OPENET
An Amdocs Company

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DATA SHEET

OPENET POLICY & CHARGING (PCC)

BUILT FOR DISRUPTION

MICROSERVICES-BASED PCC

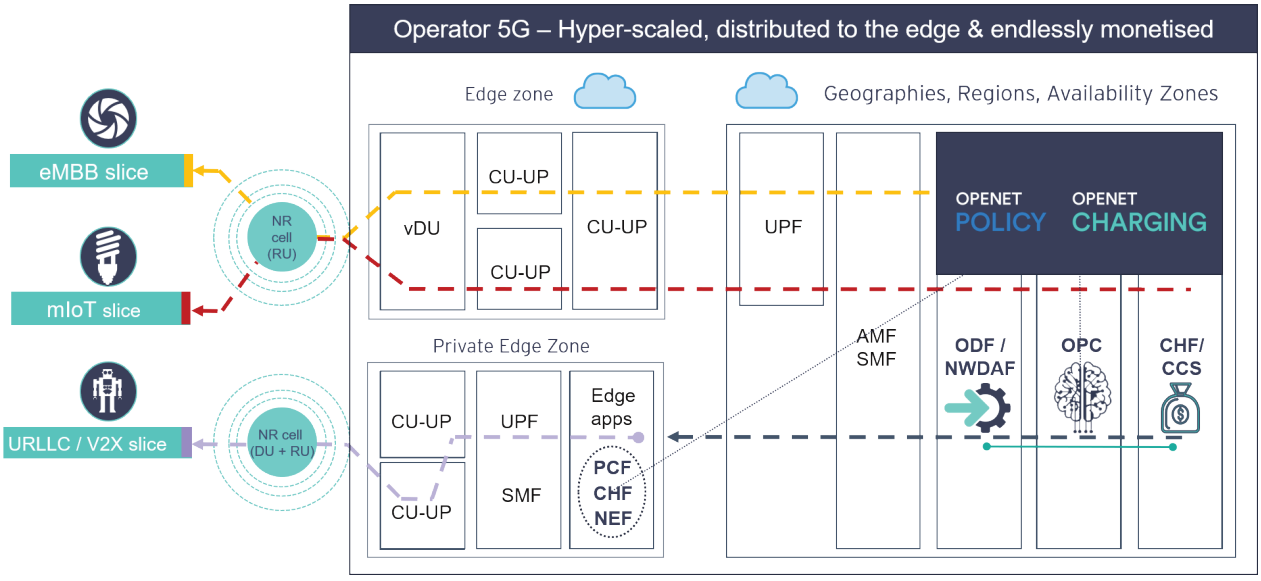
H1 2021

"Openet Policy and Charging (PCC), as seen in Figure 1, have often been considered separately within the service provider environment"

INTRODUCTION

As new and complementary approaches manifest including DevOps, microservices and Continuous Integration / Continuous Delivery (CI/CD), so too do richer capabilities that break down the traditional approach into more bitesized value. A microservices approach removes the "fork-lift" type of upgrade and introduces an "update" rather than "upgrade" method of evolution. It reduces "shocks" to the rest of the network and to services. Policy and Charging have become the ever more powerful "brain" and "treasury" respectively of an ever more powerful, open and backwards compatible 5G.

Figure 1. Hybrid Cloud for Service Providers with Openet PCC Enabling 5G Slicing, Policy Control & Monetisation at the Edge



BENEFITS

Openet's Microservices-based PCC allows multiple starting points for value creation and granularity of exposure across PCC that did not previously exist. It provides for more seamless, shared functionality and synergies across network control and IT. By doing so it enables service providers with a more powerful focal point for service creation, differentiation, control and monetisation. In turn that allows more effective handling of a larger portfolio of new services that 5G will enable. It provides for faster time to deployment as well as shorter time to test, scale and manage that wider range of new services.

Microservices-based PCC ensures that downtime during updates of individual microservices can be removed and so removes risks that previously existed. Microservices are cloud-based and scalable in whatever cloud (private, public, hybrid or multi-cloud) that works best for a service provider. All are deployable at the edge for release of enterprise and consumer use cases promised by 5G including various applications of VR/AR/xR, robotics and massive IoT.

Migration can be gradual and supported by the best specialist migration and service teams in the industry. Avoidance of forklift-style upgrades allows new business models for deployment of this technology that can in turn translate to new business model benefits for end-users.

Operationally, this new environment is exposed to teams via a UI using material design that is familiar and manageable for non-technical teams spanning network, IT and business-focussed parts of a service provider. This further ensures organisational efficiencies and faster time to market at a pace that is ahead of competitors. These teams have a critical "single source of truth" across key functions of: control and monetisation.

Significantly, this environment encompasses 5G as well as earlier generations. By doing so it ensures control across IT and network that also optimises earlier investments as requirements extend increasingly towards 5G.

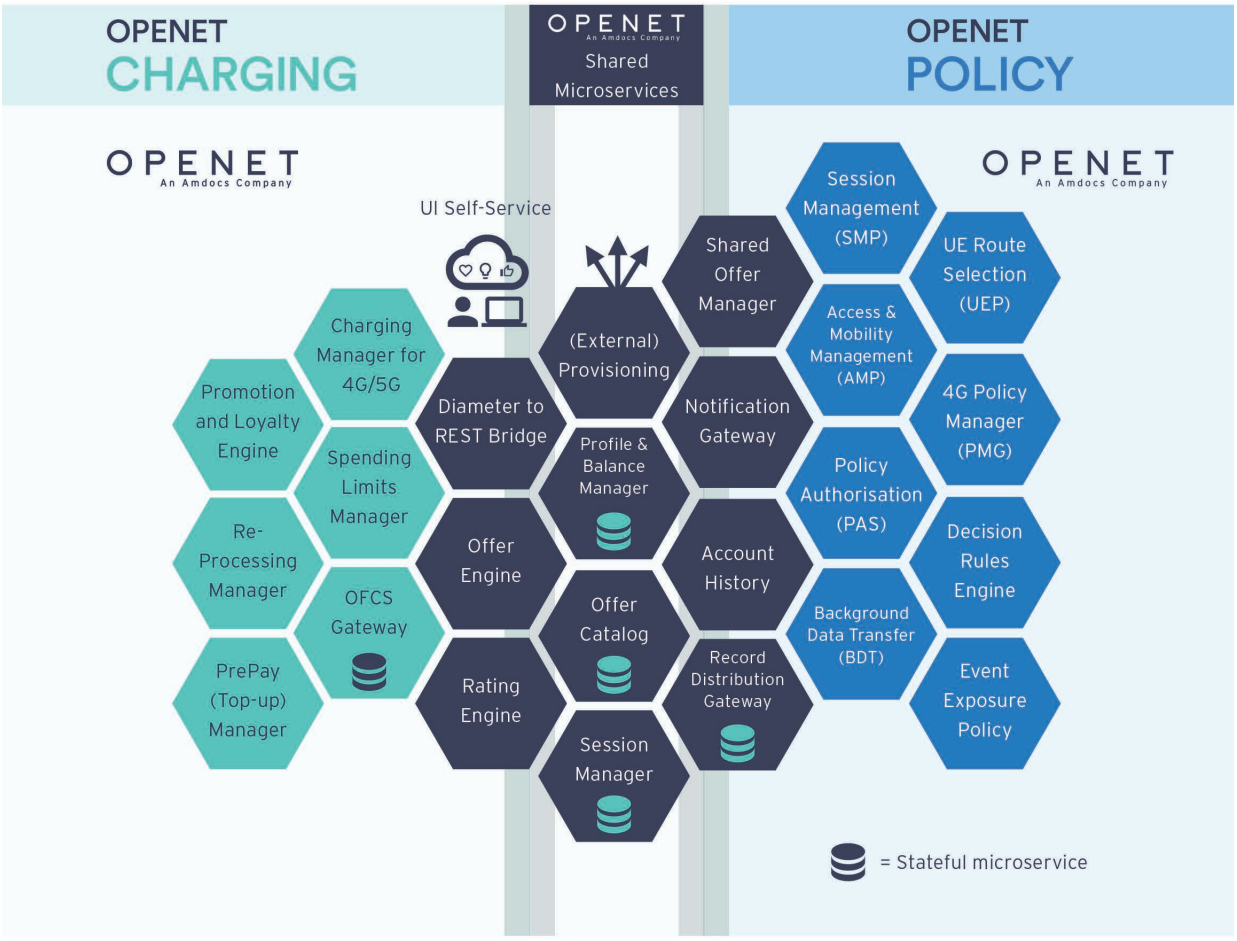
By definition, open-source and open APIs ensure that a more powerful ecosystem is enabled that has the potential for ever more spontaneous and powerful partnerships for inclusion in the richer set of service bundles that consumers and businesses have come to expect.

FEATURES

a. The Modular and Microservices-Based Architecture: Overview

Openet Solutions have long been developed in a modular fashion, with modules and components integrated in a flexible manner which allows for multiple deployment scenarios both for multi-phase migration and final architecture. A number of core solutions (i.e. Profile Manager, Balance Manager, Offer Catalog etc.) are common to the entire Openet portfolio, meaning that future expansion and enhancement projects with Openet are simplified and synergies are easily accessible. Openet has built from the ground-up as a set of microservices (Figure 2), where the fundamental principles of a microservice architecture allow for our services to be independently deployable and manageable. This separation of the solution into discrete services allows us to provide a higher level of availability, portability and scalability through being able to manage the lifecycle of each microservice separately.

Figure 2 : Summary of Microservices

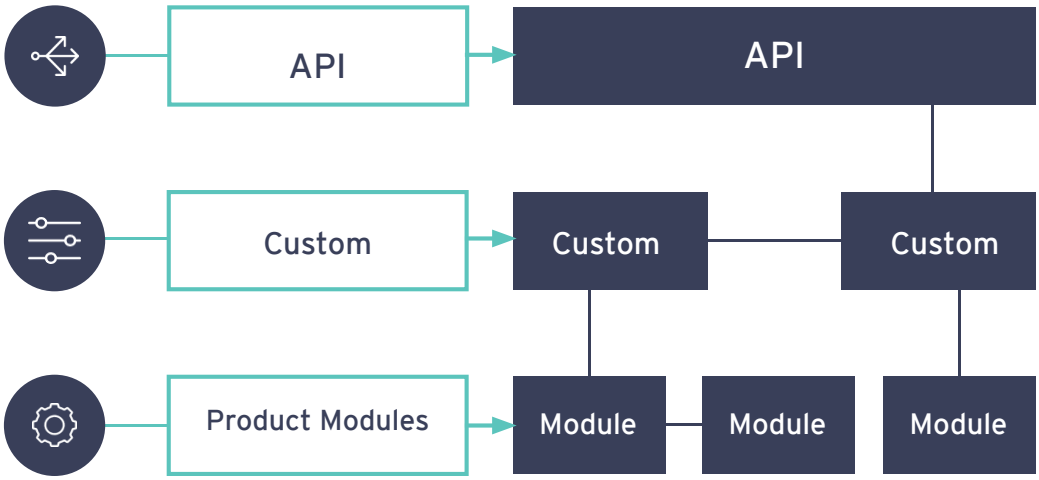


FEATURES

b. Openet's Approach to Microservices Architecture

All microservices that comprise the overall PCC (Policy + Charging Control) utilise a modular architecture (Figure 3) where the functionality of the microservice is delivered through a combination of functional modules. Each core product module has a well-defined internal API that allows it to be seamlessly inserted into the orchestrated flow that comprises the microservice logic.

Figure 3 : Openet's Approach to Microservices



Any Openet microservice can, in turn, be extended or customised by developing solution-specific business capabilities built by service providers and/or by Openet, depending on the collaboration model employed. These capabilities can be used to augment an existing core product module, or replace it entirely, and rely heavily on the well-defined internal APIs noted above.

All microservices' external-facing APIs come with definition files following the OpenAPI (www.openapis.org) specification. The API is semantically versioned adhering to these main principles:

- Major version is updated only when incompatible API changes are made
- Minor version updates are done to expose new functionality in a backwards-compatible way
- Patch version is updated for backwards-compatible bug fixes

FEATURES

c. Stateful V's Stateless Considerations: Overview

The key difference between stateful and stateless applications is that stateless applications don't "store" data whereas stateful applications require backing storage. Stateful applications like the Cassandra, MongoDB and MySQL databases all require some type of persistent storage that will survive service restarts.

Keeping state is critical to running a stateful application whereas any data that flows via a stateless service is typically transitory and the state is stored only in a separate back-end service like a database. Any associated storage is typically ephemeral. By definition, stateless services do not need to persist data from session to session. This means they can be replicated on demand, and each replica does not need to be aware of or coordinate with, other replicas.

As organizations adopt containers, they tend to begin with stateless containers as they are more easily adapted to this new type of architecture and better separated from their monolithic application codebase, thus they are more amenable to independent scaling. The efficiency impacts on the network of being able to rapidly scale up as well as down as required are enormous. It's worth emphasising that containers will work in combination with stateful as well as stateless microservices-style applications. i.e. you can also containerise stateful applications.

d. Openet Microservice Toolkit

Openet's next-generation development toolkit / ecosystem called "Forge" enables the development of telco-grade microservices and NFV solutions. Openet adopts the latest advances in software engineering to create a cloud-based BSS/OSS platform which delivers significant benefits to any service provider. It comprises of the microservices themselves as well as tools for their implementation and ongoing maintenance (Figure 4: Microservice Toolkit). Traditional monolithic BSS/OSS deployments are difficult to scale, and the lack of granular control means generic capability is deployed that may be irrelevant to specific use cases, markets and target customers at any given time. The Openet microservice toolkit is designed to deploy in the telco-cloud, dynamically scaling to meet demand and instantiating only those components that are needed to support the specific needs of the service at that time.

Figure 4 : Openet Microservice Toolkit ("Forge")

Forge Microservices	Forge Framework	Forge Management
Catalog of microservices to allow for the flexible delivery of the Openet solution portfolio. Each microservice delivered by Openet is enabled by Forge.	**Next generation framework** for the development of telco grade microservices based solutions: - Modular Architecture - Cloud Native - Enhanced security and SSO - Microservices enabled	**Operations, maintenance and toolset** to allow for the efficient management of a solution: - Kubernetes and Docker support - Unified Monitoring

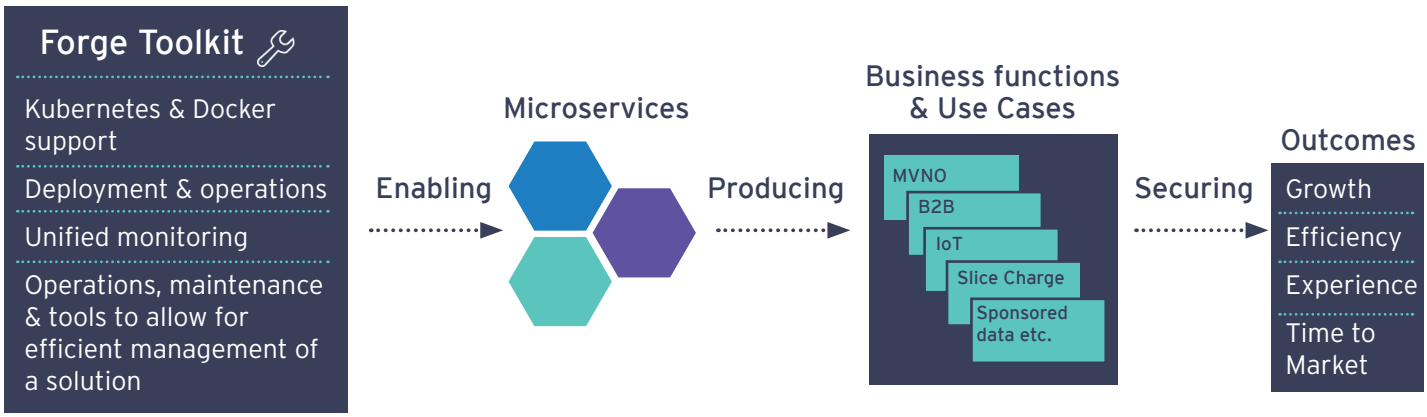
FEATURES

The Openet Microservice Toolkit enables:

- Microservices-centric development focus
- A cluster architecture enabling management of distributed systems as a single entity
- A highly distributed in-memory database
- Modular software components (extending on the already modular approach taken in delivering solutions like Openet Charging and Policy, but focussed on distributed deployment and independently modular upgradability)
- Enhanced linear and elastic scalability
- Cloud-native deployment support
- Enhanced security and SSO
- CI/CD (deployment pipelines in conjunction with Kubernetes)
- Efficiencies based on Openet's own in-field experiences of mesh technology and Service Based Architecture (SBA) for deployed telco environments

The Openet microservice toolkit provides the continued solidification of the move to digital, embracing cloud technology and microservices for needed dynamism, flexibility, and agility. It enables service providers to position beyond their traditional core business and supports the development of an ecosystem of new capabilities and services aimed at supporting a service provider's desire to grow revenue and deliver long-term opportunity, rapidly linking service needs to business outcomes (Figure 5).

Figure 5 : Forge Toolkit & Efficient Business Outcomes



WHY WE'RE DIFFERENT

Openet's experience and solutions can be used to provide a tailored, low risk, pre-integrated set of enablement to suit any service provider's requirements. As it is a modular approach, service providers only need to take the solutions they want and the API-driven approach means Openet can integrate with any existing systems that the service provider has in place.

Tier 1 service providers: for many large service providers who are undergoing a lengthy (and expensive BSS/ OSS digital transformation) Openet PCC enablers can provide a plan B. They can be quickly implemented in parallel to the existing legacy stack in order to allow the service provider to realise and increase revenues from digital services and enable personalised customer engagement.

Tier 2 and 3 service providers: including Digital First Sub brands and MVNx: Openet's Digital Platforms provide the low-risk solution to more radically get an end-to-end Digital stack up and running.

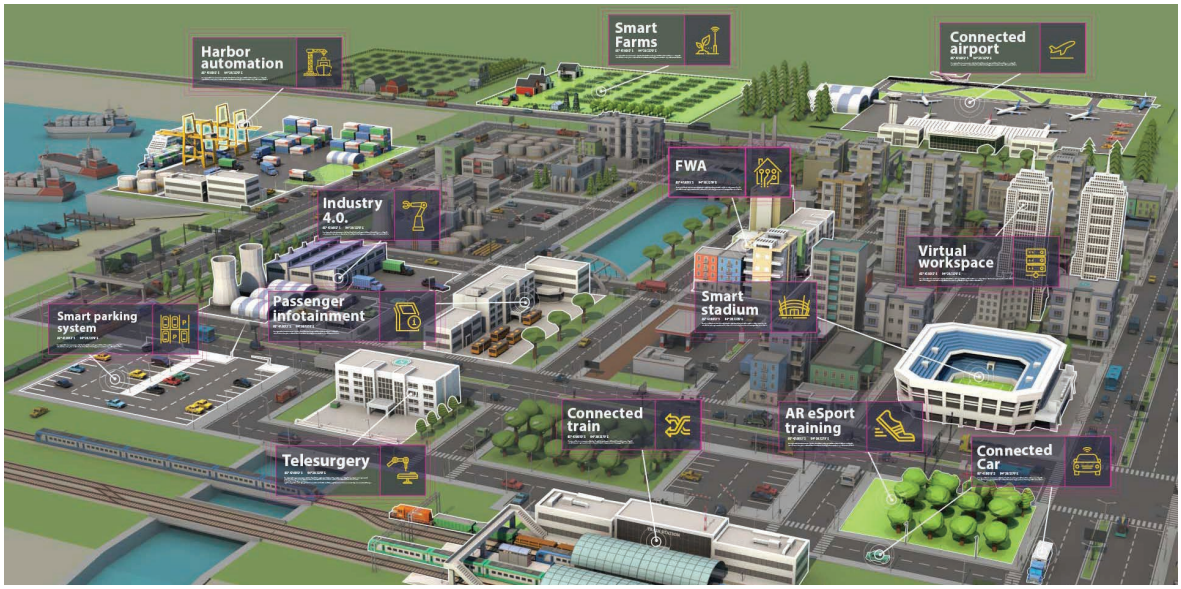
Furthermore, Openet service capsules (service-oriented microservice combinations) ensure rapid rollout at the scale fit for purpose and at a cost point that make a tailored offering affordable for specific consumer, enterprise and IoT audiences.

Offering complete flexibility, Openet PCC can be delivered on-premise or in the cloud and meticulously managed "as a service". This is all with the assurance that Openet is already the choice for PCC of leading "Tier 1" service providers.

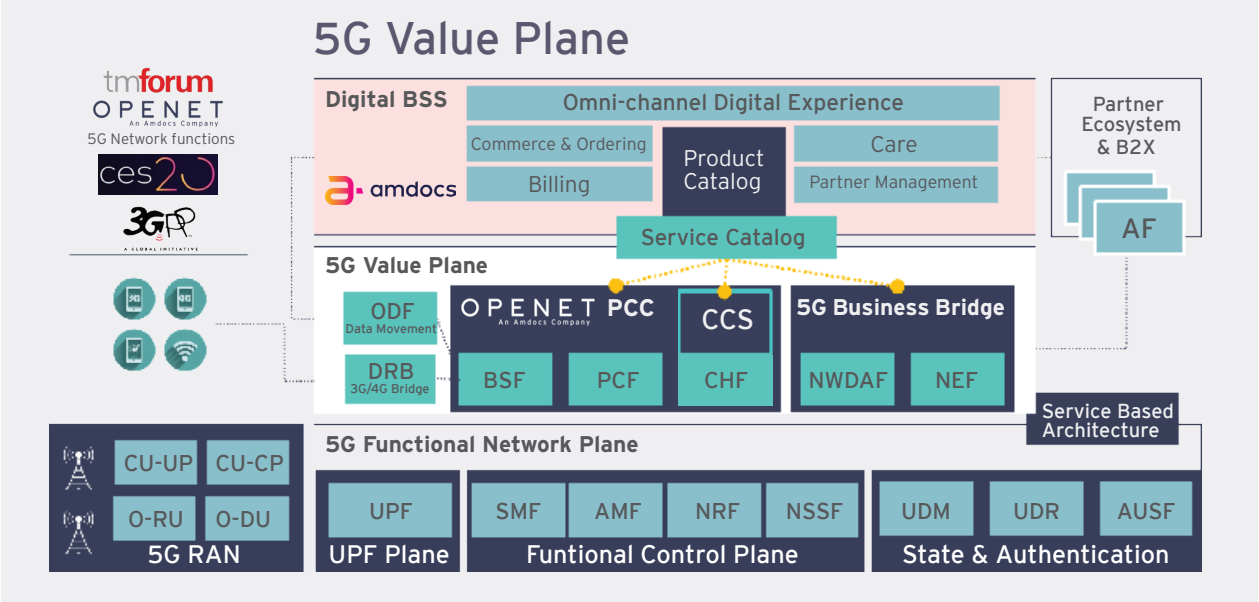
WHY WE'RE DIFFERENT

For 5G our products support a range of use cases and applications. A sample of these are highlighted in Figure 6.

Figure 6 : Sample of 5G use cases enabled by Amdocs and Openet products



Together with Amdocs we have combined products that provide a real-time and dynamic bridge between telco IT and the 5G network. At the core of the 5G Value Plane is the Openet 5G charging and policy systems and the Amdocs Service Catalog - CatalogONE. Openet's products provide the integration point to the 5G network and Amdocs CatalogONE provides the integration point to the business / IT universe. Having this foundation for 5G management and monetisation also opens up new opportunities to update adjacent solutions – such as Digital customer experience management on the business side and network optimisation on the network side. This opens up the opportunity to monetise the 5G network by enabling higher value, 5G network driven use cases and offers that realise the potential of 5G.



ABOUT OPENET:

Openet, an Amdocs company, is a leading software and services provider to communications companies. Our deep domain expertise & understanding of complex systems, underpinned by the tenacity and determination of our people, enable us to radically transform how our customers do business, providing best in class digital and 5G business support systems.

In an industry where the only constant is change, our open and innovative technology is built for change. For the last 20 years we have helped the world's most innovative communications companies manage and monetise their business and evolve from communications companies to digital service providers. This gives our customers the power to enter new markets, open new revenue streams and increase profitability.

AMDOCS & OPENET:

Amdocs (with Openet as an important part of the engine) has evolved to be the best vendor-partner to drive the enablement of 5G innovation to become commercial reality and help change the industry. We combine agile, cloud-native IT with the power of the 5G network to enable new opportunities for service providers, open new markets and develop new business models. Beyond the vision for software products, Amdocs has expanded its delivery, support and operations models that are most suitable for our customers' needs. 5G is driving change in our societies and economies, and offers huge opportunities for our customers.

Together Openet and Amdocs are Built for Change.

OPENET PRODUCTS:

Openet Charging:
Real-time convergent charging for digital and 5G services

Openet Policy:
Network policy control for next gen fixed, mobile and converged networks

Openet Data:
Data management, data processing and data governance solution designed to collect and manage data at 5G volumes in real-time

Openet Digital Platform:
End to end Digital BSS/OSS stack containing Openet & our partners' products

Openet Forge:
The digital enablement toolkit which contains Openet's library of microservices, upon which all Openet products are built

DELIVERING BUSINESS VALUE:

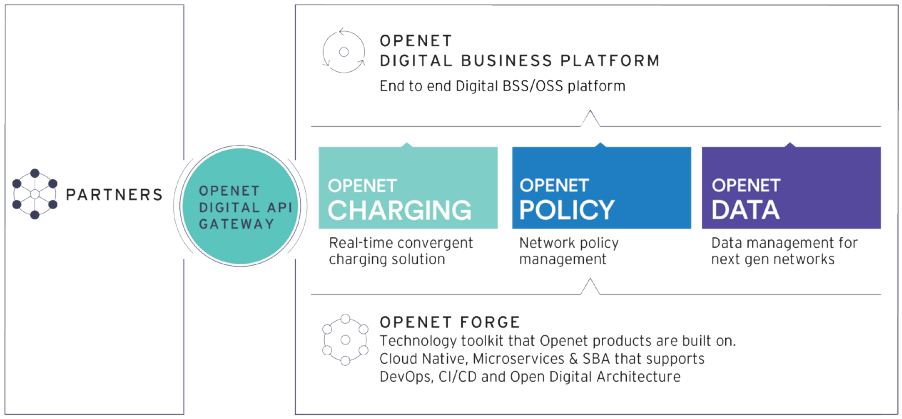
40%
Reduction in time to market for new offer creation

28%
Uplift in offer uptake

11%
Increase in mobile data ARPU

41%
Increase in mobile data revenues

OPENET PRODUCT PORTFOLIO



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