#### Data sheet

# Converged Charging System

# 

Act in real-time

Empower 5G Super Resilient

#### ccs

## **Product Overview**

Lifecycle Converged Charging System (CCS) is a standalone, carrier-grade, next generation, 3GPP compliant and 5G ready, online & converged charging system designed to support all types of services, either online or offline. It seamlessly integrates with existing Networks (Fix, Mobile, Internet, IoT, Utility...) to provide reliable, innovative and feature rich Real-time Convergent Service Control & Charging functions that unlocks new monetisation opportunities.

# The value

## Operate mission critical services

The CCS is a reliable and robust product to converge all charging needs in one single platform. Data, minutes, SMS or any chargeable event can be captured in real-time across the networks, whatever the bearer used

- Mobile networks can use CCS to manage their ecosystem of MVNOs and partners, leveraging hierarchies to monitor traffic and revenue, perform wholesale rates and traffic adjustments and detect anomalies
- Facilitate settlement and enable individual tenants real-time rating and billing, providing full visibility and control of any chargeable events, customer balance, failed calls, etc.

## 5G Slicing and new revenue streams

The 5G Core and service-based architecture delivers the ability to slice the network to support new business cases, with varying quality of service depending on the demands placed by the business case. This slicing ability coupled with 5G speeds sets the stage for enhanced mobile broadband and IoT opportunities, primarily in the areas that require ultra-reliable and low-latency communications (URLLC) and massive machine to machine communications.

## **Revenue Assurance**

The real-time charging shortens time to cash for the operator and removes revenue leakage that may occur on latent charging processes because the charging takes place immediately. The CCS and its rating ability unlock multiple-partner revenue-sharing management and provide an accurate financial outlook of the mobile network operator.



# The power of real time charging

## Create tariffs, plans and bundles in minutes

Create and implement competitive pricing models and plans in minutes. Meet customer needs through flexible packaging, bundles of services and bonuses and discounts. You can configure allowance bundles, regional tiered ratings and flexible duration periods.

Your team can self-serve and manage the strategies that fit the needs of your business with no need for IT intervention.

## Customer acquisition and loyalty

Real time charging is able to provide customers full spending control - it provides information about their remaining allowance and data and allows users to customise their plan. Purchases of top-ups/ bolt-ons are credited immediately.

On top of it, CCS unlocks a set of mechanisms engineered to engage, and increase loyalty and revenue. Some examples are:



Charity

Deliver funds to your charity through donations of unused allowance or balance



## Gifts & recurrent incentives

Provide free, limited period, ad-hoc data or service bundle to celebrate an occasion.



#### Loyalty schemes

Create a programme to nurture your customers and stimulate acquisition.



## Payback and data rollover

Reward with payback or roll over allowance

# Delivering commercial and competitive advantage to your business in an evolving 5G landscape

Lifecycle's cloud ready CCS is a highly available, resilient, supplier agnostic solution with real-time rating functionality, empowering providers to evolve their business models to leverage new network capabilities and maximise monetisation opportunities.

Our solutions automate mission critical billing and are easily integrated and scalable, catering for huge volume increases as your business grows.

Our microservice strategy allows us to quickly build and deploy new monetisation and service propositions, enabling you to win customers with innovative, flexible billing solutions, tailored to your business goals.

## 3GGP compliant charging

Our high capacity, high availability 5G ready platform is built to industry standard 3rd Generation Partnership Project (3GPP) charging specifications for both LTE and 5GC integrations. The CCS is proactively designed and continuously evolving to meet changing industry needs and regulations. Your billing solution is future proof by design.

## Manage service quota dynamically

Reduce demand on networks offering 5G over LTE during the transformation to 5GC by assigning dynamic service quota management to the CCS. The CCS can intelligently flex the size of granted service quotas based on end user service credit profiles to deliver the optimal 5G experience while increasing efficiency of Diameter integrations.

## Deploy to suit your business

There are a range of flexible and scalable deployment options; on-premise, private or public cloud. Implement as a bestof-breed charging engine to replace legacy network platforms, or as an end-to-end business transformation.

#### Minimise financial risk

The Online Charging Function (OCF) embedded in the CCS gives extensive real-time control, empowering providers to more efficiently manage the rapidly evolving rating and charging of end-user activities. The CCS maintains functional compatibility with the Online Charging System (OCS) used in 3G and 4G networks to support a stepwise transition to 5G following the service provider's timelines. High levels of automation reduce operational risk and customer service complexity. The CCS is not limited to pre-paid services. Combine the real-time rating functions of the OCF with the Charging Function (CHF) and Charging Gateway Function (CGF) in the CCS to create a powerful tool to prevent damaging over-expenditure on post-paid services. CDRs will be billed in a downstream billing system, however, real-time service control makes it impossible for end users to generate high charges and for rated CDRs to simplify billing processes downstream.

## Harness the power of events data for highly personalised billing

With our user-friendly software, you can better understand and act on end user behaviour. Event Intelligence monitors the feed of events and outputs for consumption by the network or other BSS applications. Using filters and realtime checks, it can be used to trigger new workflows, providing a unique end user experience in a manner that suits your business.

## Give spending control to your end users

Build trust by avoiding bill shock with fully transparent pricing, real-time balance management and end user-defined spending controls. Our cutting-edge rating capability, coupled with real-time service management gives spending control to end users and protects providers' revenue. Customers will receive notifications when they have used up their allowance and can be offered 'add-ons' to supplement their consumed allowances appropriate to services they are attempting to access.

#### **Grow faster**

Our CCS solution with carrier-grade OCS capabilities automates and optimises rating and CDR writing processes, business rules and operations to accelerate business growth. We provide a full BSS stack that supports the business operation from sale, in-life, commercial optimisation and customer support. CCS is designed to work seamlessly with any or all of our modules, enabling high volume customer billing and payment collection and support for all 5G and IoT projects. New business models can be monetised quickly, reducing costs and time to market.

## Integrate seamlessly when it suits your business

The CCS easily integrates with existing business and third party infrastructure. When you are ready to involve 5GC, Lifecycle's CCS is ready to be switched over to connect with the network through the SBA adaptor without the need to migrate any end users to new platforms. If the network offers both legacy LTE and 5GC simultaneously, then the CCS can accept traffic from both adaptors in parallel.

## Create new revenue streams and disrupt markets

Monetise your network assets and create value in new revenue streams opened by the 5GC revolution. Our cloud compatible architecture with adaptive service control is highly configurable to support business goals, innovation and enhanced end user experience in the transition to 5GC. We enable providers to manage connectivity and data from millions of IoT devices, setting the stage for the start of the massive Machine Type Communications (mMTC) era.

#### Remove pre and post-pay barriers

Break down the traditional barriers between prepaid and post-paid services with a single point of charging for all customers and services. Through network provisioning and seamless integration with existing BSS infrastructure, you can easily generate a single bill on behalf of all service providers.

# **CCS Features**

Name	Description
5G NOW	Start building your 5G brand right now by using exclusive features in Lifecycle's CCS to draw out the optimal end user experience and extend business case options during the 5GC transformation:
	• Support for large service request quotas to accommodate 5G bandwidths.
	• Adaptive service control that flexes the granted quota based on remaining allowance to enable real-time service control, whilst preserving optimal end user 5G experience without placing extra demand on the network.
	<ul> <li>Include additional 5G call types and sub types to breakout charging of the 5G services to create an extensive, diverse charging model.</li> </ul>
	<ul> <li>Response Times -values can be increased /decreased enabling latency to be controlled.</li> </ul>
	<ul> <li>Reserved Service Units (RSU) can be increased /decreased enabling controls to be applied -higher values allowing higher data speeds for example.</li> </ul>
	• Though combining 'Response' and 'RSU' as well as 'Rating group' values within a policy control, the operator can control the speed and latency of use of specific types /sites.
	<ul> <li>Create tailored charging profiles in the CCS to assign specific network and service product behaviours to end users:</li> </ul>
	• Prioritise allowances to stipulate how end users are charged for their service usage, for example to exhaust voice minutes before consuming cash allowances.
	<ul> <li>Restrict access to types of numbers and designated locations or construct blacklists to protect end users and business revenues.</li> </ul>
	<ul> <li>Differentiate products in a competitive market with tailored allowances exclusively for international and roaming usages for selected destinations.</li> </ul>
BUILT-IN AS STANDARD	• Authorise and charge differently based on the definitive type of service the end user is consuming by employing rating groups to produce alternative rating outcomes (for example offer free browsing of the service provider's website).
	<ul> <li>Own the detail through the granular construction of service products, supporting 5G over LTE for premium offerings.</li> </ul>
	<ul> <li>Design custom service bars to prevent access to specified network services that can be applied or removed to fit with the needs of the business case, all without dependence on the network.</li> </ul>
	<ul> <li>Cap expenditure for premium services to eliminate bill shock and effortlessly comply with regional regulations</li> </ul>



# **CCS Features**

Name	Description
Real-time Rated Service Control	<ul> <li>The advanced Account Balance Management Function (ABMF) and Rating Function (RF) in the CCS Charging Function (CHF) provides carrier- grade real-time service control capabilities:</li> <li>Offer a variety of services as discrete allowances with specified credit or usage limits (unlimited allowances are supported).</li> <li>Grant access to services end users are authorised to utilise with the available allowance remaining; ongoing use of service is ceased when allowances are exhausted.</li> <li>End user consumption of service from the allowances are controlled in real-time through concurrent reserved and committed unit management, offering the opportunity to support multiple sessions deducting from the same allowance.</li> <li>Support for pre-pay or post-pay billing models whereby the service control is always handled in real-time. Pre-pay end users must purchase an allowance before accessing the service, or usage of the service can be invoiced at the end of a billing period for post-pay end users.</li> <li>All currencies supported.</li> <li>CDRs/EDRs created for every event for reporting and reconciliation purposes.</li> </ul>
Enhanced Policy Charging Control Add-on Feature	<ul> <li>Extend policy charging control capabilities through integration with the network:</li> <li>Support for Dynamic 'Reserved Service Units' RSU for decreased latency and higher bandwidth</li> </ul>



# **CCS Features**

Name	Description
Standards- based Platform	<ul> <li>Lifecycle's CCS is based on the industry standard 3rd Generation Partnership Project (3GPP) charging specifications.</li> <li>3GPP-based IMS utilised to fulfil the integration between charging and network component.</li> <li>Additional mediation, session and policy management features can be provided as part of an integrated solution.</li> <li>3GPP IMS Diameter and HTTP protocols utilised:</li> <li>For Diameter, applications such as the Credit Control Application in conjunction with the Diameter base protocol, for example the Rf and Ro interfaces for offline and online charging respectively, and the Sy interface for integration with external PCRF platforms.</li> <li>For HTTP, the N40 Converged Charging and N40 Offline Only Charging APIs integrate into the CHF of the CCS and the N28 Spending Limit Control API connects the CCS to the 5GC network's Policy Control Function (PCF).</li> </ul>
CCS Analytics	The CCS Analytics Module provides in-depth details about your customer's journey. It's able to capture roaming country and country changes. Its also able to retrieve handset changes, new SIMs, device brand and model and more. Use this info to deliver APN settings and regulatory messages, upsell add-ons and fuel contextual campaigns.



# **CCS Functionality**

## Name

ccs

#### Description

Account Balance Management (ABMF)	Account balance management is a fundamental function of a CCS as it maintains end user account balances though reserving, debiting and crediting service allowances. CCS includes a highly developed ABMF capable of governing multiple balances across numerous simultaneous sessions for every end user, essential for providing the high-performance data services expected by end users. The ABMF is used to build the first layer of policies that include defining automatically renewing balances and enforcing credit limits coupled with granular service access and service barring rules. Monetary and non-monetary balances are supported by the CCS and can be combined in a hierarchical structure that denotes how the end user consumes the services, for example consuming allocated voice minutes before deducting from monetary balances. In addition, the CCS has the ability to raise end user usage alerts or trigger calls to action such as apply an add-on based on service usage conditions. The CCS maintains account balances in both Online Charging Function (OCF) and Offline Charging Systems (OFCS) in the same application, while supporting a stepwise transition from 3G and 4G to 5G.
Rating Function (RF)	CCS provides a rating function capable of handling offline and online charging based on the same rating rules and tariff structures shared between both charging methods. This simplifies the set-up and management process to increase speed to market and empowers service providers to respond quickly to changing market conditions and expectations. The rating function calculates the usage values generated as sessions and events by applying rules based on the end user's location, destination of service, rating groups and balance settings. In order to offer a vast array of rating configurations necessary to tailor services for a competitive communications landscape, the CCS is extensively optimised to produce low-latency rating outcomes compatible with proven carrier-grade, real-time platforms.
Charging Data Function (CDF) And Charging Gateway Function (CGF)	The charging data function is the element of the CCS that produces CDRs for every session and event handled by the CCS. In an offline charging environment, the CDRs are generated from interaction with the network over a Diameter or HTTP interface to then be fed into downstream applications for processing. If required, the CDRs can be rated by the Rating Function (RF) prior to being passed to downstream billing applications, streamlining the rating and billing processes for these applications. In an online charging environment, the CDRs are used for reconciliation purposes and in a 5GC network, the CCS is responsible for producing both the offline and online (rated) CDRs. The CCS also produces failed CDRs under certain circumstances to ensure that specific exception conditions are not kept invisible. Once CDRs have been created by the CCS, the Charging Gateway Function mediates these CDRs into a standard format for onward processing.



## ccs

# **BSS Features**

Name	Description
Trainio	
Cloud Compatibility	Open source, cloud-based principles that maximize configurability.
Carrier-grade Performance & High Availability	Lifecycle CCS has been built to support the carrier- grade operation expected of modern network architectures.
Seamless Integration	<ul> <li>Diameter or API driven network interfaces to maximise compatibility with the operator's infrastructure.</li> <li>Management APIs enable the CCS to be embedded with existing business support systems and provisioning services.</li> <li>Expand CCS capabilities through bespoke developed microservices.</li> <li>Automated management of payments through Lifecycle's own Direct Debit solution or integration with third-party payment providers.</li> </ul>
Highly Configurable End User Propositions	<ul> <li>Multiple allowances may be bundled as a package e.g. Gold Package would give access to three allowances: 1000 voice minutes + 500 SMS + 4GB Data.</li> <li>Configure tiered rating for regions e.g. on a Gold package a call to USA is cheaper than on a Bronze package.</li> <li>Flexible allowance duration periods e.g. top up after one calendar month or every 30 days.</li> <li>Support for automatic package renewal and package change journeys.</li> <li>Where multiple allowances in a package can serve the same request, prioritisation determines which allowances are consumed before others.</li> </ul>
Proactively Compliant	<ul> <li>Data capping to restrict the amount of roaming data the end user can consume.</li> <li>Premium rate services monitoring to ensure end users utilise these services within regulated limits.</li> <li>Fair usage policy management to safeguard against excess end user service consumption.</li> </ul>
Enhanced End User Experience	<ul> <li>Ability for the CCS to generate end user targeted notification alerts using API or webhook to inform of events, such as usage warnings, to comply with regional regulations.</li> <li>Carry over unused allowances or start with new allowance as required.</li> <li>Assign promotional vouchers that take money off the pre-pay charge for the next period.</li> <li>Create additional service allowance bundles that can be optionally applied to increase the amount of service available to the end user for a specified duration.</li> </ul>



# **BSS Features**

CCS

Name	Description
Optional, Flexible Billing Models	<ul> <li>Wholesale billing with ability to create a multiple reseller hierarchy.</li> <li>Retail billing with support for MultiSIM account structures.</li> <li>Business to Business applications including cost centre and location hierarchies.</li> </ul>
Additional Fraud Prevention, Monitoring And Reporting	<ul> <li>Actively prevent end users from interacting with numbers listed as fraudulent.</li> <li>Monitor end-user behaviour for patterns of fraudulent behaviour.</li> <li>Restrict access to services in real time to reduce the impact of identified fraud without intervention from the network.</li> <li>Access to data generated by the CCS to populate operational and management reports.</li> </ul>
Adaptable Deployment Options	<ul> <li>Customisable hosting options for the CCS on the cloud or embedded into the provider's existing architecture.</li> <li>Managed Service packages available for private and public cloud hosted installations.</li> <li>Use of a simulator to match current and projected volumes with the most suitable deployment approach.</li> <li>Extend the capability of the CCS through deployment of Lifecycle's business support system applications that provide CRM and end user self-care functionality in a managed service environment.</li> </ul>

## **Multiple options**

#### $\checkmark$ CCS as a Service

Our SaaS platform is designed to equip sales and marketing with all they need to self-serve and go to market with innovative services

#### ✓ White-labelled

Multitenancy allows you to provide the CCS to your partners and customers, monetising network capacity with full control

### $\checkmark\,$ Ability to work with anyone

The CCS is network and supplier agnostic and with a flexible business API gateway, so you can integrate easily



# the 5G journey

The evolution to 5G sees the replacement of the Evolved Packet Core (EPC) architecture that supports 4G LTE with a new 5G Core (5GC) that operates in a service-based architecture (SBA). 5GC delivers the ability to segment the network's service into logical slices. Each slice supports a specific set of business cases, and thus offers varying quality of service (QoS) depending on the demands placed on it by the business case.

This slicing ability coupled with 5G speeds sets the stage for enhanced mobile broadband (eMBB) and brand new IoT opportunities that were not possible in 4G. These new IoT opportunities are in the areas that require ultra-reliable and low-latency communications (URLLC) and massive Machine Type Communications (mMTC) made possible by 5GC.

Sectors that require URLLC include autonomous industrial applications, autonomous vehicles, medical applications or any mission critical application that depends on fast network communication to operate safely. For mMTC, this is an extension of the opportunities offered by 4G machine-to-machine businesses, but on a greater scale, supporting use cases ranging from smart home IoT connectivity through to connecting smart home sensors directly to emergency services responses.

The new 5GC architecture is constructed out of numerous discrete functions that perform tasks to collectively provide the services of the 5G network. Crucially, these functions are all software-based, which means multiple network functions can be deployed and orchestrated on a common, physical shared infrastructure to create Virtual 5G networks. This is how network slicing is achieved.

To integrate with a 5GC network, a Converged Charging System (CCS) is required. A CCS replaces the Online Charging System (OCS) for real-time rated services and also replaces network generated CDRs in a post-paid network. A CCS provides the critical Charging Function (CHF) of the 5GC network, which is the element that outputs both online (rated) CDRs and offline CDRs for post pay mediation and billing processes. Further, a CCS can also serve as an Account Balance Management Function (ABMF) and Rating Function (RF).



## **Primary 5G Integrations**

5G Core SBA Adaptor Integrates the CCS into the 5GC Service-Based Architecture (SBA) core network, linking network functions with the CCS internal functions including the Charging Function (CHF), Account Balance and Management Function (ABMF), the Rating Function (RF), and the Charging Data and Charging Gateway Functions (CDF/CGF).

4G/5G EPC Adaptor Enables the CCS to perform all of the 5G functions of a CCS however it is integrated into an LTE network that uses Event Packet Core (EPC) technology. This adaptor can also be used to integrate into 3G services, therefore, enabling service providers to be 5G ready before gaining access to network level 5G SBA during the 5G evolution.

Session Management Function (SMF) SMF is a network element that creates sessions and events based on attributes advised by the CCS.

Policy Control Function (PCF) PCF is a network element that manages network policy rules that are responsible for coordinating Quality of Service (QoS) profiles in 5G SBA (network slicing).

CCS Solution

# Why Lifecycle?



Automate and win with unprecedented levels of efficiency



Lead the market with the ultimate tech stack



Master the digital experience with total customer centricity

We bridge imagination and connectivity

# Our success metrics

1150

/second

Transactions per second, totalling 3BN month

Milliseconds

CCS processing time

1000s

of workflows

4.2/5

Avg Trustpilot rating for our telecom customers

13750:1

Subscribers per employee at **SMARTY** 

## Is your business set up for success?

We are experts at unlocking fresh possibilities in telecoms with our award winning digital and innovative telecom solutions.

Get in touch with our team of innovators, lets create something bold and new.

info@lifecycle-software.com +44(0)1635553400

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