Open Telekom Cloud

Overview of Billing and Price Models



T - Systems - Let's power higher performance

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).

Reductions in price up to

tor reserved Models

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.



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 scales (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 laaS services.

Prices given in the example calculations are based on the price table from May 2020.



Computing Network Management Security Virtual Private Domain Name Service **Cloud Eye Service** Log Tank Service Key Management Service Anti-DDoS Mobile Storage Solution Firewall as a Service Web Application Firewall Direct Connect/Privat Link Access Service Elastic IP Cloud Trace Service Elastic Load Balancing Identity and Access Management Content Delivery Network Price Online Display Dedicated Host **Enterprise Application** Tag Management Service Financial Dashboard Workspace Service NAT Gateway **VPC Endpoint** Container Cloud Container Resource Template Service Status Dashboard Software Repository for Container Hybrid & Edge Analysis Cloud Sear Service Hybrid Cloud Enterprise Cloud Topology Designer Storage Data Ingesti Object Storag oud Server Backup Database Relational Database Service Elastic Vol Distributed Cache Service Application Artificial Intelligence Volume Backup Document Database Distributed Message Service Short Message ModelArts Notificatio

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. 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 (in hours) is billed.

Summation of usage time example

In the course of June, you use several ECS instances of s2.xlarge.2 (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 h + 1.5 h + 2 x 0.75 h + 12.25 h = 17.75 h17.75 hours are charged on the monthly bill.

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 Volume Storage and Elastic IP! They must be deleted separately. Flavors with integrated disks or GPU will be charged even in the "stopped" mode (This applies to bare metal servers, some high performance flavors as well as disk-intensive flavors and GPU flavors).

One Billing item per VM Model VM Model: Flavor (HW) + OS

Already inclusive:

Auto Scaling

Calculation for ECS example

At 10:00 a.m. on April 1, you start an ECS instance s2.xlarge.4 (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 20.1 cents/hour.



On November 11, you use an ECS instance s2.large.1 (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 General Compute instance v2 s2.large.8 (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 <u>service description</u> 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 a reserved package is ordered, the usage in the first month is billed proportionately (only the remaining days of the month in which the order occured are billed). The same is valid for the last month of the duration of the package. Reserved packages are not renewed automatically.

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 an ECS instance s2.xlarge.8 (4 vCPUs, 2GB RAM) for 12 months. In February, you use two ECS 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.



An upgrade to a larger instance type is possible at any time. It is also possible to switch from an old generation of ECS to a newer generation or a more powerful flavor during the term, e.g. from a c3 instance to a c4 or from s2 to c3. The contract term remains the same. The time already used for the reserved package is billed to the exact day using the old cost rate (daily rate of the monthly price x days passed). The new package is valid until the originally agreed end of term and is also billed on a daily basis. The upgrade must be ordered via the service desk.



VCPU	High Pert (h, hi)	GPU (g, p)	DISK Intensive (d)	Large Memory (e)
4			32	
		32, 64	64	
16	128, 256	64, 128	128	
24			192	
28				348
	256	128, 256	256	
		280		
				696
60			540	
64		512		
80		560		
104				1.466
208				2.932
l entries: RAM [GB]	view of special flavor	s for special projects		

ECS Reserved example 2

You configure a ECS instance s2.large.4 (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.



Luby	s2.large.4	7/1 -7/29 Operating Time Reserved Contingent	28 days x 24 h + 17 h = 689 h - 744 h
July		Rest	<u>- 55 h</u>
		Cost of Elastic	€0

In the reserved upfront mode, a fixed amount is billed at the start of the term. Contrary to the regular reserved models it is not possible to switch to a larger instance or a new generation.

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.

Image Management Service

The use of the Image Management Service is free of charge. But when storing private images the used object storage (OBS) is billed. These costs are integrated into the OBS invoice item. There are no traffic costs; the storage of public images is of course completely free of charge.

Cloud Container Engine

The Cloud Container Engine (CCE) is also classified as a computing service on the Open Telekom Cloud. CCE is free for up to 50 nodes (not HA). If a larger cluster or an HA cluster is set up, there are hourly costs for using the service.

Storage

The Open Telekom Cloud offers five storage types: Elastic Volume Service (EVS, block storage – always linked to virtual machines), Object Storage Service (OBS), Cloud Server/Volume Backup Service (CSBS/VBS), Storage Disaster Recovery Services (SDRS), 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.

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 scales are of specific sizes and stack on top of each other. The higher the scale, the lower the costs for the storage volumes allocated in that scale. The exception to this rule is that the basic volume of 5 GB for standard object storage is free of charge. Already included Cloud Container Engine (CCE)

Already included

5 GB Basic Volume OBS Standard



Fig.6: Price pattern of EVS and OBS in comarison 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	(SAS,SSD,SATA, SAS boosted, SSD boosted)
Fig.7: Comparison ORS and EVS/VRS	1	

Elastic Volume Storage/Volume Backup Storage/Scalable File Service

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.

Only the ordered/allocated storage volumes are relevant when calculating the EVS, not the specific data volumes. There is a difference using VBS or SFS: In this cases only the actual stored data is billed.

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.

Pricing Model also valid for SFS and CSBS

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).



Storage Disaster Recovery Service (SDRS)

Storage Disaster Recovery Service (SDRS) is billed according to EVS. The service features mirroring of hard disks across two availability zones (AZ). An additional hard disk for data replication in the target AZ is deployed. The additional and the original EVS are billed. A fee for the service comes on top. The fee depends on size of the disks and if the disks are shared. Usually, creating the necessary ECS copy in the second data center does not result in any further computing costs. The ECS only becomes active in the event of a disaster recovery and then generates the regular ECS costs.

SDRS example



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 for standard object storage. The data volume is billed on a stepped price scale – at the higher scales, the price for storage falls. The lowest scale ranges from 0 - 5 GB. Use of this scale is free of charge. The scales then go up with limits of 1 TB, 50 TB, 500 TB, 1 PB, 5 PB, 10 PB.

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

Already included 1 GB Outbound OBS

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 \notin 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 scales as follows:



Fig.9: Scales 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. Expedited restoration is prioritized/preferred over other restorations. 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. At Outbound, we differentiate the data volume into to OBS outbound and VPC outbound. We have summarized the free and paid data transfer in the table below.

Source	Goal			
	OBS	VPC	Internet	
OBS	-	internal, free of charge	OBS-Outbound, fee-based	
VPC	Inbound, free of charge	_	VPC-Outbound, fee-based	
Internet	Inbound, free of charge	Inbound, free of charge	_	

Fig. 11: Data Transfers fee-based and free of charge

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 scale.



Fig. 12: Calculation of costs for data traffic (schematic)

Using the Private Link Access Service (PLAS), the rules for the costs of data traffic explained above are abolished. There is no longer any billing based on the outbound data volume.

Direct Connect and Private Link Access Service

Direct Connect (DC) and Private Link Access Service (PLAS) go hand in hand. With a direct connection to the Open Telekom Cloud, both services must be calculated. Billing is based on the bandwidth provided on an hourly basis. DC and PLAS provide a connection to the Open Telekom Cloud via MPLS, Ethernet Connect, Secure Cloud Gateway oder Cloud Exchange (Equinix). The Direct Connect Service is charged based on the selected bandwidth. 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 fee. Outbound data volumes transported via this connection are not charged separately. Volumes are billed as a flat rate for the provision of the connection. 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 per connection.



Fig. 13: Highly performant network connections in the Open Telekom Cloud-Direct Connect and Private Link Access Service (PLAS)

There are different scenarios for direct connections to the Open Telekom Cloud (OTC). With Ethernet Connect oneway or two-way (active/ passive) can be connected. MPLS always has a two-way connection in active/passive mode. We always recommend a redundant connection. Currently, only a two-path active/passive connection is supported.

	Billing unit	Quantity to calculate		
		one-way	two-way active/passive	
PLAS	Bandwidth	1 X	1 X	
Direct Connect	Bandwidth/Port	1 X	2 X	
Setup (Direct Connect)	One-off fee	1 X	2 X	

Fig.14: Calculation volume for PLAS

Direct Connect and Private Access Link example

Bandwith	Costs Direct Connect	Costs Private Access Link	total costs per month with 2 x DC +1 x PLAS
50 MBIT	68.55 €	218.73 €	287.28 €
100 Mbit	77.53 €	232.69 €	310.22 €
1 GBit	108.56 €	483.99 €	592.55 €

Domain Name Service

With the Domain Name Service, two components are included in the billing: First, the amount of domains created, and second, the number of queries/requests. The domains created are billed by the hour, the queries are billed per million. With intensive use of the service (more than a billion inquiries per month), users receive a discount via scales.

Oher Network Services

Other billing models are used for the remaining Open Telekom Cloud network services. Elastic IP, Elastic Load Balancer, NAT Gateway Service and VPC Endpoint are charged "pay as you go" according to usage hours.

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.

Key Management Service

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

T · · Systems ·

Already included

- Cloud Eye
- Anti-DDoS
- Identity and Access Management

Web Application Firewall

Scales	Time in hours per month	Equals Web Application Firewalls	Price in Ct/h
1	0 - 2,000	3	21
2	2,000 - 5,000	4 - 7	17
3	>5,000	7+	14

Die Web Application Firewall schützt Web Domains. Das Besondere hierbei: Die Stunden werden in Staffeln eingeteilt.

Fig. 15: Costs for WAF, conversion to monthly WAFs used full-time (approximate values).

As with the other scales, the scales are quantity-based, i.e. in the case of ten commissioned WAFs, the first scale is used for the first three WAFs, the second for the following four and the third for the last three. Additionally costs for requests occur: one million requests will be charged with 60 cents.

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

Distributed Messaging Service is measured in terms of the number of API calls and queues triggered. The first 1 million calls per month are free, after which \in 1 is charged per million calls. Hence 7.5 million API calls incur costs of \in 6.50. Kafka Premium is also available as part of the DMS. Kafka Premium is billed according to the size of the instance and allocated storage according to the hours used.

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.

	Free contingent	Costs for actions in excess of the free contingent
SMS	100	11.1 Ct/SMS*
E-Mails	1.000	2.1 Ct/100,000 E-Mails
http Calls	100.000	10 Ct/1,000,000 Calls
API Calls	1 Mio.	1 € per 1 Mio. Calls

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

Fig. 16: Free contingents and costs for SMN (usage of SMS, E-Mail and http calls also evoke an API call)



PaaS and SaaS

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 mySQI/PostgreSQL/MSSQL image or the corresponding images for the big data analyses. This is charged based on the hourly prices for the corresponding VMs. In addition, there are license costs for using MSSQL. 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 db.s1.2xl (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 delete 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 79.2 Ct/h = \in 57.02. The storage of 1 TB is allocated for 443 hours. 443 h x 1000 GB / 720 h = 615.28 GB. Additionally billed, 616 GB x 9.9 Ct/ GB = \in 60.98. The total costs in September amount to \in 118.00. 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, master stand-by, cluster) 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.

		master stand-by per nour	Cluster 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	2.496
128			4.992
256			9.984
512			16.968

Fig.17: Hourly costs for DCS at a glance

Data Ingestion Service / Data Warehouse Service

Data Ingestion Services uses four parameters for cost calculation. Firstly, the actual monthly average data volume is billed; total amount of data and duration are cost-relevant. Additionally - similarly to the object storage requests generate costs. Requests are e.g. data package uploads or downloads. The number of requests are also related to the volume of a single data package. Per 25 kB one request is counted. Thus a 100 kB package results in four requests (although it is only one package). (The charge for 1 million requests is 2 cent). The fourth component for costs is the number of used partitions. Furthermore DIS distinguishes between "general" and "advanced". The Data Warehouse Service is billed according to the used ECS in the respective price models (elastic/reserved).

Enterprise Agreement

The Enterprise Agreement has been designed for customers with particularly high requirements and tezh desire for more direct support. The Enterprise Agreement is offered in three versions: silver, gold and platinum. A customer can book one of the packages as required. One package can be ordered for every tenant. Each tenant is then entitled to the corresponding service, which does not have to be uniform across the company. Since the provision of the Enterprise Agreement takes eight weeks, the billing only starts after this period. Enterprise agreements are only available to direct sales customers. If you are interested, contact our service desk.

Financial/Enterprise Dashboard

The Financial Dashboard is available to users of the Open Telekom Cloud free of charge. This allows customers to have on overview of services used and costs incurred on a daily basis. If this financial dashboard cannot meet all of the users' requirements (e.g. internal billing), T-Systems can provide an advanced enterprise dashboard. This is available in three paid versions. The Enterprise Dashboard can be ordered via the service desk. The services and costs for the Enterprise Dashboards can be found in the table below.

	API access	Dashboard Self Service	Multi-Tenant	Organization Mgmt	Price (per month)
Medium	+	+	_	_	50€
Large	+	+	+	-	100€
Extra Large	+	+	+	+	250 €

Abb.18: Financial Dashboard - Enterprise-Variante

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