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WHITE PAPER

# Enabling Communication Service Providers to catch up with the Smart Home opportunity

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The time when only geeks and early adopters were looking into Smart Home has gone. These days a more or less advanced form of home automation can be found in many homes. In more developed economies Amazon Alexa, Nest and Google Assistance have been a popular Christmas presents for the last few years. Business also came to believe in virtues and learned how smart building systems can help increase energy efficiency and assure security.

Security Dealers surveyed by Parks Associates reported in the third quarter of 2019 a double-digit growth in installation of a variety of Smart Home Devices. Currently the biggest interest seems to be around Network Video Cameras with 22% growth – but a double-digit installation increase has been also recorded for Smart Leak Detectors, Light Switches, Thermostats, Door Locks and Smoke Detectors. ABI research for visionaries forecasted back in 2018 that Smart Home will reach US$11.2 billion by 2022 for Communication Service Providers (CSP) alone.

Big CSPs have already defined their Smart Home strategies partnering with solution providers such as Aura working with Telefonica or Djingo working with Orange. The others have also realized that Smart Home and IoT is the trigger opportunity that can help develop their business beyond traditional telco centric revenue streams.

# Why are the CSPs positioned well to revolutionize the Smart Home market?

Smart Home market have many flavors.

**Home automation** is a traditional market for smart device vendors. These devices provide a set of features that allow to manage home utilities, assure home security and control building energy efficiency. These devices come together with applications, in many cases cloud based, that provide human-friendly interfaces for management and event processing.

**Home assistance** has been a traditional space for many local service providers. There are professionals needed to help assure proper operation of home appliances. These businesses are in many cases supported by insurance companies that provide maintenance service as part of their home insurance package. Upcoming in this area and driven by IoT device capabilities is the support of preventive maintenance features. Finally, there is one more market that goes beyond just buildings and appliances but focuses on residents.

**Home health** as a response to healthcare system challenges related with aging societies and more common chronic diseases is definitely on the growth path. This market connects healthcare service providers with telemedicine technology innovators.

One of the most valuable commonalities from CSP perspective of these Smart Home markets are communication capabilities. Smart home devices and medical IoT devices located in designated buildings gather a lot of information. Efficiency of these systems is proportional to the ability of data processing for decision making purposes. Ability to provide stable, trusted and secured communication channels position CSPs like no one else to revolutionize the Smart Home market and secure sustainable growth outside of traditional telecommunications domain.

# Flexibility as a method to ensure wide adoption

It has been proven many times, that building proprietary and closed solutions is not always the best approach. Standardization, on the other hand, with a very fragmentated market such as Smart Home is very challenging. The concept of a microservices based system architecture seems to be the right answer to overcome these challenges. It provides customers the flexibility to deploy use case specific functions with a CSP enabled eco-system. It also doesn't limit CSPs to enable their own functions packed as microservices, ready to be utilized with customer specific use cases – with the ability to generate further SaaS/PaaS revenue streams.

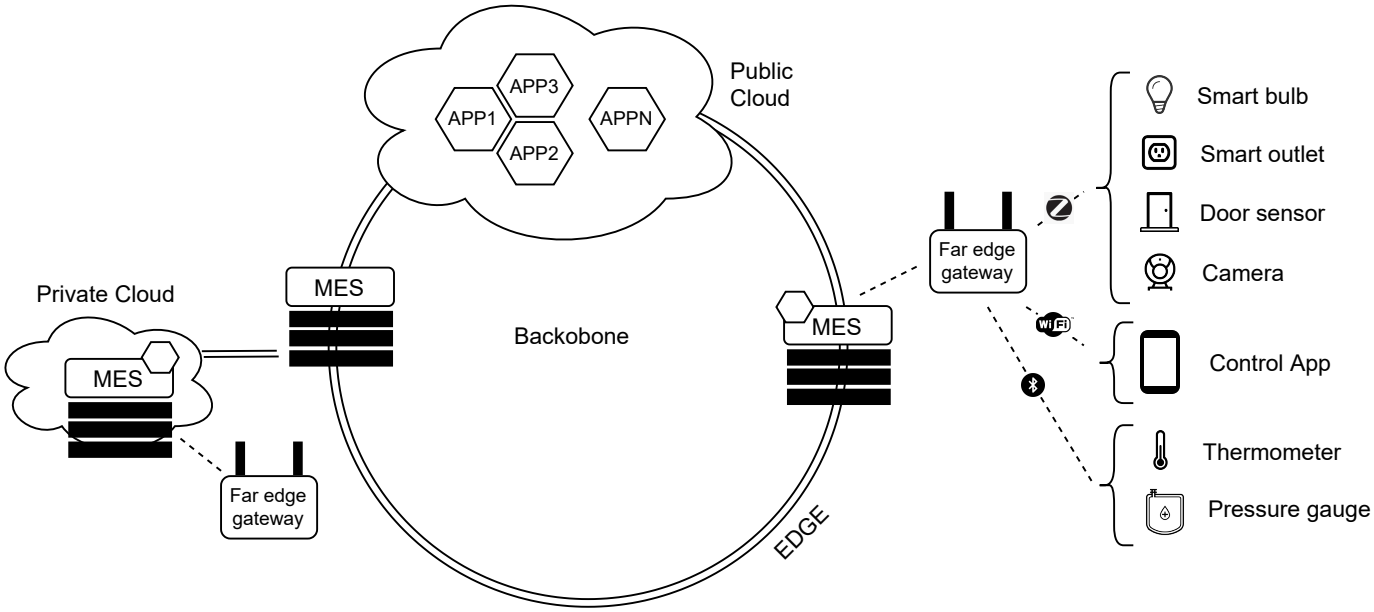



**Figure 1.** *CSP enabled Smart Home Eco-System*

# Making far EDGE gateway smart

Gateways have traditionally been the heart of connectivity. They are an indispensable element of the architecture in which many sensing devices are located in a short distance from each other. Traditionally their role is to gather data from sensors, format it and send to the application for processing. Internet Service Providers typically provide such gateways that are deployed in service subscribers' homes to provide network access. Mobile operators also offer Internet access through pocket gateways that are connected to their cellular networks. Smart Home isn't different in this matter. Smart Home gateways provide connectivity for sensing devices and delivers data to the application layer – in most cases located in the cloud.

It all sounds simple, but CSPs need more to enter the Smart Home market. They need flexibility to connect and service sensing devices manufactured and deployed by different vendors. They also need far edge data processing that happens at the gateway to be as effective as possible to limit unnecessary traffic to the cloud application layer.

Softgent's **Flexgent** provides light weight hardware agnostic micro-services engine software dedicated for gateways which is a foundation for IoT connectivity. It has been designed to address a hassle of assuring connectivity to sensing devices provided by different vendors. The engine provides life cycle management for microservices that can be deployed using various software coding technologies such as Phyton scripts, C#, Java and C++. It comes with a set of core functions that provide management features available through defined interfaces for any deployed microservice.

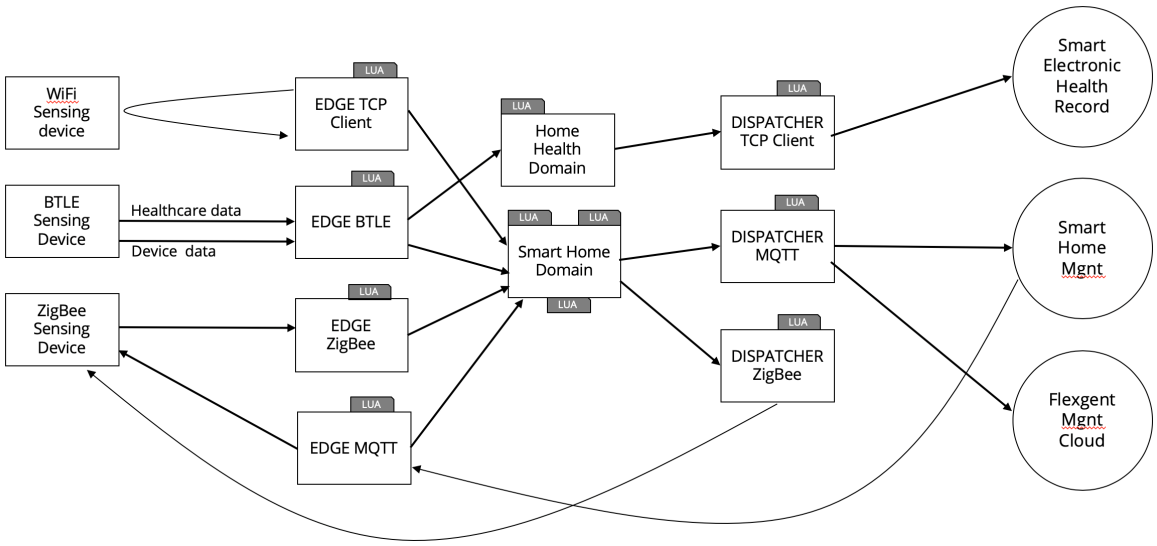



**Figure 2.** *Flexgent- Gateway microservice architecture*

Flexgent provides also a set of IoT Fabric features, that can enable Smart Edge without extensive programming and software management overhead. The IoT Fabric turns the concept of the data chain **"edge-domain-dispatcher"** into an easy to deploy plugin-based architecture. It opens the edge to a variety of sensors through plugin script programs that can deliver sensing data right into the domain. Edge features various of communication methods used by sensors to cover all Smart Home use cases. Dedicated plugins can be deployed for Wi-Fi, ZigBee that are used commonly for Smart Home devices as well as BTLE featuring an interface for healthcare IoT.

Data processing is the key function of the domain. It allows to make decisions based on analysis carried out by customizable scripts that define how to dispatch sensing data. The gateway can be even programmed to use AI functions right in the domain. Based on image preprocessing it can decide on which frames to dispatch to cloud processing in the same time saving a lot of unnecessary network traffic (more information about Flexgent AI capabilities can be found under *https://softgent.com/flexgent-iot/smartedge*. Dispatchers also provide interfaces to network located applications through easy to customize plugins,. It can be programmed to send data directly to the cloud or to CSP owned Microservices Edge Servers.

# Microservices Edge Servers (MES) is CSP' strength in Smart Home market

The recent trend of bidding farewell to legacy telco architecture that puts complex application and data centers in the form of monolithic, but still scalable functional clouds seems to be in favor for CSP's and their ability to play a significant role in the Smart Home market. Clouds and their storage, processing and GPU capabilities are not going away. Customer's demands and the trend to decompose application functions into loosely coupled service-oriented applications forces cloud vendors to change their architectures. That change created room for the recent trend of creating capabilities for decoupled service-oriented applications closer to the edge. Microservices Edge Servers that provide access to flexible, edge demand specific services can increase network efficiency by limiting bandwidth to the servers located far from service subscribers. MES can also help with time sensitive applications reducing latency from 50ms-55ms specific for cloud server down to 1ms-6ms.

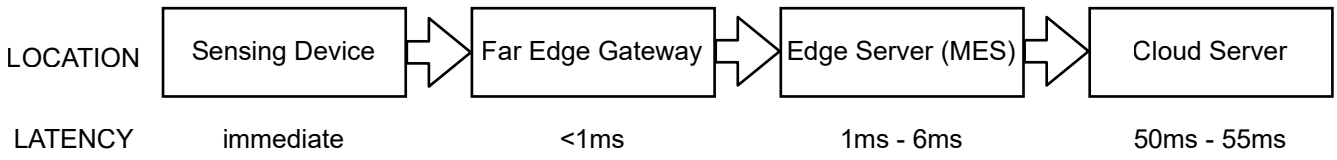



**Figure 3.** *Latency based on the location in the network*

MES servers will naturally reside at the edge of CSP networks and deploying services within these servers will generate new revenue streams for operators. MES seems to be the designed location for Smart Home and Home Health applications for obvious latency and bandwidth-saving reasons. Customers for these applications might also require enabling MES as exclusive servers, available only for their services subscribers – in many cases in secured and specific locations. This is an excellent opportunity for CSP to enable a new set of services to address market specific needs and also play a significant role in Smart Home technology.

Softgent's MES solution enables service providers to easily migrate decoupled application microservices from cloud servers to the edge servers. That migration is specific demand driven and allows CSP to adjust MES services to subscribers needs. Softgent's MES is composed of industry standard and popular Open Source software components including Docker containers and Kubernetes containers manager. Service demand is managed through customized functions of MES DNS. User requests are always routed to the closest MES in the CSP network, where MES DNS is designated to process it.

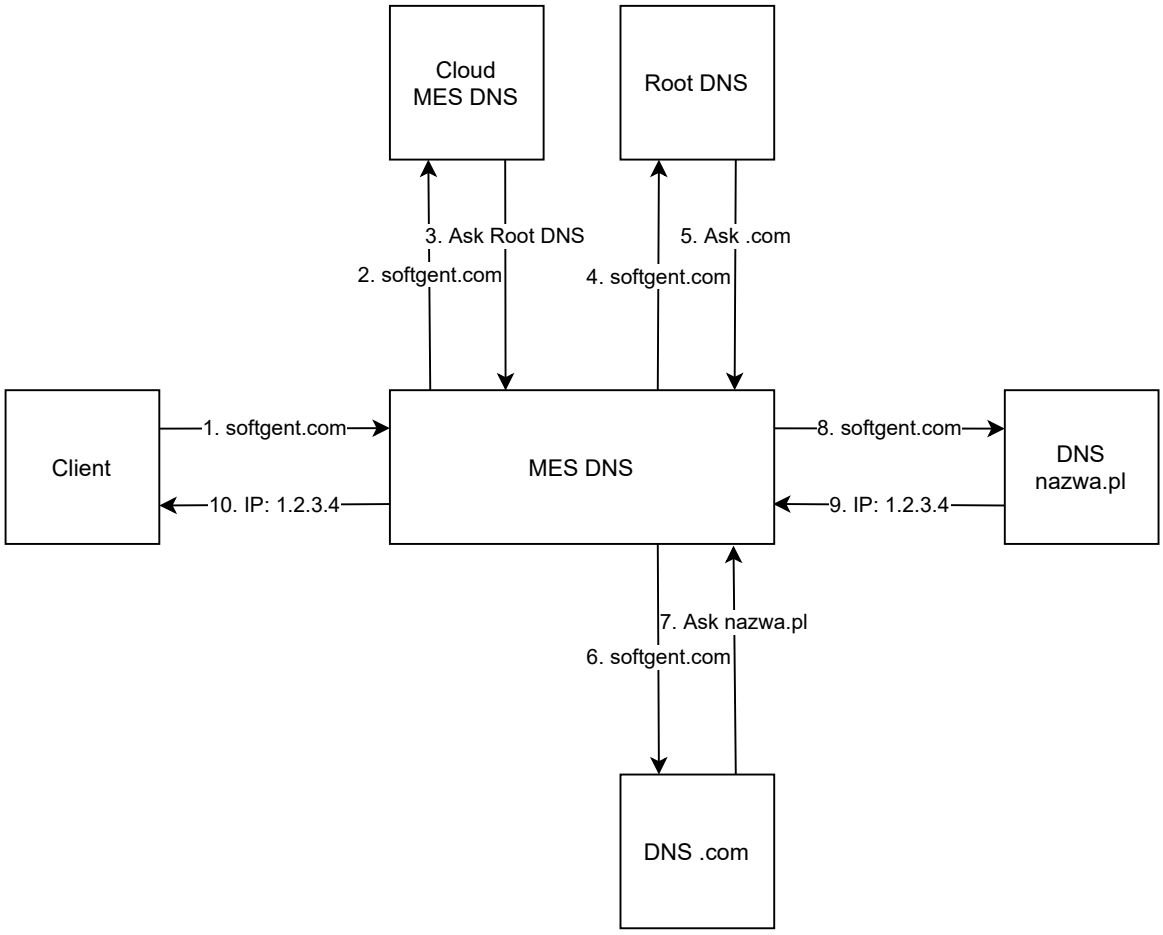



**Figure 4.** *MES DNS*

Service containers that are not residing within the MES capabilities are requested from its original destination in the cloud.

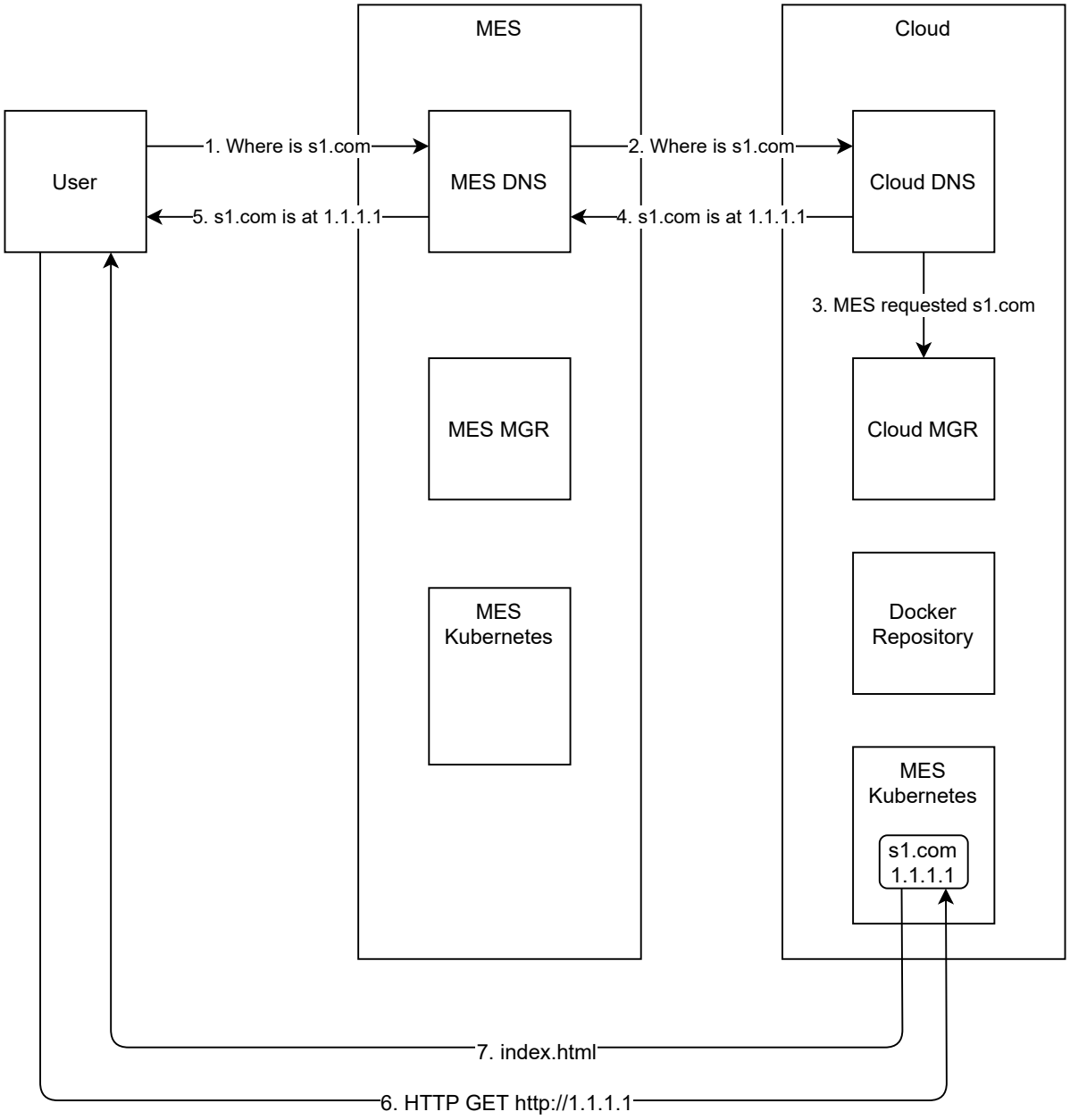



**Figure 5.** *First user request for specific service*

A cloud service that features a MES DNS function upon request will provide a docker image of the requested service. The image will be transferred to MES to service further incoming requests.

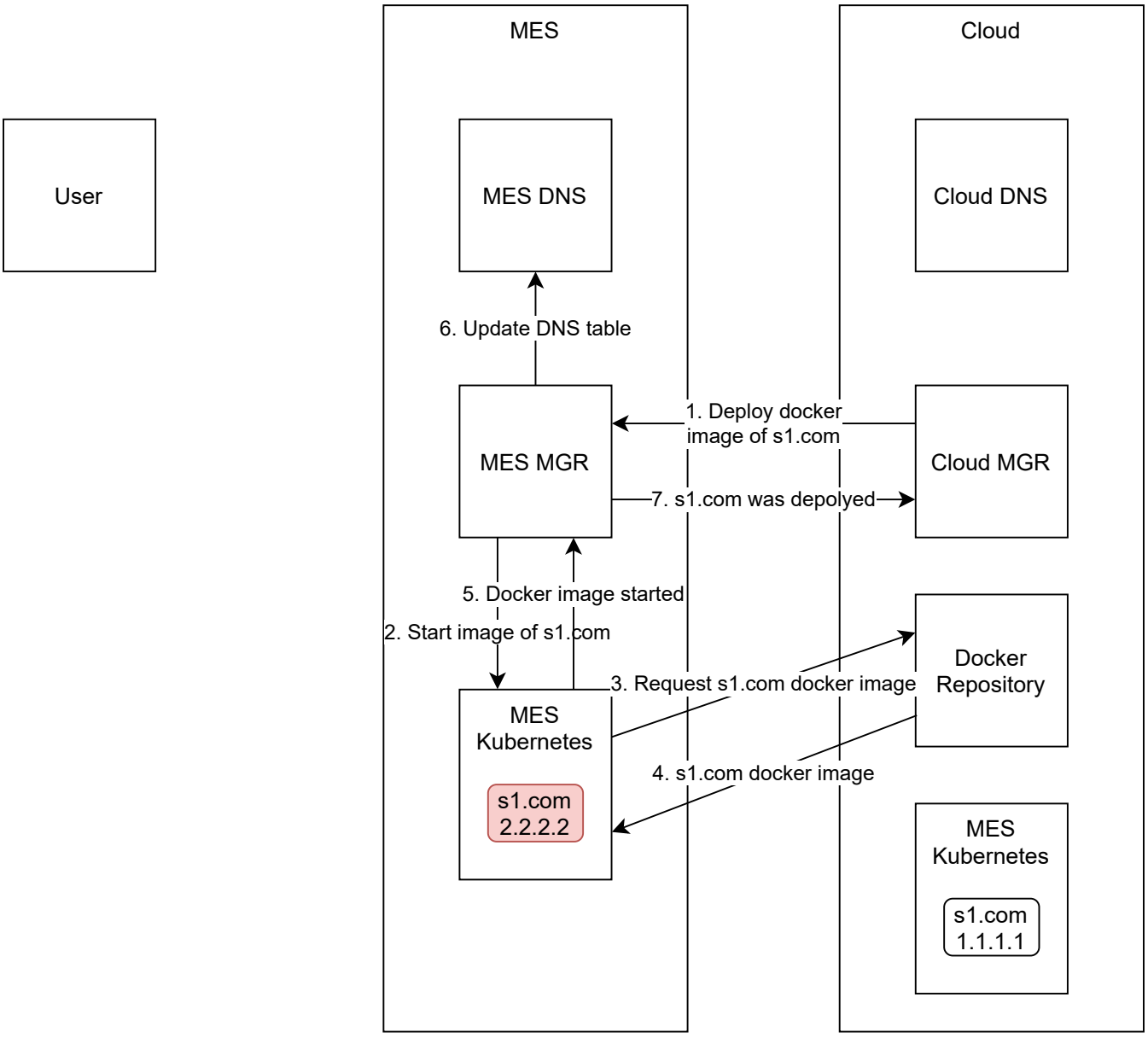



**Figure 6.** *MES obtaining requested service container*

A consecutive MES user request for the same service will be executed directly from the MES server residing right at the edge.

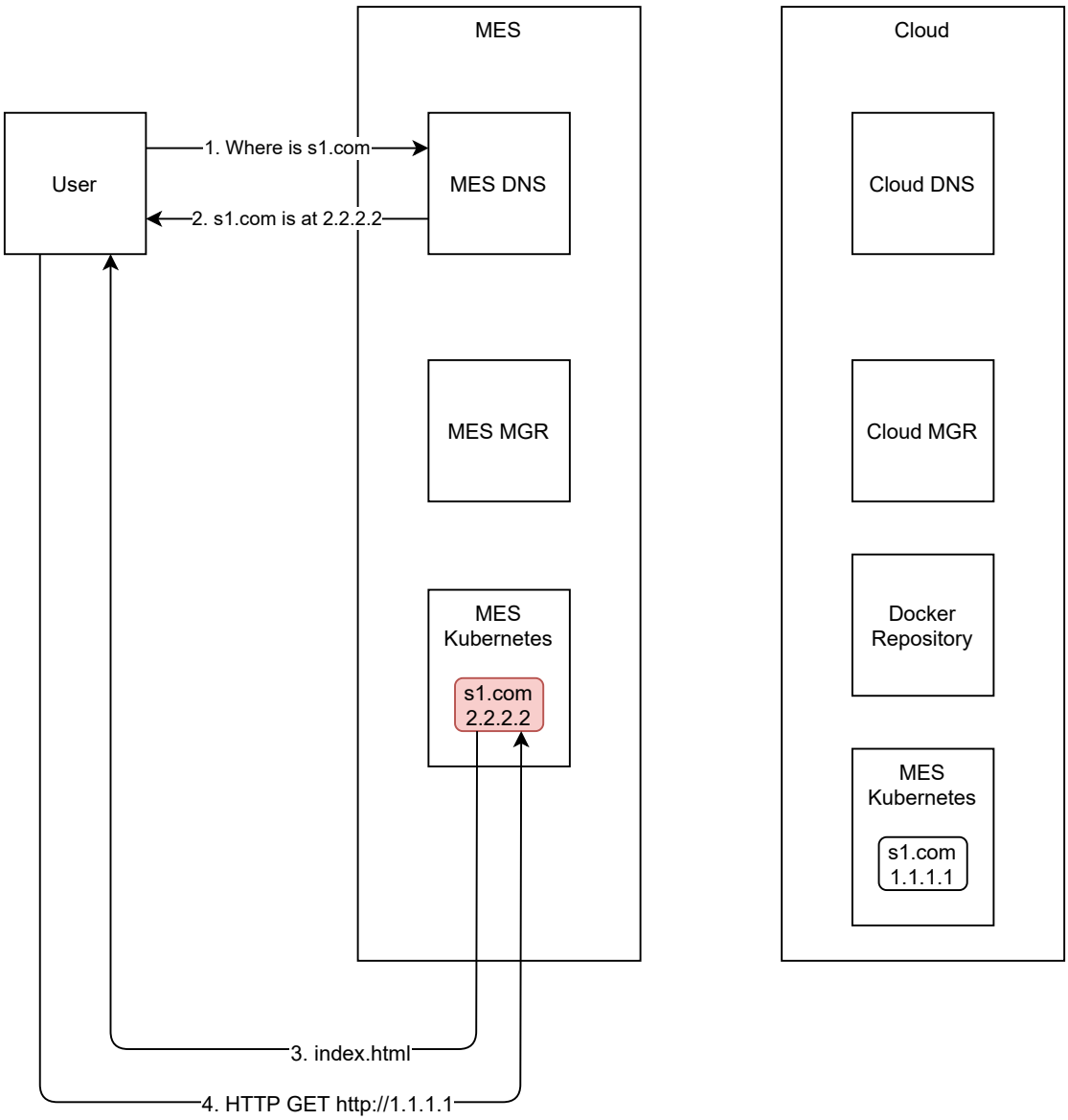
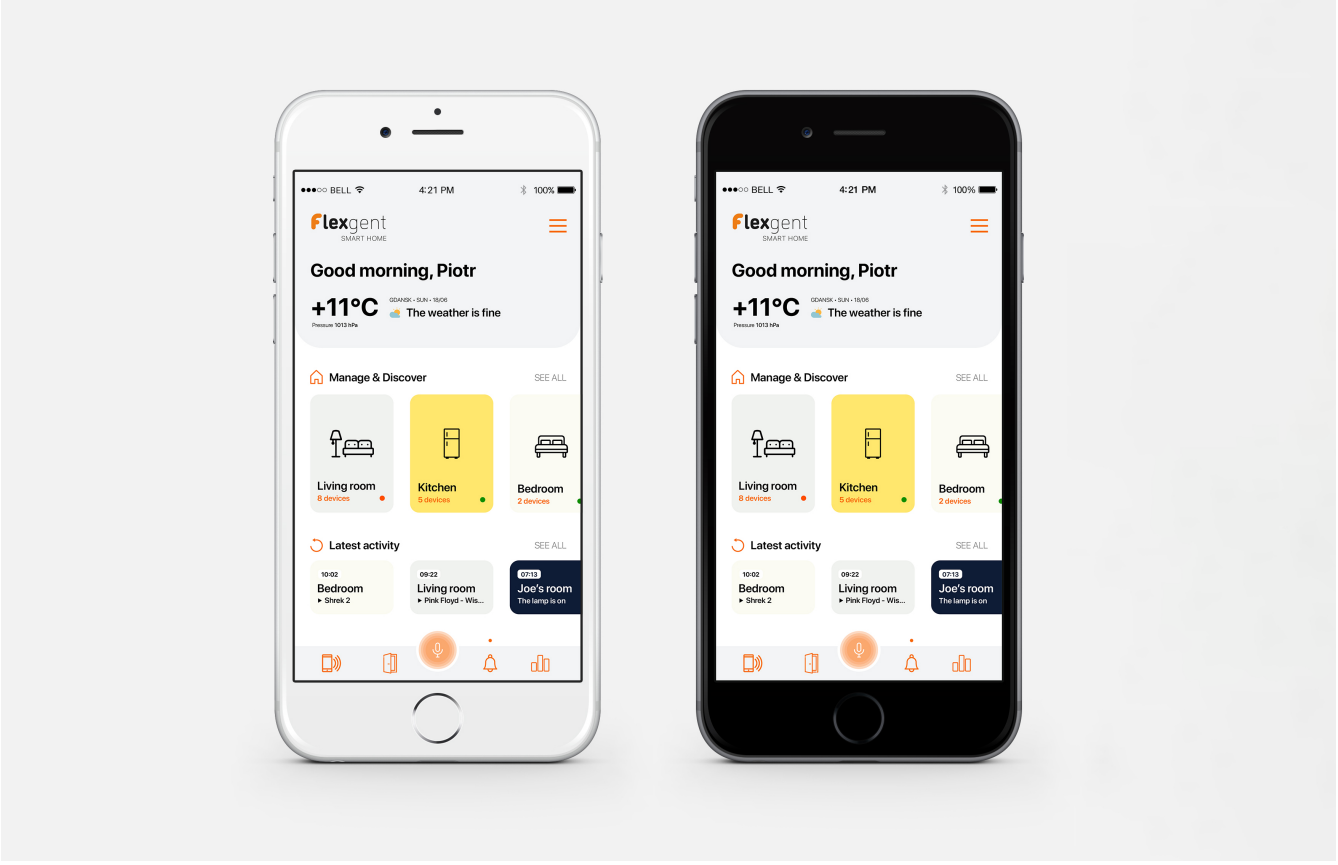



**Figure 7.** *Second request for the same service*

Softgent's MES solution allows a CSP to migrate cloud services specific to Smart Home and Home Health directly to the designated edge server. It is enough for the CSP to configure the far edge gateway to be connected directly to the designated MES, and docker images with Smart Home specific services will be automatically deployed to the specific edge. This solution provides the CSP a high level of scalability and ability to deploy an unlimited number of MES servers at the edge of the network using a single centralized cloud repository for service images.

# Through the full integration

Softgent provides a complete solution for CSP's interested in enabling Smart Home functions. Flexible, hardware agnostic gateway software can easily be adopted as a component for existing gateway software – or it can be provided as a dedicated, stand-alone Smart Home gateway. IoT Fabric flexibility and plugin scripts architecture allow to connect any devices communicating over Wi-Fi, ZigBee or BTLE and to significantly limit integration time and costs. Dispatching gateway data to a MES located at the edge of the CSP's network featuring Softgent's MES DNS will enable scalability to assure low latency and allows to optimize the CSP's network bandwidth. Softgent's cloud applications and APIs provide out of the pocket Smart Home device management and Home Health dispatching to the healthcare specific Electronic Health Record Systems - using industry proven communication protocols such as HL7 and MQTT. This Solution can also be enriched with mobile applications for Android or iOS.



# About Softgent

SOFTGENT Sp. z o.o. is an engineering company specializing in AI, communication and IoT. Softgent models software and hardware blocks, helping their clients manage the entire data chain including data collection, to-the-edge transfer and back end processing. They twist concepts into innovations and enable clients to win by increasing product competitiveness. Softgent's Flexgent software stack is a hardware agnostic solution for an easy and secure IoT, that can significantly reduce time-to-market and deployment costs. Advergent product utilizes Softgent's AI software components to improve retail market digital signage advertising efficiency. For more information, visit www.softgent.com