Globally Distributing Data

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Replication – Why?

Performance

Within a region, ensures SLA on RUs purchased

Across regions, brings data closer to the consumer

Business continuity

In the event of major failure or natural disaster

Turnkey Global Distribution

Turnkey Global Distribution

Associate any number of regions with your Cosmos DB account

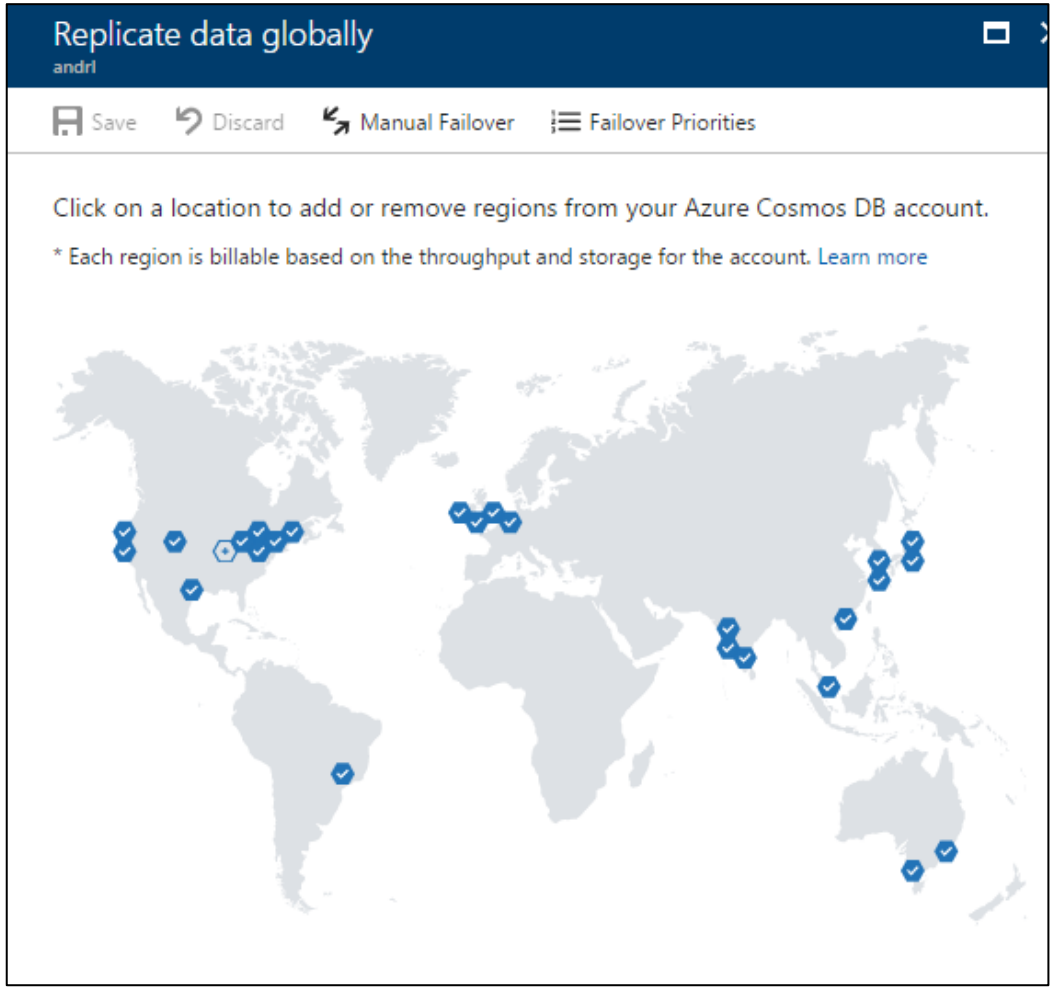
- Limited to geo-fencing policies

Dynamically add/remove regions

- Associate (and disassociate) regions with the click of a mouse

Failover priorities

- Choose preferred region, followed by regions for failover in order of preference



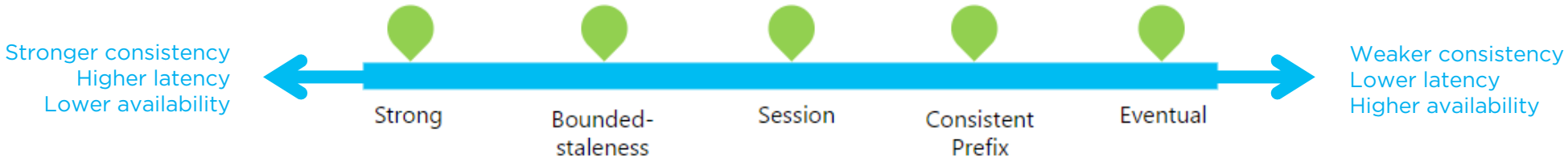
Demo

Global distribution

Replication and Consistency

How do you ensure consistent reads across replicas?

- Define a consistency level



Replication within a region

- Data moves extremely fast (typically, within 1ms) between neighboring racks

Global replication

- It takes hundreds of milliseconds to move data across continents

Five Consistency Levels

Strong

No dirty reads

Bounded staleness

Dirty reads possible

Bounded by
time and updates

Session

No dirty reads for writers
(read your own writes)

Dirty reads possible
for other users

Consistent prefix

Dirty reads possible

Reads never see
out-of-order writes

Eventual

Stale reads possible

No guaranteed order

Setting the Consistency Level

Set default for entire account

Can be changed at any time

https://portal.azure.com/#resource/subscriptions/62e2dd31-22cc-439d-aa5e-edd19758f3b5/resourceGroups/cosmosdbd

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Azure Cosmos DB account

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- Tags
- Diagnose and solve problems
- Quick start
- Data Explorer

SETTINGS

- Replicate data globally
- Default consistency
- Firewall
- Keys
- Add Azure Search

Add Collection | Refresh | Move | Delete Account | Data Explorer

Status
Online

Resource group (change)
cosmosdbdemos

Subscription (change)
Visual Studio Ultimate with MSDN

Subscription ID
62e2dd31-22cc-439d-aa5e-edd19758f3b5

Read Locations
West US

Write Location
West US

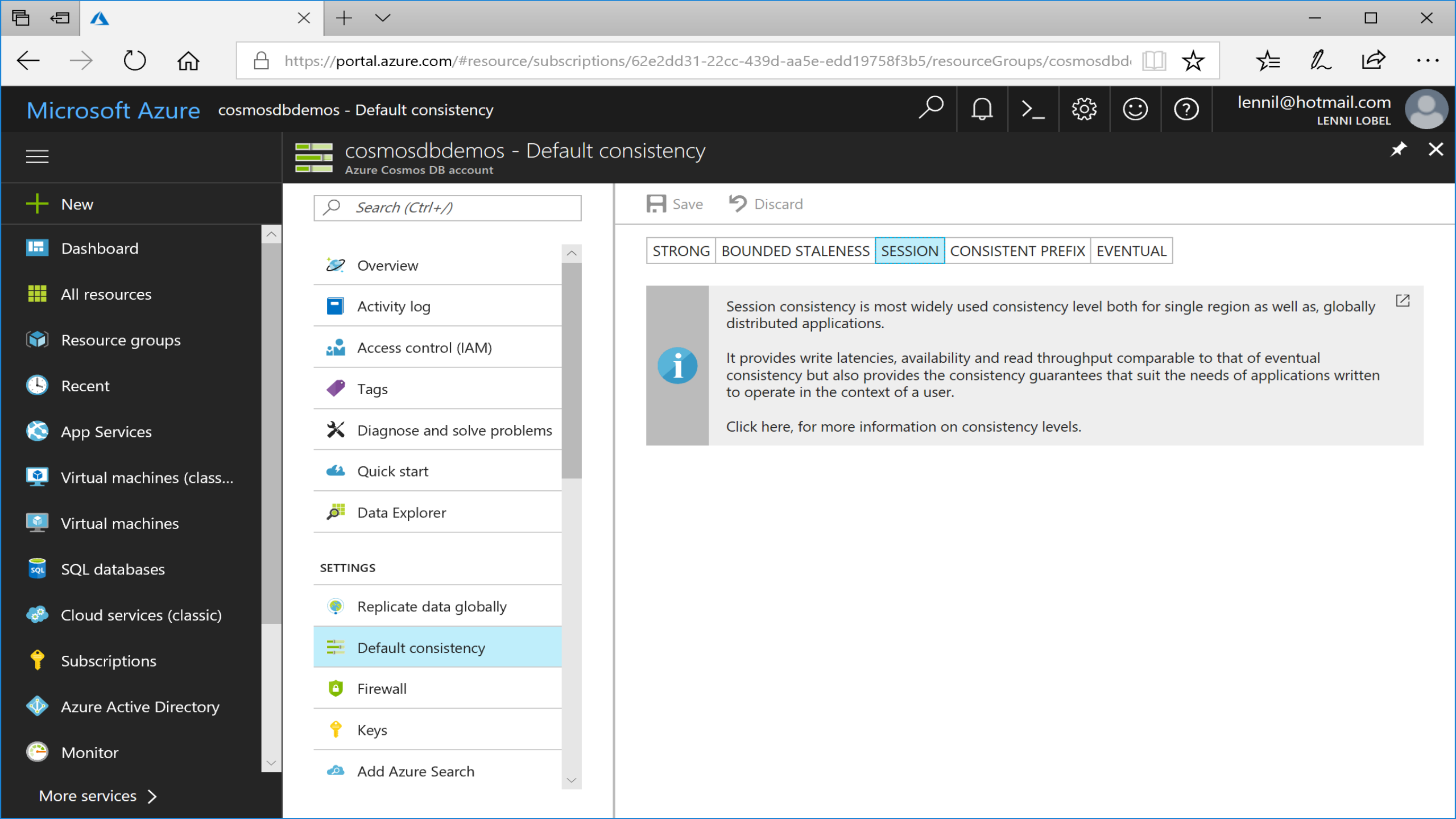
Document Endpoint
https://cosmosdbdemos.documents.azure.com:443/

Collections

Looks like you don't have any collections yet. Data Explorer

Regions

Region Configuration
COSMOSDBDEMOS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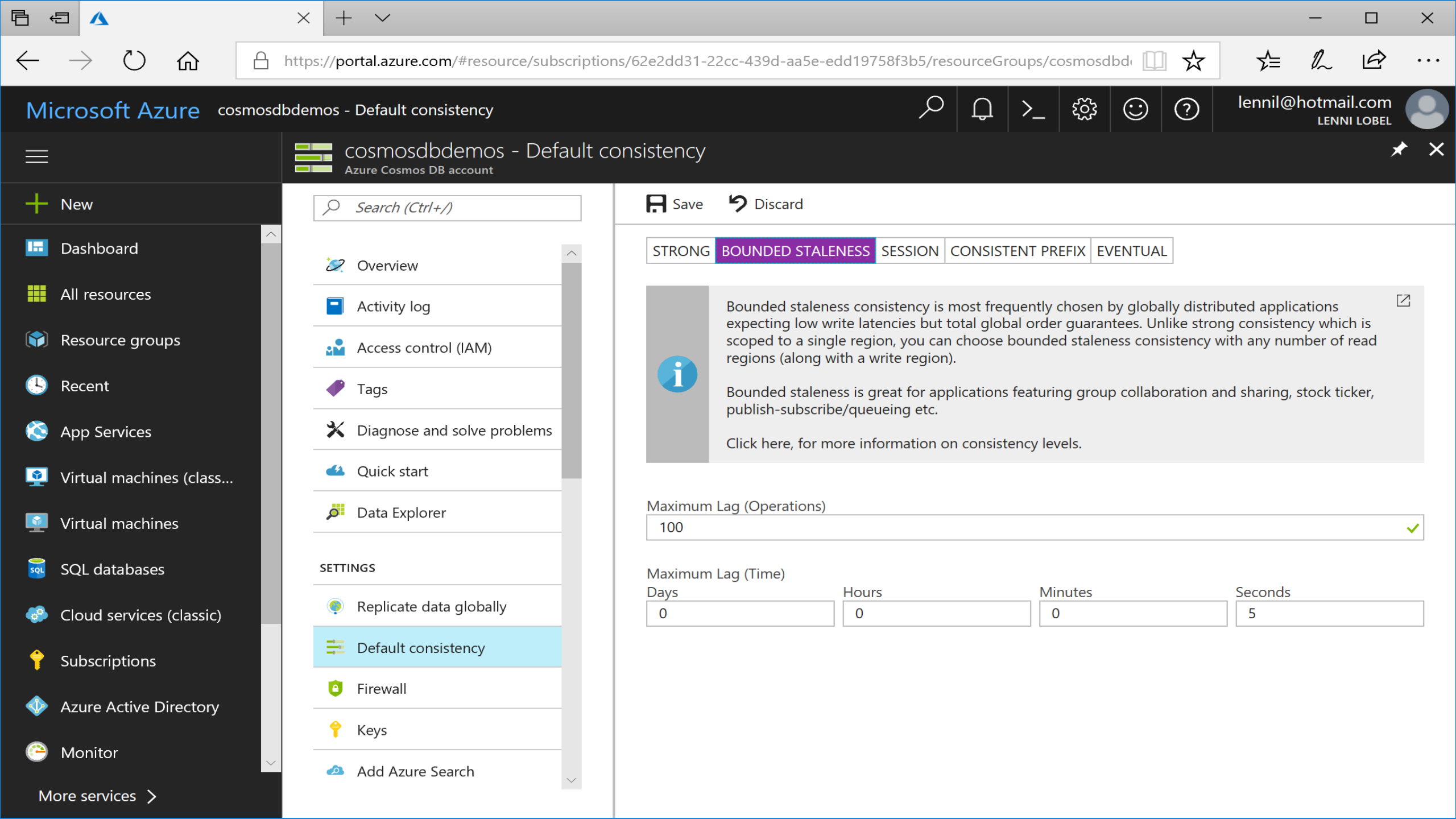
STRONG
BOUNDED STALENESS
SESSION
CONSISTENT PREFIX
EVENTUAL
Session consistency is most widely used consistency level both for single region as well as, globally distributed applications.
It provides write latencies, availability and read throughput comparable to that of eventual consistency but also provides the consistency guarantees that suit the needs of applications written to operate in the context of a user.
Click here, for more information on consistency levels.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Bounded staleness consistency is most frequently chosen by globally distributed applications expecting low write latencies but total global order guarantees. Unlike strong consistency which is scoped to a single region, you can choose bounded staleness consistency with any number of read regions (along with a write region).
Bounded staleness is great for applications featuring group collaboration and sharing, stock ticker, publish-subscribe/queueing etc.
Click here, for more information on consistency levels.
Maximum Lag (Operations)
100
Maximum Lag (Time)
Days
Hours
Minutes
Seconds
0
0
0
5

Setting the Consistency Level

Set default for entire account

Can be changed at any time

Override at the request level

Any request can weaken the default consistency level

```
new DocumentClient(new Uri(endpoint), masterKey, connectionPolicy, ConsistencyLevel.)
```

- BoundedStaleness
- ConsistentPrefix
- Eventual
- Session
- Strong

Summary

Replication

- Within a data center
- Global replication
- Preferred failover regions

Five consistency levels

- Strong
- Bounded staleness
- Session
- Consistent prefix
- Eventual