100 XP

Capacity estimation using the Azure Cosmos DB Capacity Calculator

5 minutes

There are a couple of ways you can do capacity planning for your Azure Cosmos DB workloads:

- If you're migrating your existing database workload but you only know your number of vcores and servers in your existing cluster, you'll need to estimate requests units using [vCores or vCPUs(/azure/cosmos-db/convert-vcore-to-request-unit). We'll discuss this subject in more detail under the *migration* module.
- If you know your current database workloads typical request rates, you can estimate request units by using the Azure Cosmos DB capacity planner.

To optimize cost and performance in Azure Cosmos DB, we must provide the databases and collections workloads with the right amount of throughput (Request Units per second or RU/s for short). The Azure Cosmos DB capacity planner will help us estimate the required RU/s for our Azure Cosmos DB for MongoDB workloads. Let's take a look at this tool in more details.

Azure Cosmos DB capacity planner

The *Azure Cosmos DB capacity planner* is an online tool that will estimate the amount of RU/s your workload will need based on multiple parameters that define the workload itself. The capacity planner offers two modes, Basic and Advanced. Let's take a look at the different workload parameters we'll define for each of these modes.

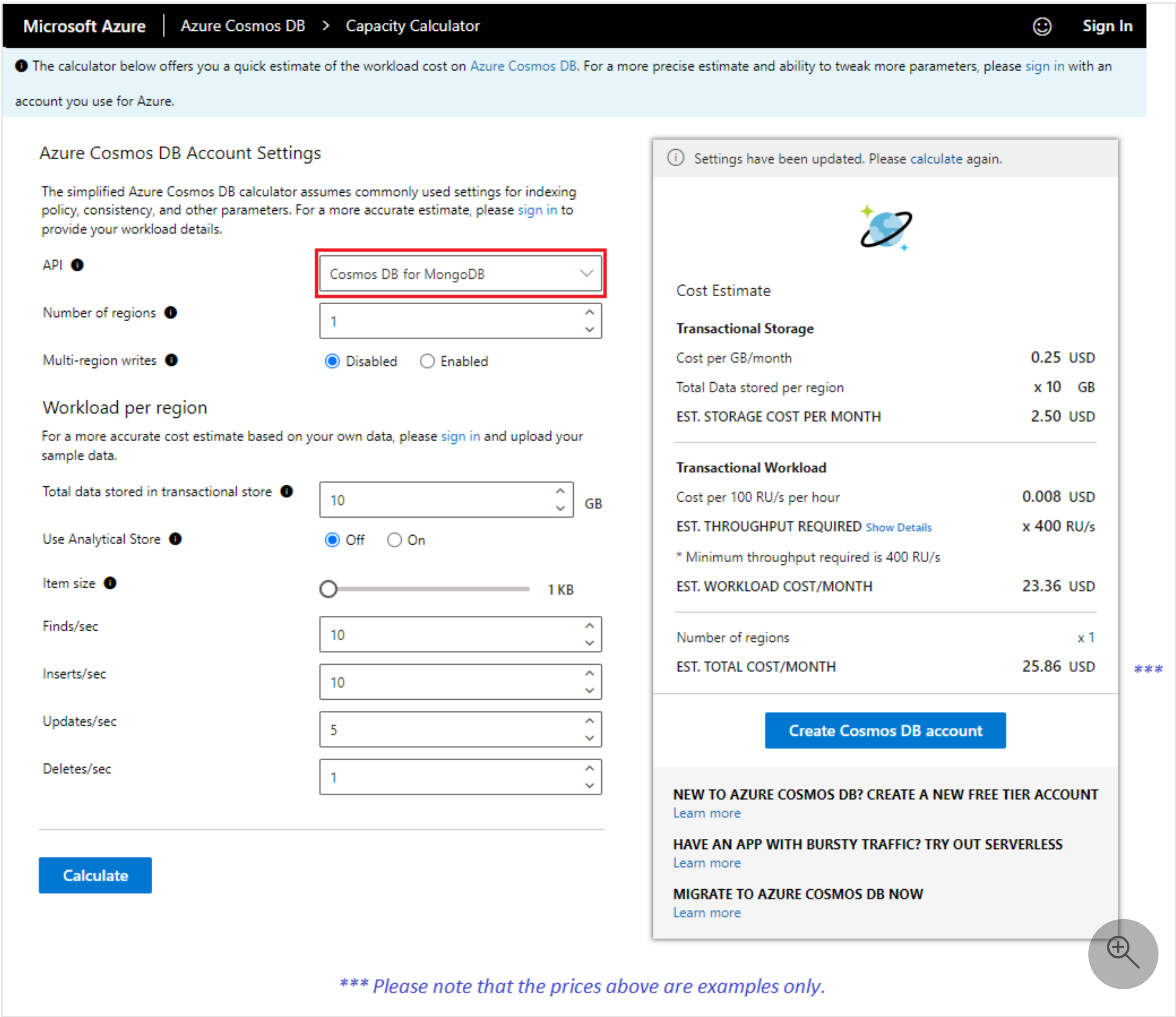
Basic mode

The *Basic mode* provides a quick cost and throughput estimation for your workloads. This mode will require less information about your workload and will assume you're using the default Azure Cosmos DB settings for indexing policy, consistency and other Azure Cosmos DB parameters.

Let's review the diffent workload parameters and the values to input.

- **API** - Select *Cosmos DB API for MongoDB*.

- **Number of regions** - Azure Cosmos DB for MongoDB is available in all Azure regions. Select the number of regions required for your workload.
- **Multi-region writes** - If *Enabled*, your application can read and write to any Azure region. If *Disabled*, your application can write data to only a single region, but can read from any selected region.
  - Enable it when you expect to have an active-active workload that requires low latency writes in different regions.
  - Multi-region writes guarantees 99.999% read and write availability.
  - Multi-region writes require more throughput when compared to the single write regions.
- **Total data stored in transactional store** - Total estimated data stored (GB) in the transactional store *in a single region*.
- **Use analytical store** - Choose *On* if you want to use Synapse analytical store.
  - If set to *On*, enter the **Total data stored in analytical store**, which represents the estimated data stored (GB) in the analytical store *in a single region*.
- **Item size** - The estimated average size of the documents (1 KB - 2 MB).
- **Finds/sec** - Number of find operations expected per second per region.
- **Inserts/sec** - Number of insert operations expected per second per region.
- **Updates/sec** - Number of update operations expected per second per region.
  - When you choose automatic indexing, the estimated RU/s for the update operation is calculated as one property being changed per an update.
- **Deletes/sec** - Number of delete operations expected per second per region.


Microsoft Azure | Azure Cosmos DB > Capacity Calculator

Sign In

The calculator below offers you a quick estimate of the workload cost on Azure Cosmos DB. For a more precise estimate and ability to tweak more parameters, please sign in with an account you use for Azure.

Azure Cosmos DB Account Settings

The simplified Azure Cosmos DB calculator assumes commonly used settings for indexing policy, consistency, and other parameters. For a more accurate estimate, please sign in to provide your workload details.

API: Cosmos DB for MongoDB

Number of regions: 1

Multi-region writes: ● Disabled ○ Enabled

Workload per region

For a more accurate cost estimate based on your own data, please sign in and upload your sample data.

Total data stored in transactional store: 10 GB

Use Analytical Store: ● Off ○ On

Item size: 1 KB

Finds/sec: 10

Inserts/sec: 10

Updates/sec: 5

Deletes/sec: 1

Calculate

Settings have been updated. Please calculate again.

Cost Estimate

Transactional Storage	
Cost per GB/month	0.25 USD
Total Data stored per region	x 10 GB
EST. STORAGE COST PER MONTH	2.50 USD

Transactional Workload	
Cost per 100 RU/s per hour	0.008 USD
EST. THROUGHPUT REQUIRED Show Details	x 400 RU/s
* Minimum throughput required is 400 RU/s	
EST. WORKLOAD COST/MONTH	23.36 USD

Number of regions	x 1
EST. TOTAL COST/MONTH	25.86 USD ***

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*** Please note that the prices above are examples only.

Once you select **Calculate**, the **Cost Estimate** tab will show the total cost for storage and provisioned throughput. Notice that by default it will show you the **EST. THROUGHPUT REQUIRED**, but you can select **Show Details** to see the estimated cost of the different types of CRUD and query requests.

> **Tip**
>
> Don't forget to select **Calculate** again if you change any of the parameters to get a new estimation.

Advanced mode

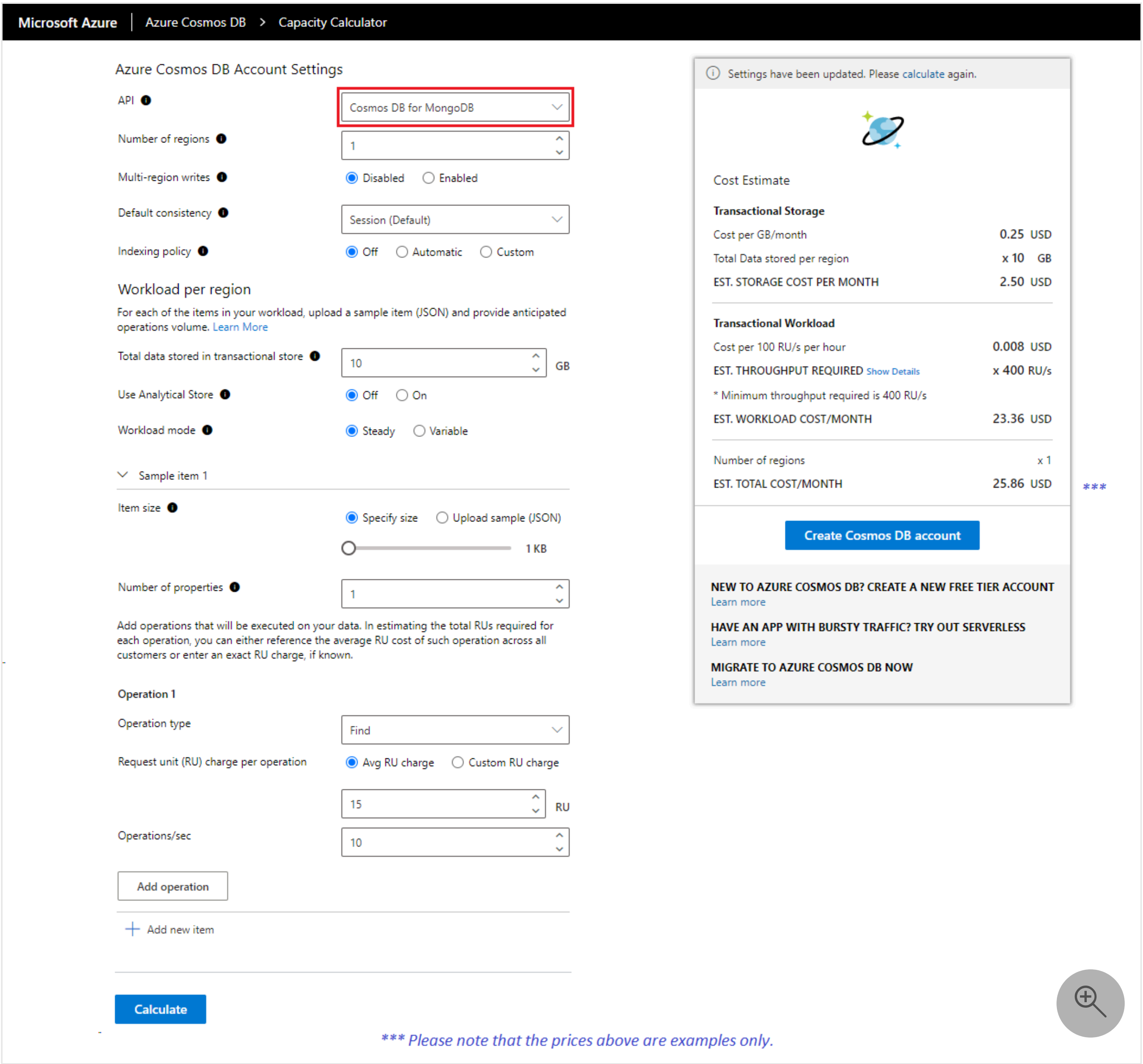
The *Advanced mode* requires a more detailed view of your workload. You'll need to provide more settings that will yield a more precise estimate on the cost and throughput of your workload. To choose the Advanced mode of the capacity planner, you'll need to sign in to the tool with an account you use to connect to Azure. You can find the **Sign In** option on the upper right hand corner of the tool.

Once you signed in, you'll notice a more detailed set of parameters than the Basic mode. Let's review the different workload parameters and the values to input.

- **API** - Select *Cosmos DB API for MongoDB*.
- **Number of regions** - Azure Cosmos DB for MongoDB is available in all Azure regions. Select the number of regions required for your workload.
- **Multi-region writes** - If *Enabled*, your application can read and write to any Azure region. If *Disabled*, your application can write data to only a single region, but can read from any selected region.
    - Enable it when you expect to have an active-active workload that requires low latency writes in different regions.
    - Multi-region writes guarantees 99.999% read and write availability.
    - Multi-region writes require more throughput when compared to the single write regions.
- **Default consistency** - Azure Cosmos DB for MongoDB supports 4 consistency levels, to allow developers to balance the tradeoff between consistency, availability, and latency tradeoffs. We'll discuss consistency levels in more details in the *Replication, Monitor and Optimize* module.
- **Indexing policy** - This setting defines how your workload plans to use its indexes. We'll discuss indexes in more detail in the *Design MongoDB Databases for Azure Cosmos DB* module. To learn more, see index management in API for MongoDB.
    - If you choose *Off* option, none of the properties are indexed that results in the lowest RU charge for writes. You'll need to query using the _id field and the shard key for every query, any other query will scan all partitions.
    - If you choose the *Automatic* option, will index all fields/properties in your documents that in turn allows flexible and efficient queries.
    - If you choose the *Custom* option, you can define the properties that are indexed with multi-key indexes or compound indexes.
        - You can enter the number of properties indexed later in the form.
- **Total data stored in transactional store** - Total estimated data stored (GB) in the transactional store *in a single region*.
- **Use analytical store** - Choose *On* if you want to use Synapse analytical store.
    - If set to *On*, enter the **Total data stored in analytical store**, which represents the estimated data stored (GB) in the analytical store *in a single region*.
- **Workload mode** - Select if you expect your workload to be *Steady* (constant), or *Variable*.
    - Select *Steady* if you expect the workload volume to be constant.
    - Select *Variable* if your workload changes over time. For example, a retail company whose sales drastically increase on weekend and/or holiday seasons.

- When *Variable* is selected, Enter the **Percentage of time at peak**.
- With peak and off-peak intervals, you can optimize your cost by programmatically scaling your provisioned throughput up and down accordingly.

- **Item size** - The estimated average size of the documents (1 KB - 2 MB).
  - You can also Upload sample (JSON) document for a more accurate estimate.
  - If your workload has multiple types of items (with different JSON content) in the same container, you can upload multiple JSON documents and get the estimate. Use the Add new item button to add multiple sample JSON documents.
- **Operation type** - The type of operation such as Find, Aggregate, Modify etc.
- **Request unit (RU) charge per call** - The estimated RU/s charge to execute the selected operation type.
- **Calls/sec per region** - Number selected operation types executed per second per region.



Azure Cosmos DB Account Settings

API	Cosmos DB for MongoDB
Number of regions	1
Multi-region writes	● Disabled ○ Enabled
Default consistency	Session (Default)
Indexing policy	● Off ○ Automatic ○ Custom

Workload per region

For each of the items in your workload, upload a sample item (JSON) and provide anticipated operations volume. Learn More

Total data stored in transactional store	10 GB
Use Analytical Store	● Off ○ On
Workload mode	● Steady ○ Variable

Sample item 1

Item size	● Specify size ○ Upload sample (JSON) 1 KB
Number of properties	1

Add operations that will be executed on your data. In estimating the total RUs required for each operation, you can either reference the average RU cost of such operation across all customers or enter an exact RU charge, if known.

Operation 1

Operation type	Find
Request unit (RU) charge per operation	● Avg RU charge ○ Custom RU charge 15 RU
Operations/sec	10

Settings have been updated. Please calculate again.

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REQUIRED, but you can select **Show Details** to see the estimated cost of the different types of CRUD and query requests.

💡 Tip

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ⓘ Note

All prices are shown in US dollars. Refer to the Azure Cosmos DB pricing page to see all rates by region.

Next unit: Exercise - Create a MongoDB DB app using the Azure Cosmos DB for MongoDB

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