# SAP HANA extension nodes

Frequently Asked Questions

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### 1. What is SAP HANA extension node?

One of the concepts for handling warm data in HANA are HANA extension nodes. The extension nodes concept is based on the HANA scale-out feature. One node in a HANA scale-out Landscape is reserved for warm data; hot data should not be located on this node. The expectation for warm data is, that they are used quite seldom, mainly for lookups, sporadically updated.
There is no change in how HANA processes the data on the extension node, compared to normal nodes. The data are still stored in column store and need to be loaded into memory for getting processed. The difference is, that due to nature of warm data, only a small portion of the data need to be loaded into memory at one point in time. Consequently, it is possible to share the available DRAM in the node for more data, than on normal nodes.

### 2. How is SAP HANA extension node licensed?

HANA extension nodes are conceptionally based on HANA scale-out. Hence, apart from the HANA standard license no additional license is required.

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### 3. What is the minimum SAP HANA version and SPS level required to configure Extension Nodes?

For SAP BW on HANA, you need SAP HANA 1.0 SPS 12 as the minimum SAP HANA release and BW 7.4 SP12 as the minimum BW release. However, SAP BW 7.50 SP05 or SAP BW/4HANA is strongly recommended. For SAP HANA native applications, you need HANA 2 SPS03 as minimum SAP HANA release.

### 4. Can a customer with scale-up deployment implement Extension Node?

Customers with a scale-up deployment need to extend to a scale-out deployment, as Extension Node requires a dedicated node in the HANA landscape. Extension Node and HANA standard node cannot share the same OS, network, and disk, but must use different nodes (different physical servers, virtual machines, or partitions). In a HANA-native use case the HW configuration for Extension Node and HANA standard node must be identical. For BW-cases the HW configuration can be different.

### 5. Can a customer with certified HANA appliance, attach Extension Node on TDI5 compliant HW?

Customers can attach a TDI5 compliant Extension Node to an existing certified HANA appliance, however the appliance will be then converted to a TDI configuration.

### 6. What are the supported use cases?

Extension Nodes are supported for BW on HANA, BW/4HANA and SAP HANA native applications. In case of HANA native scenarios, the customer application must ensure an appropriate data categorization for warm data. Only warm data are to be located on the Extension Node and the application ensures a proper partitioning specification and access patterns to this data set. For BW, the application fully controls the data distribution and access paths of warm data.

### 7. What are the minimum and maximum volume limits of WARM data in Extension Nodes?

Extension Nodes offer an efficient way to use HANA memory. Extension Nodes can use more memory for HANA data footprint than using the 50% of the HANA database memory allocation limit. Extension Nodes can be “overloaded” to use 200% of the database memory allocation limit. This also depends on the I/O performance of the used HANA hardware. There is actual no minimum volume limit for Extension Nodes, but it wouldn’t make sense to configure small Extension Nodes and HANA standard nodes. The scale-out administration overhead would eliminate the advantages of an Extension Node compared to having all data in a scale-up deployment.

### 8. Can you implement Dynamic Tiering along with Extension Nodes?

HANA dynamic tiering is a dedicated disk-processing server attached to the HANA database. It uses multistore tables to store data across in-memory and disk-store. Extension Nodes support all HANA column-store table types, including multistore tables. Dynamic Tiering and Extension Nodes can co-exist, but the mixed use is not supported for BW use-cases.

### 9. Can you define Multistore Table spread across HOT and WARM data across Extension Nodes and Dynamic Tiering?

That is technically possible. But you must carefully define your partition specification of the multistore table, where warm data are located both on Extension Nodes and Dynamic Tiering. Your application has then to apply the right access paths to select different warm data from the fast Extension Node or slower Dynamic Tiering.

**10. Is active-active supported for Extension Nodes?**

The Extension Node has the same functional scope as any HANA standard node. Hence, active-active is supported.

**11. Is there a max database size limitations for Extension Nodes?**

There is no maximum database size limitation for Extension Nodes. All database sizes are supported.

**12. What are the major differences between Extension Nodes and Dynamic Tiering?**

Extension Nodes and Dynamic Tiering each have their own unique value proposition. Extension Nodes support the complete functional scope of the HANA database. They are assumed to provide higher performance than dynamic tiering, if access patterns and partition specification have been considered carefully. Dynamic Tiering stands for large volume warm data solution with a lower price point, but not covering the compete functional scope of HANA:

**13. What are the ideal use cases for Extension Nodes?**

The ideal use case for Extension Nodes is BW on HANA or BW/4HANA, as BW controls the data distribution, right partitioning and access paths. The BW analytical engine has all information about the data sets, so any unnecessary access to data is filtered out. BW also helps you to define the correct set of warm data in the HANA system.

**14. What is the expected performance degradation on Extension Nodes?**

There are some performance implications data on Extension Nodes. However, these data have been classified by customer as warm data and should accept a performance degradation. In best case, the data access the data set, which is not displaced from memory. In this case the data processing is as fast as for standard HANA nodes, assuming Extension Nodes have the same HW configuration like HANA standard nodes. In the worst-case the complete table or complete columns must be re-loaded from disk, as the requested data has been displaced from memory to disk or the filter doesn't match the partition criteria where no efficient partition pruning is possible. The re-load causes a delay in the query processing depending on the I/O performance of the Extension Node.

**15. Where can I find more information on Extension Nodes?**

In the SAP HANA Administration Guide (section: Data Temperature: Extension Nodes) you find more information on Extension Nodes. It also includes references to SAP Notes on how to configure Extension Nodes. There are also sections in the BW and BW/4HANA online documentation about Extension Nodes.

**16. Can you implement Extension Nodes in MDC environment?**

Yes, you can implement Extension Nodes in any HANA deployment environment, as Extension Nodes have the same functional scope as any HANA standard node.

**17. How many Extension Nodes permitted in a scale-out landscape?**

Looking at the most common use cases and data distributions we assume a single Extension Node to be sufficient. We strongly recommend to start with a single Extension Node for warm data and to scale-up before you add another Extension Node, as the more Extension Nodes you have in the landscape the more carefully you need to design your data layout and access patterns to warm data. You should also carefully compare the "overload" of a single Extension Node causing disk access latency versus the data management of multiple Extension Nodes in a HANA scale-out landscape.

**18. Is it possible to have fail-over node for an Extension Node?**

This is possible like for any other HANA standard node. You must ensure that the standby-node has the appropriate sizing for the fail-over scenario. Extension Nodes and HANA standard nodes can share the same standby node, assuming they have the same HW configuration.

**19. Are there any limitation of data types or advanced analytics functionality on Extension Nodes?**

There are no limitations for data types or advanced analytics functionality on Extension Nodes.

**20. What are typical HANA scale-out settings with Extension Nodes?**

The standard BW scale-out configuration where the Extension Nodes fit best is a scale-out system with 4 or more active HANA nodes, where one of them can be configured as Extension Node. That also works for native HANA applications, but even smaller setups are possible, e.g. 1 HANA standard node and 1 Extension Node.

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