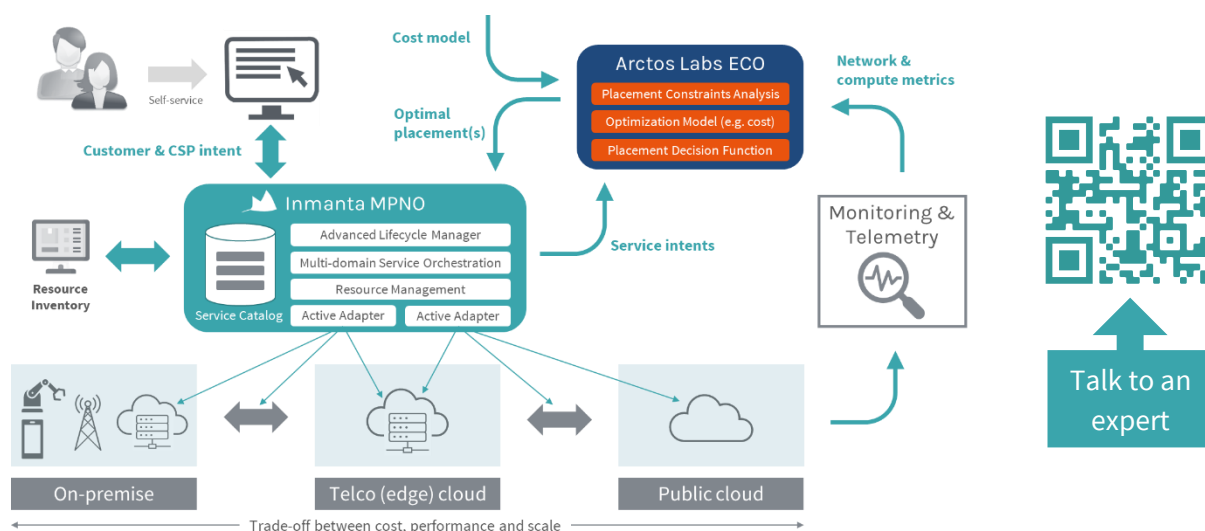


Figure 2: The overall flow within the intelligent MPN orchestration solution by Arctos Labs and Inmanta.

The overall flow in the solution is as follows:

1. The enterprise customer or CSP creates the intended MPN variant by selecting a template from the service catalog and specifying a few business-level parameters.
2. Inmanta MPN Orchestrator receives the intent from the self-service portal / BSS system.
3. As part of the feasibility check, the orchestrator calls the Arctos Labs Edge Cloud Optimizer.
4. The Edge Cloud Optimizer calculates a network placement model by using constraint information (e.g. from the service intent), cost models and network metrics. This results in a placement that yields the lowest cost but satisfies all the constraints.
5. The optimal placement model is returned to the orchestrator for provisioning. This may include human-in-the-loop and/or multiple iterations with the optimizer to support alternative placement options.
6. Once a satisfying result is achieved, the orchestrator dynamically translates the high-level intent into actions and configurations. Finally, Inmanta's active adapters provision and correctly configure the network functions and edge applications at the desired location.

Optimize cost & improve customer experience

The intelligent MPN orchestration solution eliminates the need for expensive projects with manual intervention. This has a direct impact on customer satisfaction, as the **customer intent can be captured and executed on demand**. The Edge Cloud Optimizer ensures the placement of the 5G Core functions satisfies the performance and security concerns of the customer, while Inmanta's

intent-based, multi-domain orchestrator makes sure this optimal placement model is provisioned and maintained in a fully automated way.

Moreover, this solution reduces the operational costs by **deploying** individual MPN network functions **in the most cost-efficient locations from a CSP perspective**, spanning on-prem, telco (edge) cloud and public cloud. CSPs can also request alternative, potentially less cost-efficient placements, for example to offer enterprise customers multiple options at a premium price.

Plug-and-play to create best-of-breed variants

MPN services are particularly challenging as they need a high degree of tailoring for different verticals and may have advanced latency or privacy constraints. Inmanta and Arctos Labs provide CSPs the tools to **develop a catalog of parameterizable MPN templates and optimization models**. The open and flexible architecture allows CSP to freely select and integrate best-of-breed components from any vendor or provider. This enables CSPs to **tweak and optimize MPN variants for different verticals**. The intelligent orchestrator combines these constraints expressed at design-time with the parameters entered from a self-service portal into an automated provisioning flow for a specific MPN.

Conclusion

Simplify MPN deployments with the intelligent MPN orchestration solution from Inmanta and Arctos Labs. Inmanta and Arctos Labs accelerate the provisioning not only for MPN network functions but also for a wide range of edge applications, while ensuring optimal placement across on premise, telco (edge) cloud and public cloud.