

Sub-Capacity pricing for z/VM

Sub-capacity pricing for software running in the z/VM[®] operating environment is available to clients running z/VM Version 6 Release 3 or higher on a supported machine. For information about how z/VM is licensed in a Full Capacity environment, please see the [z/VM web page](#). Software pricing at less than full machine capacity can provide more flexibility and improved cost of computing as a client manages the volatility and growth of new workloads.

Through the implementation of Sub-Capacity pricing for select z/VM programs, clients can:

- Pay for z/VM programs based on defined workload requirements and not necessarily the [full engine capacity](#) of the machine
- Add hardware capacity for new workloads, capabilities, and functions, such as KVM, and not have IBM software pricing for z/VM programs automatically increase for existing workloads
- Buy new hardware capacity for future growth with no immediate increase to their IBM software bill provided that no additional software capacity is required at that time
- Potentially benefit from improved price/performance as workloads grow

Requirements for Sub-Capacity pricing for z/VM

Sub-Capacity pricing for z/VM requires clients to run the [IBM License Metric Tool \(ILMT\)](#) in conjunction with the z/VM Hypervisor Proxy for ILMT to determine z/VM sub-capacity program licensing requirements. ILMT is the same tool that is used to support sub-capacity pricing for Linux[®] on IBM Z[®] programs from IBM that are licensed under Passport Advantage. See the last page of this document for more information about the z/VM Hypervisor Proxy for ILMT and how to download a copy of the tool and the user guide.

The quantity of each z/VM program license needed to satisfy applicable IBM terms and conditions is referred to as the “required license capacity.” The quantity of each z/VM program that you have acquired is referred to as “entitled license capacity.” If your required license capacity exceeds your entitled license capacity, you must promptly place an order for additional license capacity for that program to meet or exceed the required license capacity.

Each sub-capacity eligible z/VM program will be licensed according to either terms applying to the z/VM hypervisor and its features, or z/VM-Based terms, as determined by IBM. For a list of the specific z/VM programs eligible for sub-capacity pricing, refer to the [IPLA z/VM-Based web page](#).

- **z/VM hypervisor and optional feature terms**
For z/VM and any of its optional features, the required license capacity is the calculated engine capacity utilized by z/VM, as reported by ILMT from data generated by the z/VM Hypervisor Proxy running in each z/VM LPAR.
- **z/VM-Based program terms**
z/VM-Based terms apply to IBM programs running on the z/VM operating system. Under these terms, the required license capacity of each program equals the license capacity of z/VM on the machine(s) where the z/VM-Based program executes.

Each month you must run ILMT to prepare ILMT reports containing z/VM program usage information for every machine running z/VM, and keep these reports on file for presentation to IBM upon request.

Each month you must determine from the ILMT report if any additional program license entitlements are required, and if so you must promptly place an order for that additional required license entitlement. To determine the number of entitlements required, see the [Virtualization Capacity License Counting Rules](#) website.

Licensing for z/VM programs with Sub-Capacity

z/VM and most z/VM systems management software programs are Z IPLA products whose licensing is based upon the number of Engines (also sometimes referred to as Processors). The Value Unit Exhibit for z/VM is [VUE021](#).

z/VM is able to run on Z general purpose processors (often called Central Processor engines or CPs). z/VM is also allowed to run on Integrated Facility for Linux engines (often called [IFLs](#)) but only when running Linux or Open Solaris workloads. When counting the number of engines which must be licensed the two different types of engines, CPs and IFLs, are counted independently.

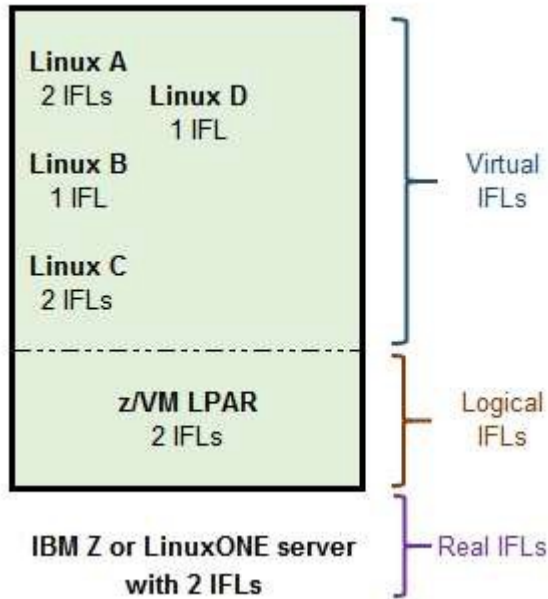
When a customer qualifies for Sub-Capacity pricing for z/VM and z/VM-Based programs, the maximum license requirement rules for a software program are:

- Client does not have to purchase more license entitlement for a program than the number of active engines on the machine (e.g. maximum z/VM engines on a 12-way machine is 12)
- Client does not have to purchase more license entitlement for a program than the number of engines assigned to the shared pool where that product runs (e.g. maximum of 7 z/VM engines for a shared pool with 7 engines). Note: This limit does not affect the additional license entitlement that might be required for dedicated partitions.

See the following pages for some z/VM Engine Counting Examples

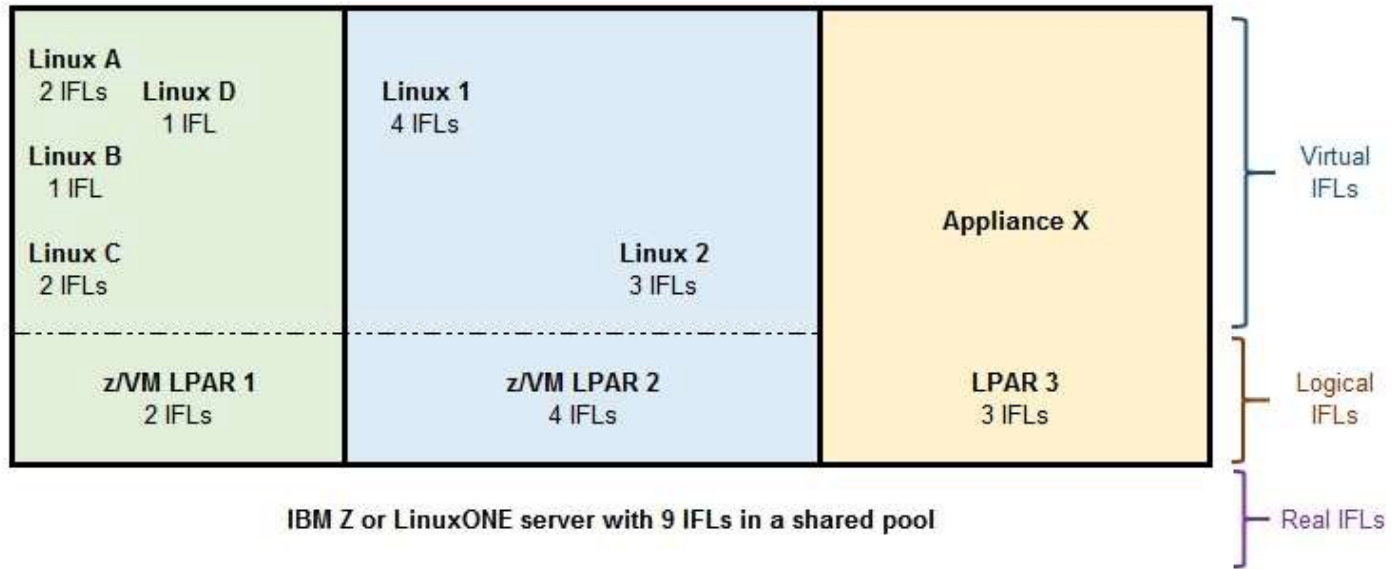
See the last page in the document for information about the z/VM Hypervisor Proxy for ILMT

Example 1 – Simple Full Capacity Environment



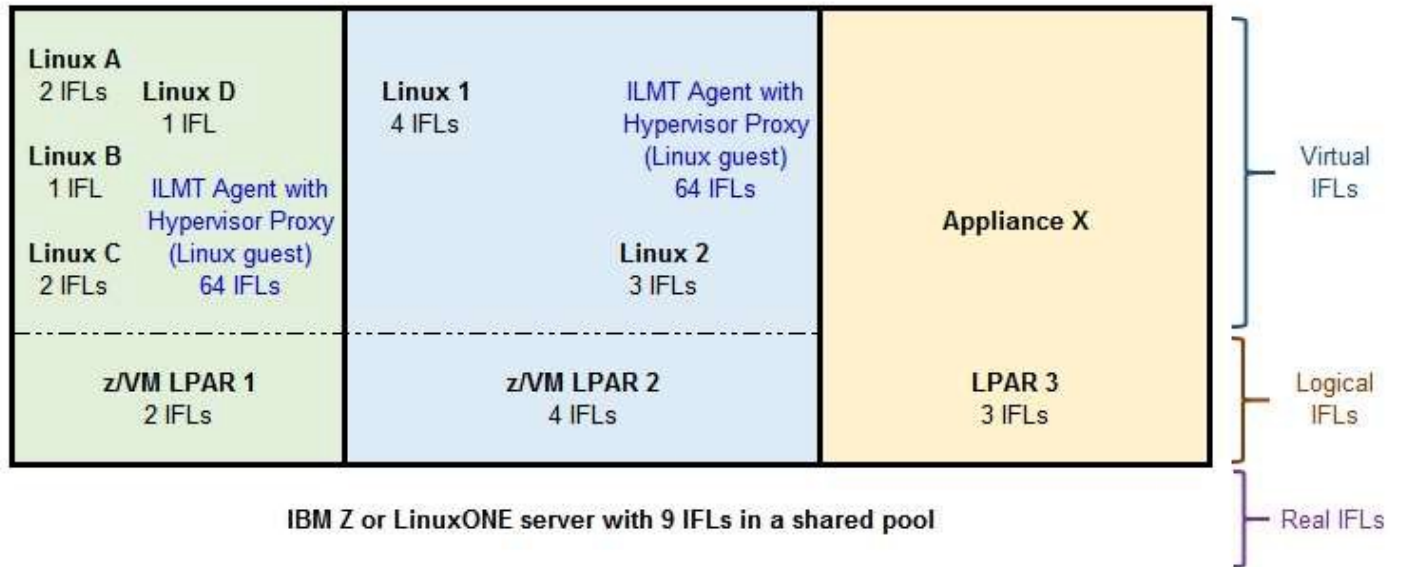
- In example 1 we have an IBM Z or LinuxONE server with a shared pool of 2 IFL engines in a 1 LPAR configuration.
 - The LPAR is defined with 2 Logical IFLs and is running z/VM with 4 Linux guests.
- Under Full Capacity terms z/VM would be licensed for 2 Engines (20 Value Units) representing the full capacity number of IFL engines on this server.
- Note: under Sub-Capacity terms z/VM would still require licensing for 2 Engines (20 Value Units), representing the sub-capacity number of IFL engines configured for use by the z/VM LPARs on this server.

Example 2a – Full Capacity Linux Environment with non-VM workload



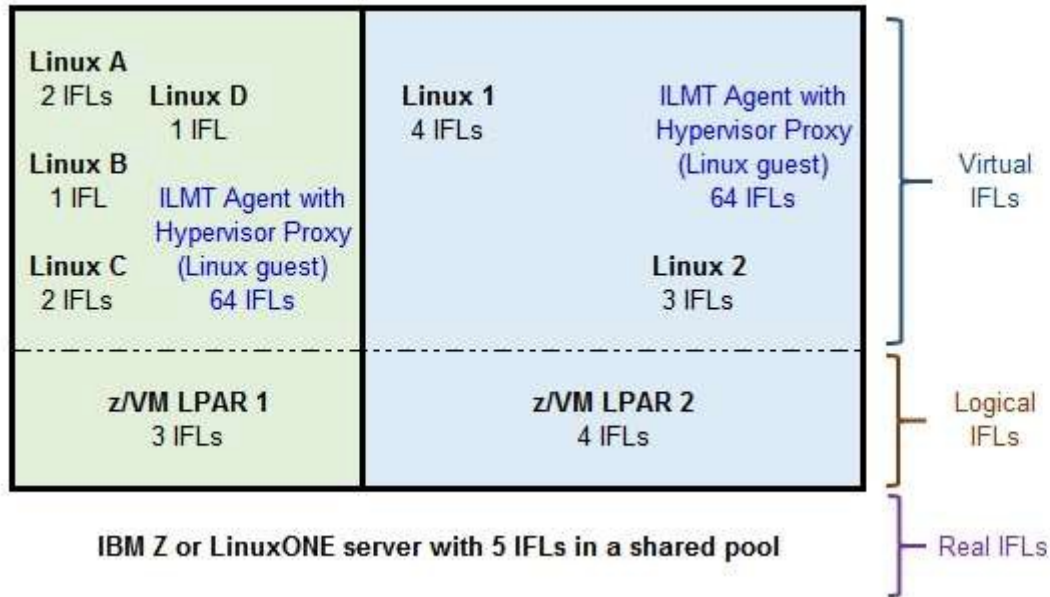
- In example 2a we have an IBM Z or LinuxONE server with a shared pool of 9 IFL engines in a 3 LPAR configuration.
 - LPAR 1 is defined with 2 Logical IFLs and is running z/VM with 4 Linuxguests.
 - LPAR 2 is defined with 4 Logical IFLs and is running z/VM with 2 Linuxguests.
 - LPAR 3 is defined with 3 Logical IFLs and is running an Appliance known as X.
- Under Full Capacity terms z/VM would be licensed for 9 Engines (81 Value Units) representing the full capacity number of IFL engines on this server.

Example 2b – Sub-Capacity Linux Environment with non-VM workload



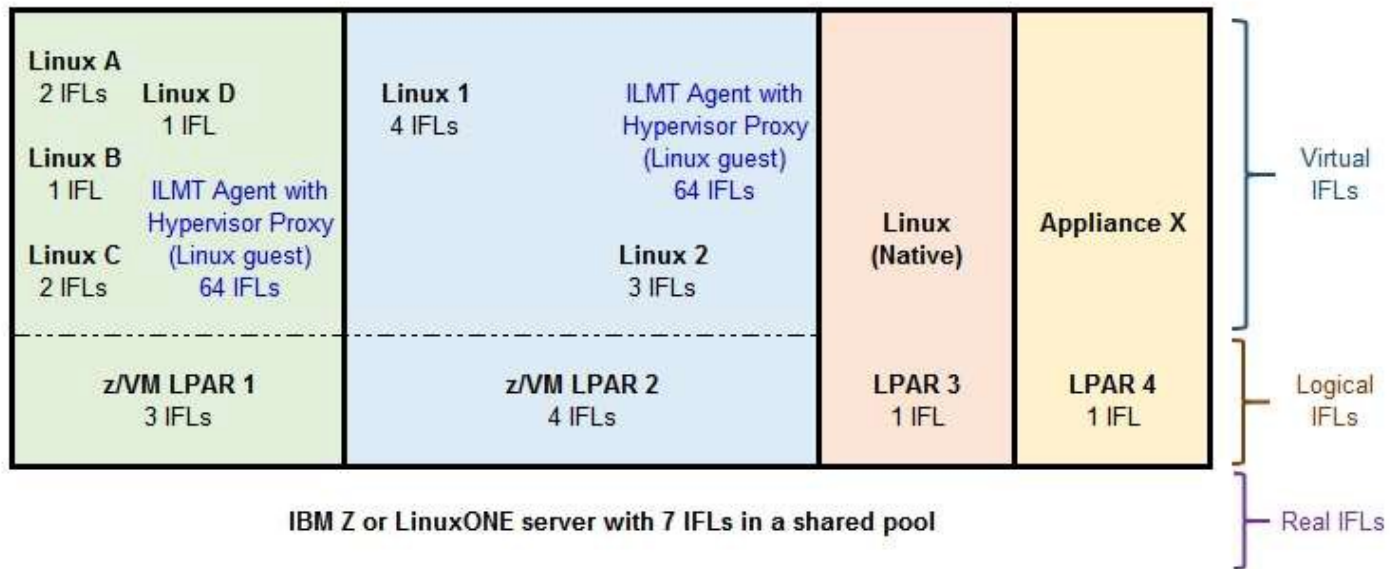
- In example 2b we have an IBM Z or LinuxONE server with a shared pool of 9 IFL engines in a 3 LPAR configuration.
 - LPAR 1 is defined with 2 Logical IFLs and is running z/VM with 5 Linux guests, including 1 Linux Guest running the ILMT Agent with the z/VM Hypervisor Proxy for ILMT.
 - LPAR 2 is defined with 4 Logical IFLs and is running z/VM with 3 Linux guests, including 1 Linux Guest running the ILMT Agent with the z/VM Hypervisor Proxy for ILMT.
 - LPAR 3 is defined with 3 Logical IFLs and is running an Appliance known as X.
- Under Sub-Capacity terms z/VM would be licensed for 6 Engines (57 Value Units) representing the sub-capacity number of IFL engines configured for use by the z/VM LPARs on this server.
 - Each z/VM Hypervisor Proxy guest must be defined to have the maximum number of virtual CPUs, currently 64.
 - The ILMT Agent and z/VM Hypervisor Proxy are only active infrequently and should not impact the workload of the other z/VM guests in the LPAR when properly configured.

Example 3a – Sub-Capacity Linux Environment with license capping



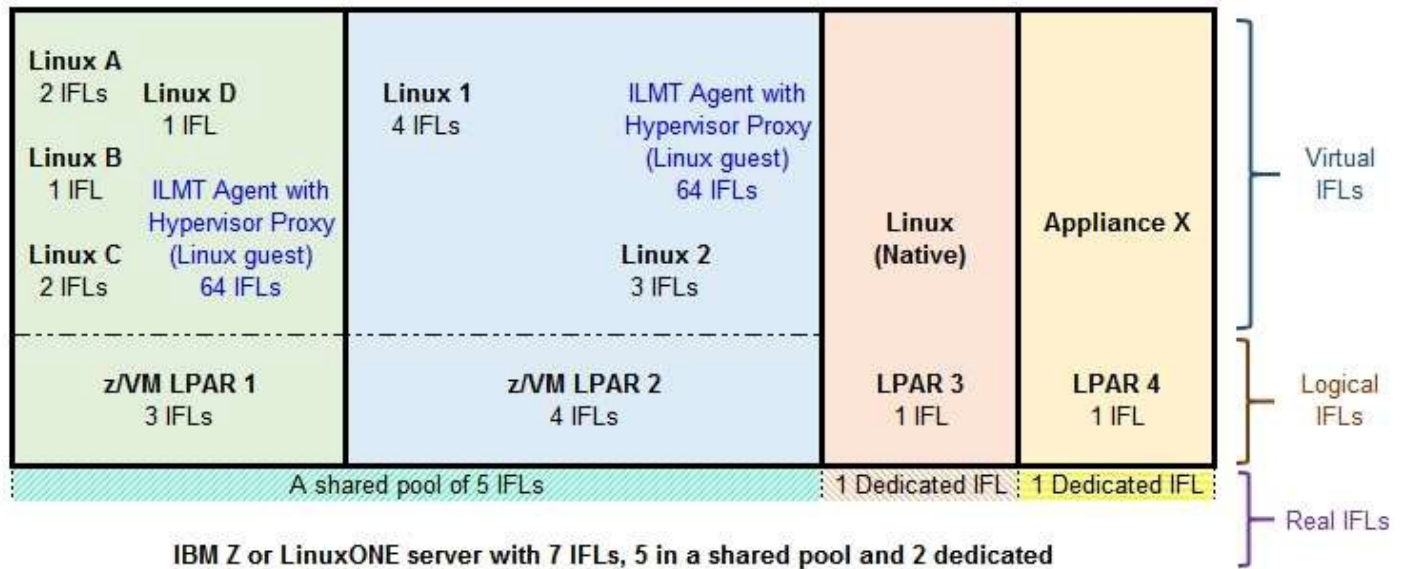
- In example 3a we have an IBM Z or LinuxONE server with a shared pool of 5 IFL engines in a 2 LPAR configuration.
 - LPAR 1 is defined with 3 Logical IFLs and is running z/VM with 5 Linux guests including the Hypervisor Proxy.
 - LPAR 2 is defined with 4 Logical IFLs and is running z/VM with 3 Linux guests including the Hypervisor Proxy.
- Under Full Capacity terms z/VM would be licensed for 5 Engines (48 Value Units) representing the full capacity number of IFL engines on this server.
- Under Sub-Capacity terms z/VM would also be licensed for 5 Engines (48 Value Units) representing the lesser of the 7 Logical Engines configured for the z/VM LPARs capped by the full capacity number of 5 IFL engines on this server.

Example 3b – Sub-Capacity Linux Environment with 2 engine workload growth



- In example 3b we have added 2 more IFLs to handle the new workload represented by a native Linux LPAR and an LPAR running an Appliance, giving us an IBM Z or LinuxONE server with a shared pool of 7 IFL engines in a 4 LPAR configuration.
 - LPAR 1 is defined with 3 Logical IFLs and is running z/VM with 5 Linux guests including the Hypervisor Proxy.
 - LPAR 2 is defined with 4 Logical IFLs and is running z/VM with 3 Linux guests including the Hypervisor Proxy.
 - LPAR 3 is defined with 1 Logical IFL and is running Linux natively.
 - LPAR 4 is defined with 1 Logical IFL and is running an Appliance known as X.
- Under Full Capacity terms z/VM would be licensed for 7 Engines (65 Value Units) representing the full capacity number of IFL engines on this server.
- Under Sub-Capacity terms z/VM would also be licensed for 7 Engines (65 Value Units) representing the sub-capacity number of IFL engines configured for use by the z/VM LPARs on this server.
 - This represents an additional 2 Engines which must be licensed for z/VM compared to Example 3a, even though the 2 new IFL engines were intended to be for support of a non-VM workload. Notice that the capping of the license requirement seen in Example 3a is not happening in the new configuration in Example 3b.

Example 3c – Sub-Capacity Linux Environment with both shared and dedicated engines



- In example 3c we still have an IBM Z or LinuxONE server with total of 7 IFL engines in a 4 LPAR configuration as follows:
 - LPAR 1 is defined with 3 Logical IFLs in a shared pool having 5 IFLs and is running z/VM with 5 Linux guests including the Hypervisor Proxy.
 - LPAR 2 is defined with 4 Logical IFLs in a shared pool having 5 IFLs and is running z/VM with 3 Linux guests including the Hypervisor Proxy.
 - LPAR 3 is defined with 1 Logical IFL dedicated to it running Linux natively.
 - LPAR 4 is defined with 1 Logical IFL dedicated to it running an Appliance known as X.
- Under Full Capacity terms z/VM would be licensed for 7 Engines (65 Value Units) representing the full capacity number of IFL engines on this server.
- Under Sub-Capacity terms z/VM would be licensed for 5 Engines (48 Value Units) representing the lesser of the 7 Logical Engines configured for the z/VM LPARs capped by the 5 IFL engines in the shared pool used by the z/VM LPARs.

z/VM Hypervisor Proxy for ILMT

Prior to using ILMT in support of z/VM sub-capacity you must install and configure the z/VM Hypervisor Proxy for ILMT in a Linux virtual machine in each logical partition (LPAR) running z/VM. The Proxy is required in order to provide z/VM configuration information to the ILMT agent. In order to function correctly, the Linux guest running the z/VM Hypervisor Proxy must be defined with the maximum possible number of virtual engines, currently that is 64. If the number of virtual engines is greater than 64, the z/VM Hypervisor Proxy cannot be used and sub-capacity pricing is not available. The ILMT Agent and z/VM Hypervisor Proxy are only active infrequently and should not impact the workload of the other z/VM guests in the LPAR when properly configured. Installation instructions for the z/VM Hypervisor Proxy are available in the Users Guide, see the link below.

The ILMT Server has to be installed only once per enterprise. It is the server that collects all the information being sent to it from all of the client's machines, which must be running the ILMT Agent, and in this case, clients also must run the z/VM Hypervisor Proxy. The ILMT server is supported on Linux and on Microsoft Windows. ILMT and instructions for its ordering and installation and use are available from the [IBM License Metric Tool information website](#).

Prior to downloading the Proxy, you will be required to obtain an IBM ID (formerly known as an IBM Registration ID). As part of the [IBM ID registration](#) process you will be asked to provide your e-mail address and company name. (This is the same ID as existing z/OS sub-capacity customers use to download SCRT.)

The following deliverables are available for download:

[Download z/VM Hypervisor Proxy for ILMT V1.0.2](#) (updated 28 June 2019)

[Download the z/VM Hypervisor Proxy for ILMT Users Guide \(PDF, 1 MB\)](#) (updated 28 June 2019)

z/VM Sub-Capacity Pricing terms require that you always use the most current version of the Proxy. Please note that only the most current version and release are available for download from the website.

z/VM News

On 17 July 2017 IBM [announced](#) Sub-capacity pricing terms for z/VM and z/VM-Based programs.

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