

OPEN TELEKOM CLOUD

OVERVIEW OF BILLING AND PRICE MODELS

One of the main arguments for using cloud computing is its dynamic availability – with costs based on actual use. So simple, clear and cost-effective to find out the prices for hourly usage of virtual machines, such unclear pricing when additional components are used. Because hardly anyone uses only VMs. Network connection, storage, licenses for software (operating systems, middleware, databases and applications) – complete IT environments comprise a large number of components. Self-service also always means that users have to keep track of costs.

With the Open Telekom Cloud, bills are issued every calendar month. In these bills, the services used are offset against any credit balance and free contingents (from reserved contracts).

For the core offering of the Elastic Cloud Server, in addition to hourly pay-as-you-go models, there are also reserved models available that offer users discounts of up to 60 percent on regular orders of resources over 12, 24 or 36 months. Two discount models are available: monthly advance payments and prefinancing of the entire period (upfront). The upfront model offers the biggest discounts.

REDUCTIONS IN PRICE UP TO

60%

FOR RESERVED MODELS



Fig.1: Price models for computing services: on demand or for long-term use

This document explains how the individual cost blocks for the Open Telekom Cloud are calculated. This is to provide transparency regarding the billing models underlying the different services. Some services offer free contingents, meaning they can be used free of charge up to a specified volume. If the free monthly contingent is not exceeded, no costs are charged. For other services, costs increase with increased usage on a linear basis or in steps (i.e., higher volumes can be used at relatively lower costs). The presentation of the pricing is based on the individual services, starting with the core IaaS services.

Prices given in the example calculations are based on the price table from June 2017.

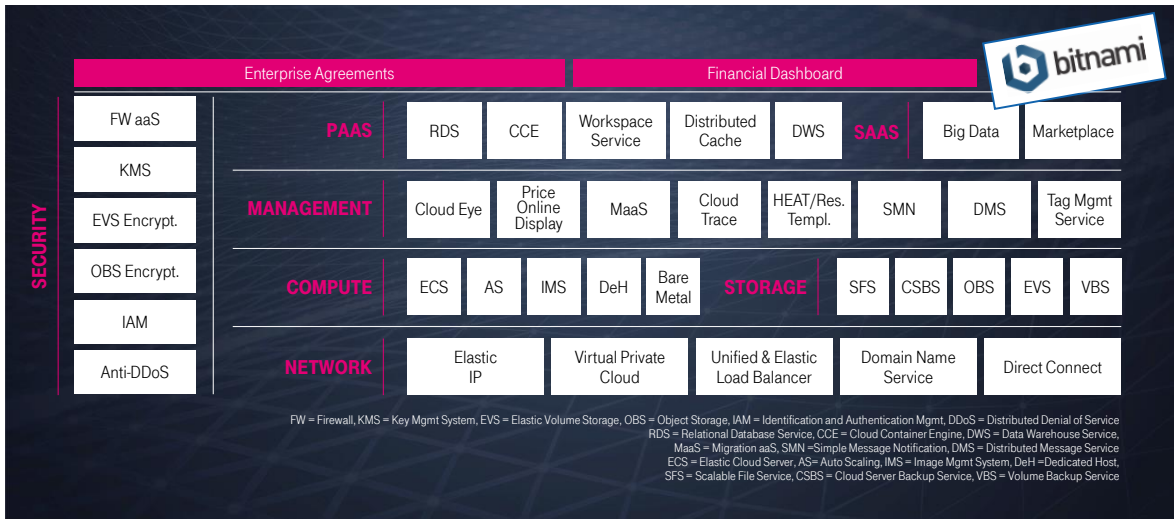


Fig. 2: Overview of services in the Open Telekom Cloud

COMPUTING SERVICES

ECS ELASTIC

On the Open Telekom Cloud, the pay-as-you-go model is referred to as „elastic“ (as opposed to „reserved,“ see above). Elastic instances can be ordered and canceled as required. Billing is on a per-minute basis. Only the time in which the ordered instances are active, i.e., have the status „running“ is billed. A separate billing item is generated for each kind of VM (flavor plus operating system): a Computing-I flavor with CentOS and a Computing-I flavor with Windows are recorded separately, but several Computing-I flavors of the same type with open Linux derivatives are not. The usage time of the individual VMs is recorded second-by-second and summed up in the course of the calendar month. The resulting total time is billed.

SUMMATION OF USAGE TIME EXAMPLE

In the course of June, you use several instances of Computing-II No. 3 (4 vCPUs, 8GB RAM). One on June 10 for 2 hrs 30 mins, one on June 12 for 1 hr 30 mins, two on June 15 for 45 mins, one on June 20 for 12 hrs 15 mins.

$$2.5 \text{ h} + 1.5 \text{ h} + 2 \times 0.75 \text{ h} + 12.25 \text{ h} = 17.75 \text{ h}$$

17.75 hours are charged on the monthly bill.

The first hour counts from usage of one minute. Metering of consumption stops the moment the instance is no longer active, i.e., when the status is „stopped.“ It does not have to be deleted from the console. Use of the autoscaler does not change anything: If the autoscaler is used to start or stop instances, then this is charged as if it had been manually started.

Please note: If the instances are stopped, additional costs are incurred for the associated Elastic Block Storage and Elastic IP! They must be deleted separately. In particular, this also applies to flavors in which local hard drives are integrated at all times (some high-performance flavors as well as disk-intensive flavors).

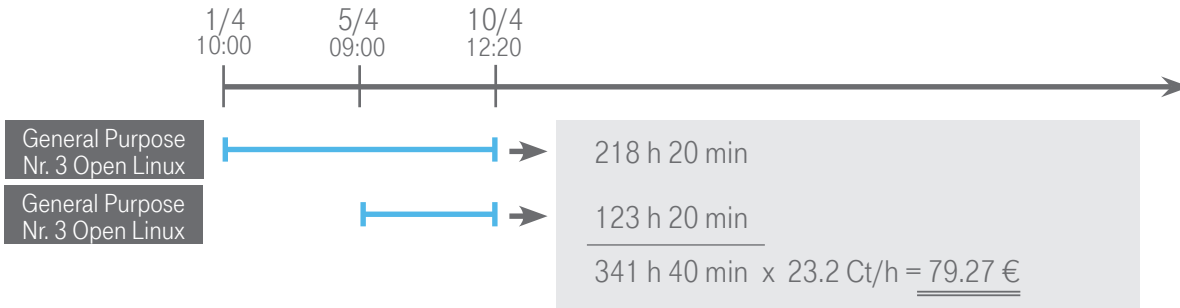
ONE BILLING ITEM PER VM MODEL:
VM MODEL:
Flavor (HW) + OS

ALREADY INCLUSIVE:

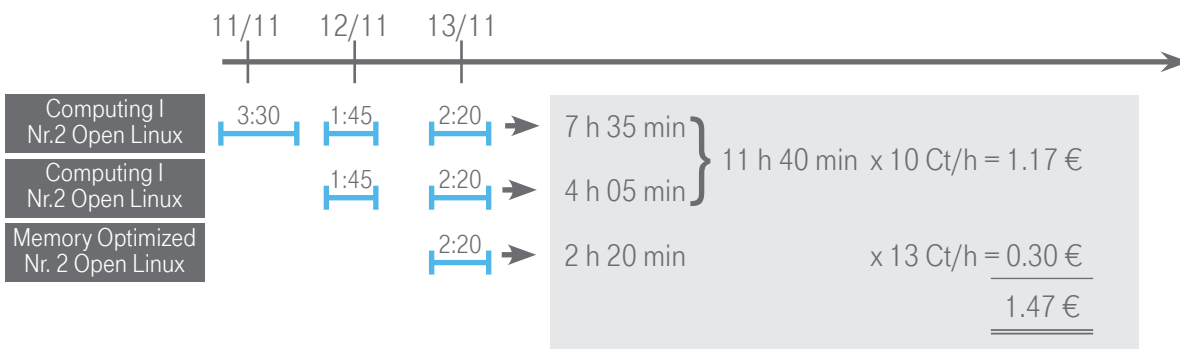
- Auto Scaling
- Image Management Service

CALCULATION FOR ECS ELASTIC EXAMPLE

At 10:00 a.m. on April 1, you start an ECS general purpose instance No. 3 (4 vCPUs, 16 GB RAM) with CentOS.
 At 9:00 a.m. on April 5, you start a second instance of the same type. Both instances run until 12:20 p.m. on April 10 and are then stopped. The basic costs for an instance is 23.2 cents/hour.



On November 11, you use a Computing-I instance No. 2 (2 vCPUs, 2GB RAM) for 3 hrs 30 mins. On November 12, you use two such instances for 1 hr 45 mins. On November 13, you use both instances together with a memory-optimized instance (2 vCPUs, 16GB RAM) for 2 hrs 20 mins. All instances are operated with an open Linux version.



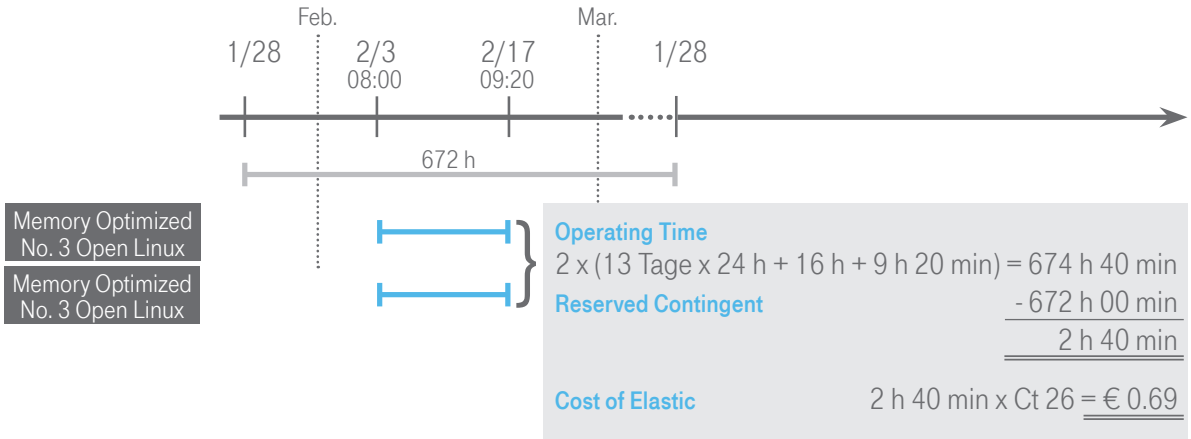
ECS RESERVED

Reserved instances are not available for all flavors. The [service description](#) sets out the available instances. Reserved instances can be reserved for a period of 12, 24 or 36 months. They are not fixed to a specific instance, rather, only to the instance type, and are billed even if the instance is inactive. Users acquire a credit balance corresponding to uninterrupted use of an instance of the selected type for the chosen period. This credit balance is spread over the individual months of the contract term (days of each month x 24 hours). Contract term always starts at midnight on the order date.

If the instance is not used for the full month, the unused contingent for that month is forfeited; nor can it be used later on in the reserved period. But it is possible, for example, in the course of a month, instead of using one instance for the entire period, to use two instances for partial periods. The use of capacities in excess of the ordered amount is billed on top using the elastic model.

ECS RESERVED - EXAMPLE 1

On January 28, you reserve a memory-optimized instance No.3 (4 vCPUs, 2GB RAM) for 12 months. In February, you use two memory-optimized instances of the type ordered at the same time from 8:00 a.m. on February 3 to 9:20 a.m. on February 17. The use of 672 hours in excess of the monthly contingent (2 h 40 min) is charged using the elastic model.



During the first three months, it is possible to upgrade to larger instance types. The contractual term remains the same. Time already used in the reserved package is billed on a daily basis at the old cost rate (daily rate of the monthly price x days passed). The new package applies until the end of the originally agreed term and is also billed on a daily basis.

OVERVIEW OF THE OPEN TELEKOM FLAVORS

	COMP I	COMP II	GEN PURPOSE	MEM OPT
VCPU	RAM [GB]			
1	1	2	4	8
2	2	4	8	16
4	4	8	16	32
8	8	16	32	64
16	16	32	64	128
32	32	64	128	-

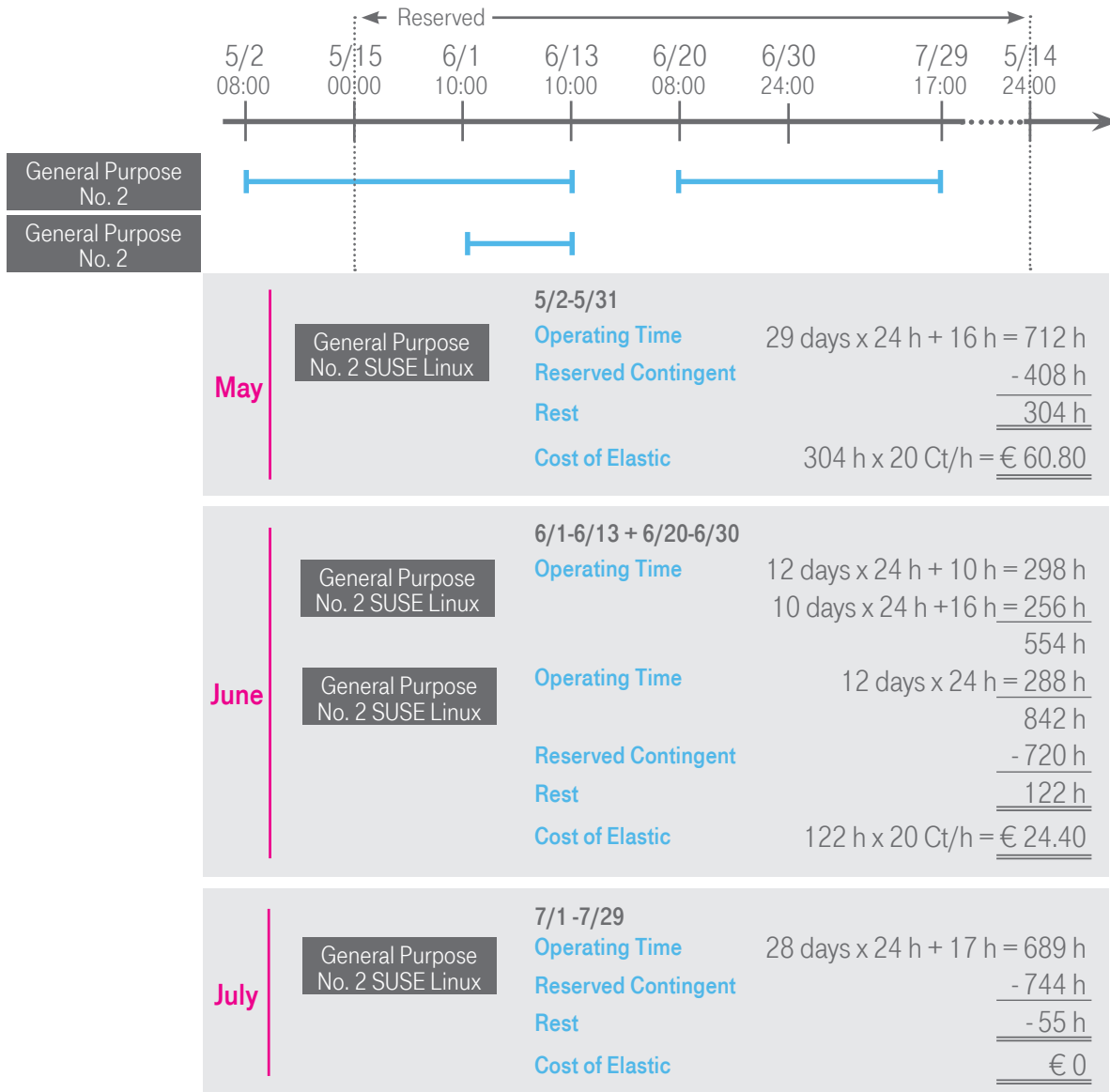
Fig. 3: Overview of BASIC flavors

	HIGH PERF.	GPU	WORKSPACE	DISK INTENSIVE	LARGE MEMORY
VCPU	RAM [GB] + ADDITIONAL RESOURCES				
2	4, 8, 16		4		
4	8, 16, 32	8 + vGPU	8 (+1 vGPU)*	32 + 5,4 TB	128
6			16		
8	16, 32, 64	16 + vGPU 64 + GPU (pass through)	16 + vGPU	64 + 10,8 TB	128 / 256
12					256
16	32, 64, 128 128**, 256**			128 + 21,6 TB	470
18					445
32	64, 128, 256				940
36				256 + 43,2 TB	890

Fig. 4: Overview of ADVANCED flavors

ECS RESERVED - EXAMPLE 2

You configure a general purpose instance No. 2 (2 vCPUs, 8 GB RAM, SUSE Linux) in the Open Telekom Cloud and use this continuously from 8:00 a.m. on May 2. From 9:00 a.m. on May 15, you order a reserved package for this instance type that applies for 12 months with retroactive effect from midnight on May 15. At 10:00 a.m. on June 1, a second instance of the same type is started to cover a spike in utilization (autoscaler). This is then stopped again, with the first, after precisely 12 days. At 8:00 a.m. on June 20, the first instance is started up again. At 5:00 p.m. on July 29, the active instance is switched off.



In the reserved upfront mode, a fixed amount is billed at the start of the term. It is not possible to switch to a larger instance within the first three months. In the subsequent months, the reserved upfront instances are also shown on the bill as a reserved upfront package, without being charged for. The credit balance „depletes“ over the selected term, with the pro rata amount available each month (hours x days). The only difference from the example above is that the complete amount for 8,760 hours (365 days x 24 hours) is billed at the end of the month in which the order is placed.

DEDICATED HOST

Dedicated hosts are also available on the Open Telekom Cloud. Within the technical parameters, several separate virtual machines (VMs) can be set up and modified on these reserved resources. The bill shows only the licenses for the VMs, no costs are incurred for open Linux. The same billing models as for ECS also apply for dedicated hosts: elastic, reserved and reserved upfront, with the rates applicable for the hosts.

STORAGE

The Open Telekom Cloud offers four storage types: Elastic Volume Service (EVS, block storage – always linked to virtual machines), Object Storage Service (OBS), Cloud Server/Volume Backup Service (CSBS/VBS), and Scalable File Storage (SFS). The pricing models vary between the object storage and the block-storage offers (EVS, VBS). In general, object storage is VM-independent and a more cost-effective storage option, whereas block storage enables fast data access thanks to a directly connected virtual hard drive.

ALREADY INCLUSIVE:
5 GB Basic Volume OBS

The reference period here is also the relevant calendar month. The average volume of allocated storage is determined (in GB) and used as the basis for billing. In the block storage option, prices rise on a linear basis in line with the data volume. For object storage, prices are based on (discounted) stepped scales. The steps are of specific sizes and stack on top of each other. The higher the step, the lower the costs for the storage volumes allocated in that step. The exception to this rule is that the basic volume of 5 GB for object storage is free of charge.

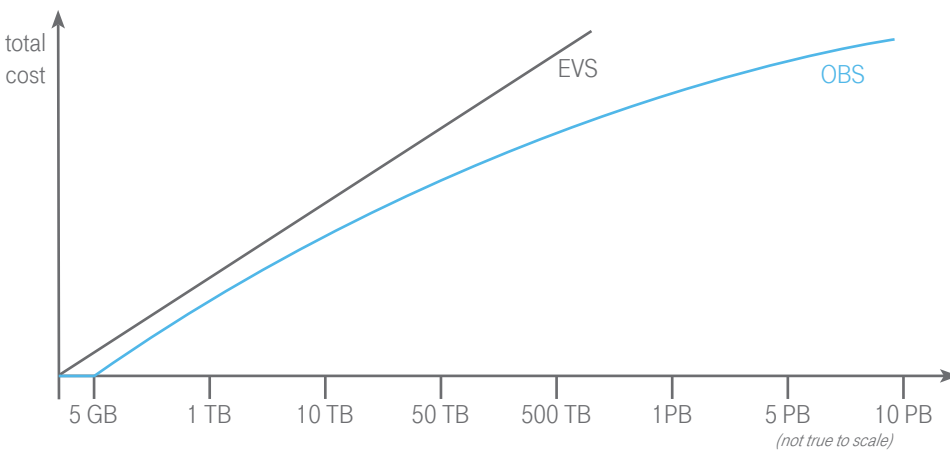


Fig.5: Price pattern of EVS and OBS in comparison with increasing use

CRITERIA	OBS	EVS/VBS
CALCULATION BASIS	amount of data	allocated storage/backup volume
ACCESS OPTIONS	access from internet	no access from the internet/ direct connection to ECS VM
PRICE PATTERN	declining scaled prices	fixed/GB - linear
COST OF REQUEST	cost per request	inclusive
SPECIAL CHARACTERISTICS	exemption for 5 GB	five performance classes (SAS,SSD,SATA, SAS boosted, SSD boosted)

Fig.6: Comparison OBS and EVS/VBS

ELASTIC VOLUME STORAGE/VOLUME BACKUP STORAGE

Elastic Volume Storage (EVS) can be ordered in three classes. Prices also vary according to access speed. Monthly costs are determined on the one hand by the allocated storage volumes in GB, and on the other by the duration of their use. I.e., if the storage is only provided for half a month, then only half of the costs are incurred. Elastic Volume Storage is deemed to be provided even if the associated instance is stopped, as long as the storage has not been deleted. EVS pricing model is also applied to Scalable File Service and Cloud Server Backup Service.

PRICING MODEL ALSO VALID FOR SFS AND CSBS

Only the ordered/allocated storage volumes are relevant when calculating the storage, not the specific data volumes.

The amount of storage used (OBS) or allocated (EVS) is multiplied by the number of usage hours and divided by the total number of hours for the month. This gives the average storage used in a month.

The average storage allocated in a month is multiplied by the basic price per GB. This results in a linear increase in costs as the volume of allocated storage increases.

EVS EXAMPLE

The storage associated with a VM fluctuates over the course of a month. It increases from 100 GB to 320 GB, falling again to 200 GB at the end of the month. Thus the average amount for the month is 200 GB. This average amount is multiplied by the basic rate (4.6 Ct/GB).

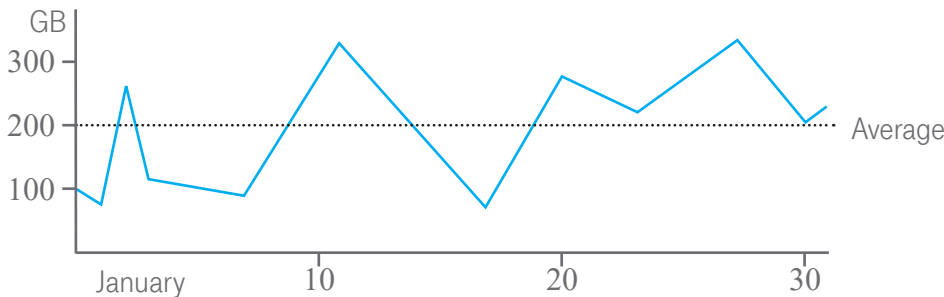


Fig. 7: Determination of the monthly average for EVS (schematic)

PREPAID EVS STORAGE

Another cost optimization model is offered via prepaid storage. This model only applies to EVS SSD storage. In line with the pre-paid model, you can order 500 GB, 1 TB, or 2 TB in advance at a discount of approx. 5 percent. The ordered volume can then be used up over the next three months starting from the month in which the order was placed. Volumes that are not used up within the three months will expire; volumes exceeding the quota will be billed in the classic mode (see above). A maximum of three of these packages can be ordered for each customer. Regardless of the day, these packages are valid from the 1st day of the month in which they were ordered; this means they can also be used almost retrospectively for the first month.

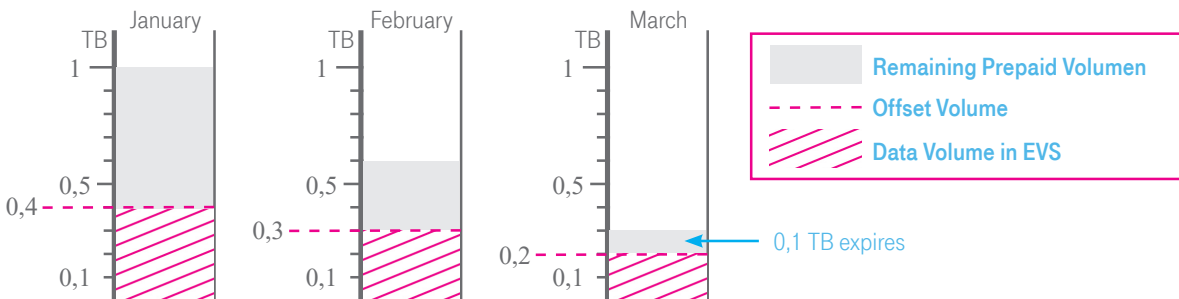


Fig. 8: „Consumption“ of a prepaid allowance of 1 TB over three months

OBJECT STORAGE

Object storage is billed differently from block storage. For object storage, only the storage actually used (i.e., the actual data volume) is billed. However, additional costs are incurred for requests to access the object storage. For every 1,000 requests, 0.7 cents is billed. The data volume is billed on a stepped price scale – at the higher steps, the price for storage falls. The lowest step ranges from 0 - 5 GB. Use of this step is free of charge. The steps then go up with limits of 1 TB, 50 TB, 500 TB, 1 PB, 5 PB, 10 PB.

**ALREADY
INCLUSIVE:**
1 GB Outbound
OBS

The average data volume stored in a month fills the steps from the bottom upwards, with the amounts charged at the prices for the corresponding steps (€/GB). The total price for object storage is calculated as the sum of the costs for each individual step used. For outbound traffic, costs are generally incurred for network services. However, 1 GB of outbound transfer per month is free of charge.

OBS EXAMPLE

In the middle of the month, 4,000 GB in 1 million files is uploaded to the object storage. A request is charged for each uploaded file, regardless of file size. 1 million requests incurs costs of € 7 (1,000 x 0.7 Ct). Since the data were uploaded in the middle of the month, the average storage volume for the month is 2,000 GB. This is spread over the object storage steps as follows:

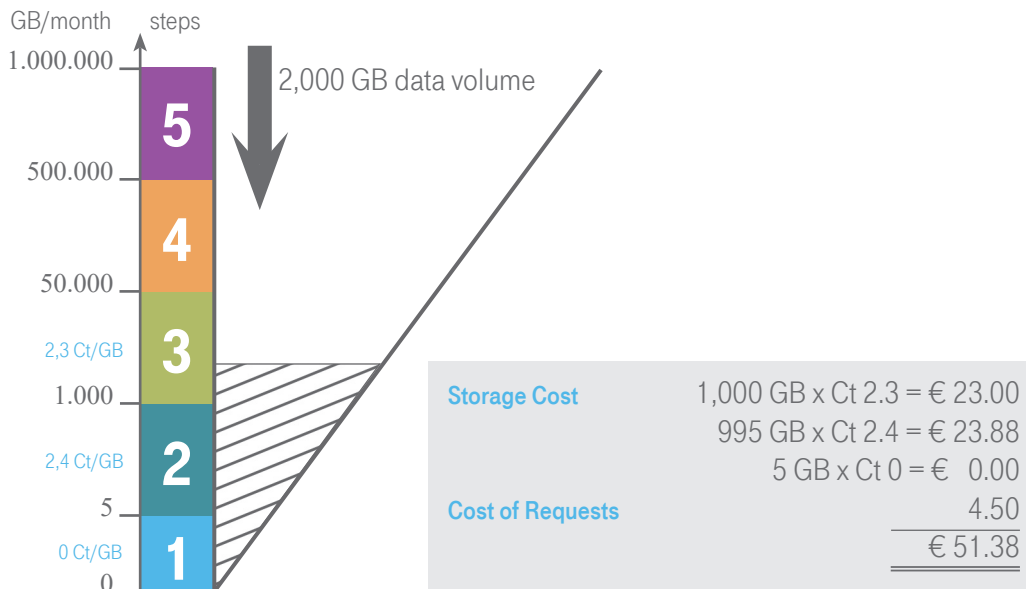


Fig.9: Steps for Object Storage (schematic)

COLD OBJECT STORAGE

The storage part of the cold object storage is billed in the same way as for standard object storage. Cold object storage uses a low-cost, “slow” storage medium and stores data in compressed form. It is suitable for data that is to be called up and recovered on rare occasions only. The data storage is very cost-effective, but recovery results in additional costs. Recovery takes place on standard object storage as a cache. This is not included in the free contingent and is added to the monthly bill. The recovery process also incurs costs – depending on speed. Data can be called up at three speeds: bulk, standard, and expedited. The bulk request is the slowest but also the most cost-effective while expedited recovery is the most expensive option. Since the object storage is designed for the long-term storage of data, there is a minimum storage period of 90 days. If this period is not achieved due to the early deletion of data, the difference to the minimum storage period is calculated and billed with the charge of the first scale .

WARM OBJECT STORAGE

Warm object storage behaves similarly to standard object storage in terms of data transfer and requests, but has more favorable storage prices and slightly higher prices for requests. Similarly to standard object storage, data is not retrieved as quickly either. This is why warm object storage is particularly suited to medium-term data storage. Its minimum storage period is therefore 30 days. If this period is not achieved due to the early deletion of data, the difference to the minimum storage period is calculated and billed with the charge of the first scale.

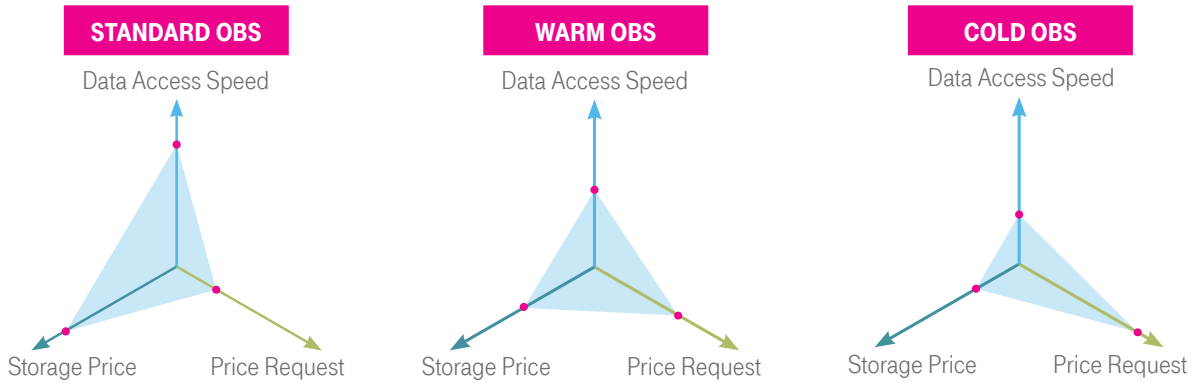


Fig. 10: Speed and Price comparison for Standard, Warm, and Cold Object Storage

NETWORK

Cloud computing is defined as a sourcing model that provides computing and storage capacities from pools via networks. Accordingly, the network is also an integral component of cloud computing. VPCs separate the resources of different tenants from each other, VPN and Elastic IP enable secure access via the Internet, etc. Data transfer to and within the Open Telekom Cloud is free of charge; downloading and sending out data are priced on a stepped scale based on data volumes. The entire outbound data volume for a calendar month is added up and used as a basis for billing.

For the other network services of the Open Telekom Cloud, two pricing models are used. Elastic IP and Elastic Load Balancer are charged on a „pay as you go“ basis. Depending on the length of use in hours.

NETWORK EXAMPLE

You have 100 TB of data stored in the Open Telekom Cloud. In the course of the month, you added another 15 TB. In the same period, users used the stored data. In total, 20 TB of data were downloaded by users accessing the data. Only the downloaded data (Internet traffic outbound upflow) incur charges. This data traffic reaches the fourth billing step.

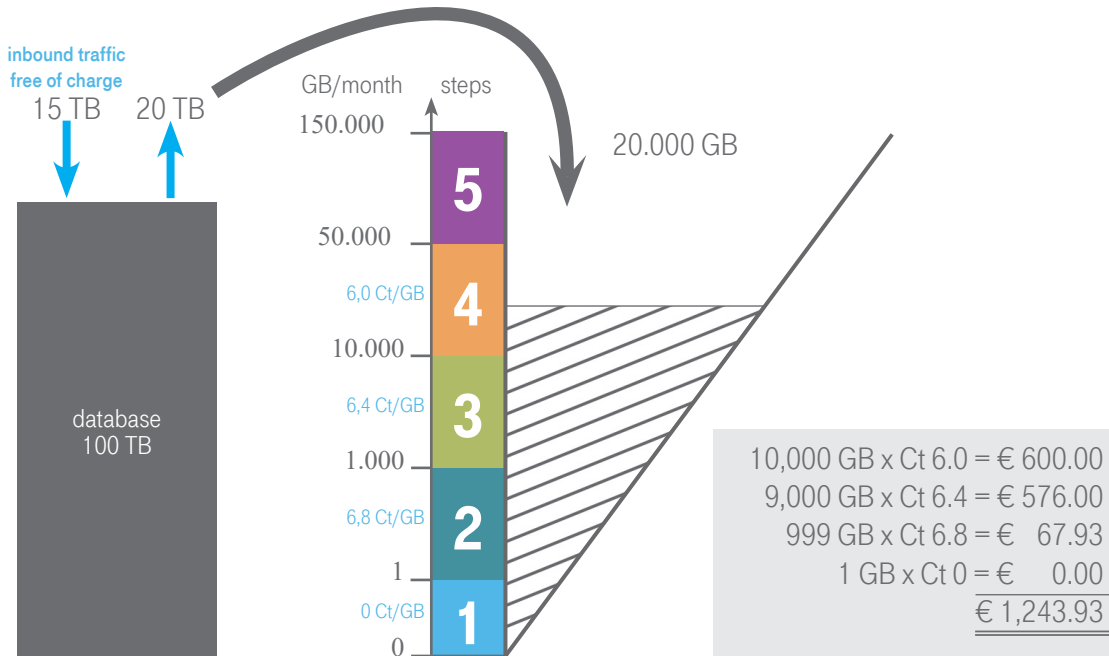


Fig. 11: Calculation of costs for data traffic (schematic)

DOMAIN NAME SERVICE (DNS)

For Domain Name Services, domains are priced on a stepped scale. If a domain is set up and remains configured for more than 24 hours, then it is charged once for the entire month. If a domain is deleted again after less than 24 hours, then it is not charged. In total, there are three steps for DNS with falling prices: 1-25, 26-50, and above 50. DNS is used by means of requests, i.e., if a domain is used, the number of requests is recorded and charged. Requests are billed by the million.

DIRECT CONNECT

Direct Connect provides a connection to the Open Telekom Cloud via MPLS or Ethernet Connect. The Direct Connect Service is charged based on the selected bandwidth. Higher bandwidths have a better price/bandwidth ratio. To this end, a coupling to the T-Systems data center must be provided. The costs for this are not included in the Direct Connect price. The coupling to the Open Telekom Cloud is billed based on the selected bandwidth and for each physical port used for transfer. 1 G and 10 G ports are provided for connections. Direct Connect requires a one-time set-up charge of € 249.

SECURITY

Many Security Services of the Open Telekom Cloud are free, including identity and account management, the anti-DDoS service, and EVS and OBS encryption.

However, use of the Key Management Service (KMS) incurs usage-based charges. The free contingent for KMS comprises 20,000 API calls. Usage of the generated keys is calculated on an hourly basis. In addition, API calls incur charges: 1,000 calls generate costs of 0.3 cents.

- ALREADY INCLUSIVE:**
- Cloud Eye
 - Anti-DDoS
 - Identity and Access Management

MANAGEMENT

Management services are generally free of charge. This applies for the use of the Price Online Display (the displaying of costs when activating services), Cloud Eye (resource monitoring), Cloud Trace (monitoring of access to resources) and Heat/Resource Templates.

For management services that trigger follow-up activities (Distributed Messaging Service - DMS, Simple Message Notification - SMN), there are basic free contingents. Usage in excess of the basic free contingent incurs costs for the excess amount. This can include costs for network services.

Distributed Messaging Service

DMS is measured in terms of the number of API calls and queues triggered. The first 1 million calls per month are free, after which € 1 is charged per million calls. Hence 7.5 million API calls incur costs of € 6.50.

Simple Message Notification

SMN can trigger a range of different actions: sending of text messages, e-mails, http calls, or API calls. These actions can entail the transmission of large volumes of data.

The following free contingents apply for use of SMN (whereby it should be noted that every use of text messaging, e-mail and http calls also triggers an API call):

	FREE CONTINGENT	COSTS FOR ACTIONS IN EXCESS OF THE FREE CONTINGENTS
SMS	100	11.1 Ct/SMS*
E-MAILS	1,000	2.1 Ct/E-Mail
HTTP CALLS	100,000	10 Ct/1000,000 Calls
API CALLS	1 Mio.	€ 1 pro 1 Mio. Calls (identical with the use of DMS)

*Note: Triggering an SMS could provoke significant additional costs!

Fig. 7: Free contingents and costs for SMN

MIGRATION AS A SERVICE

MaaS triggers a data transfer from other cloud sources to the Open Telekom Cloud. MaaS itself is free of charge, and inbound traffic is free too. Only the object storage used in the Open Telekom Cloud is billed.

PAAS AND SAAS

The Cloud Container Engine (CCE) is also classified as a platform service on the Open Telekom Cloud. The CCE can be used free of charge. If instances are subsequently started, these are billed at the corresponding costs. Datawarehouse Service is billed according to the used ECS in the respective price models (elastic/reserved).

ALREADY INCLUSIVE:
Cloud Container Engine (CCE)

Relational Database Service (RDS)

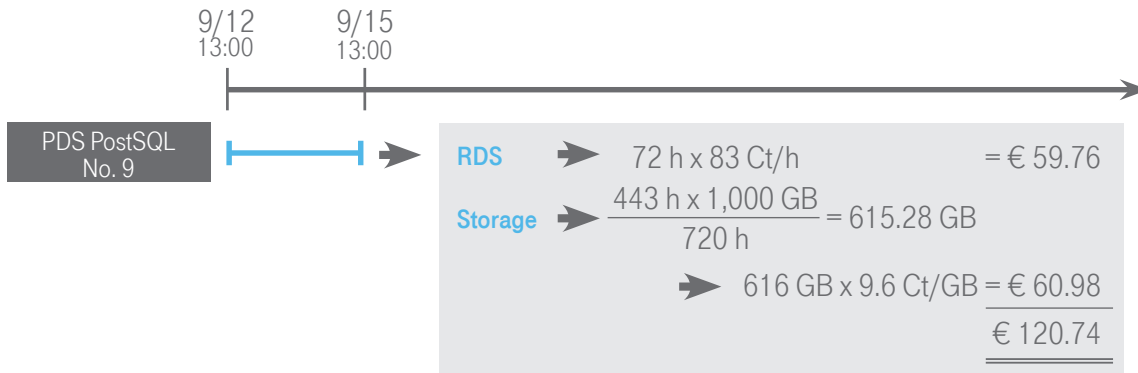
The RDS and the MapReduce Service are charged using the elastic (pay-as-you-go) model of the Elastic Cloud Server as described above. The ECS flavors are each rolled out and provided with an operating system and a MySQL/PostgreSQL image or the corresponding images for the big data analyses. This is charged based on the hourly prices for the corresponding VMs.

Additional storage for backups and images is billed using the model described above for the storage options

RDS EXAMPLE

At 1:00 p.m. on September 12, you start an instance of type RDS 9 (8 vCPUs, 32 GB RAM) with PostgreSQL. To this end, you chose a SATA disk with a volume of 1 TB. At 1:00 p.m. on September 15, you stop the instance. You keep the data on the data disk.

For the three days in which it runs actively, the RDS incurs costs of 72 h x 83 Ct/h = € 59.76. The storage of 1 TB is allocated for 443 hours. $443 \text{ h} \times 1,000 \text{ GB} / 720 \text{ h} = 615.28 \text{ GB}$. Additionally billed, 616 GB x 9.9 Ct/GB = € 60.98. The total costs in September amount to € 120.74. The costs for the operating system and database software are included in this price. The main cost driver is the permanent data storage.



Distributed Cache Service (DCS)

The decisive factors for the costs of DCS are the main memory (RAM) and variant (single node or master stand-by) used. With master stand-by, the user is provided with a high-availability service. If the Distributed Cache Service is configured as master stand-by, two instances are provided in technical terms but only one DCS item is listed on the bill. The hourly rate charged for using the service depends on the combination that is chosen.

RAM GB	SINGLE NODE PER HOUR	MASTER STAND-BY PER HOUR
1	0,015	0,026
2	0,035	0,062
4	0,075	0,131
8	0,190	0,332
16	0,426	0,745
32	0,654	1,144
64	1,368	2,393

Fig. 13: Hourly costs for DCS at a glance

Enterprise Agreement

The Enterprise Agreement has been designed for customers with particularly high requirements and the desire for more direct support. The Enterprise Agreement is offered in three variants: Silver, Gold, and Platinum. Customers can order one of the packages depending on their requirements. One package can be ordered for every tenant. Every tenant is then entitled to use the corresponding service (which does not have to be standardized throughout the company). Since it takes eight weeks for the Enterprise Agreement to be provided, billing will not start until this period has ended. The minimum term of twelve months will not start before this date either. After the 12-month minimum term, the Enterprise Agreement may be terminated with a notice period of one month. Enterprise Agreements are only available for customers of T-Systems International GmbH, Frankfurt, Hahnstraße.

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