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Unleashing the power of PostgreSQL® in the cloud

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Picture this...

It's Monday morning and your manager has just sent you an email about a decision to ***migrate your busiest application*** *from* ***on-premises to the cloud***

You have some ***reservations****. You know this application is one of the* ***busiest PostgreSQL services*** *in your environment.*

How can you support this migration without our application users suffering from performance issues post migration?

What do you do?

Let's do some testing!!

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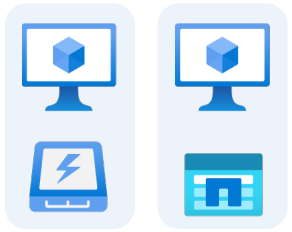
What do we need to test

PostgreSQL database running

Instaclustr Managed Platform for PostgreSQL



Instance types

DS13_v2 (8vCPU 56GB RAM 2TB Storage) using **Microsoft Azure Premium SSD**

E8s_v4 (8vCPU 64GB RAM 2TB Storage) using **Azure NetApp Files**

Benchmark testing tool PGBench

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What is ANF?

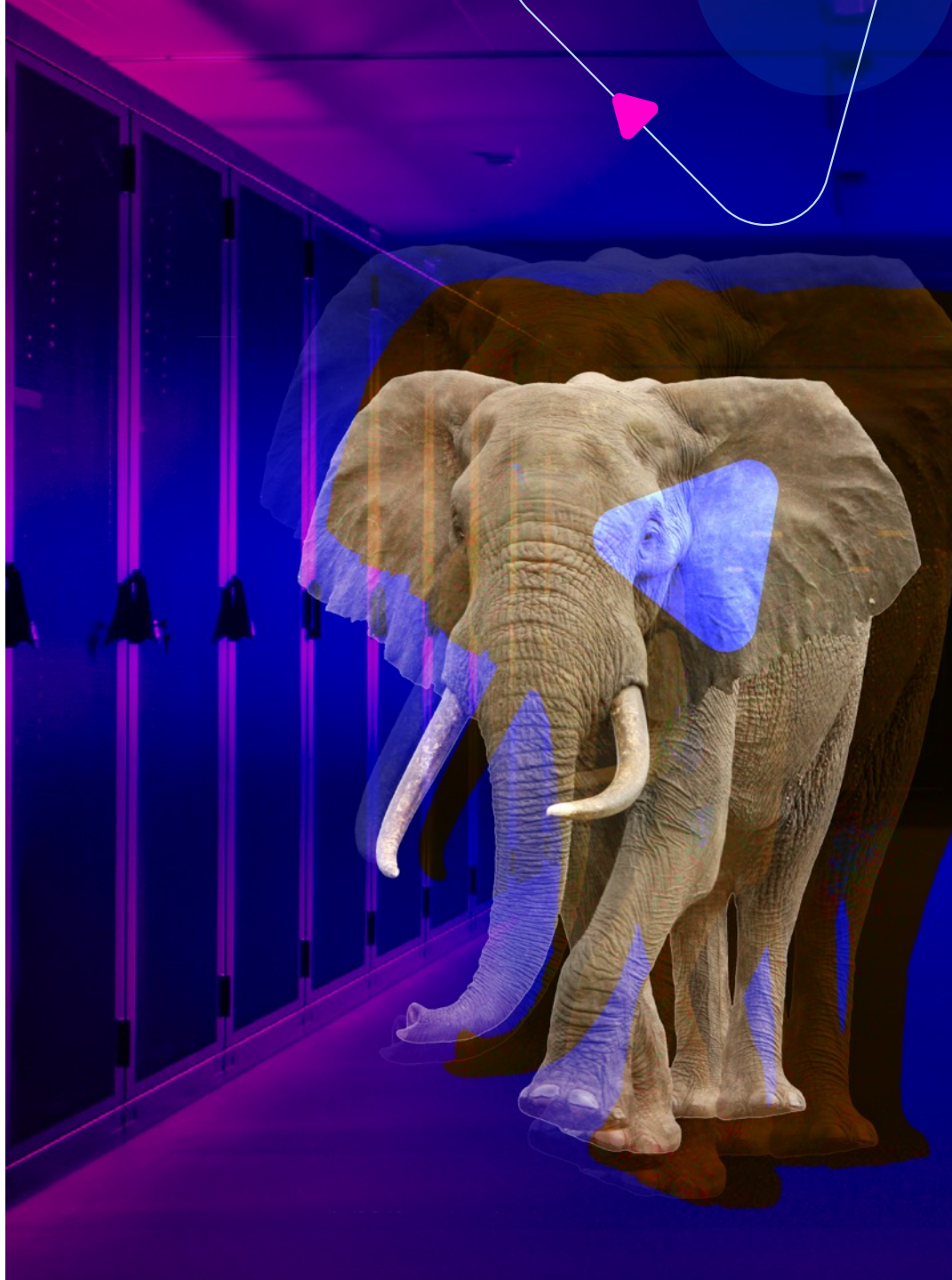
Azure NetApp Files is a Microsoft Azure native, **highly available, high performance file storage service** for your business applications.

Performance tiers:

- **Standard** (16 MiB/s per 1TiB quota)
- **Premium** (64 MiB/s per 1TiB quota)
- **Ultra** (128 MiB/s per 1TiB quota)

Capabilities:

- 99.99% Availability by default
- Multi-protocol support (NFSv3, NFSv4.1, SMB 3.0, SMB 3.1.1, and simultaneous dual-protocol)
- Instantaneous snapshots
- Cross region and cross-zone replication



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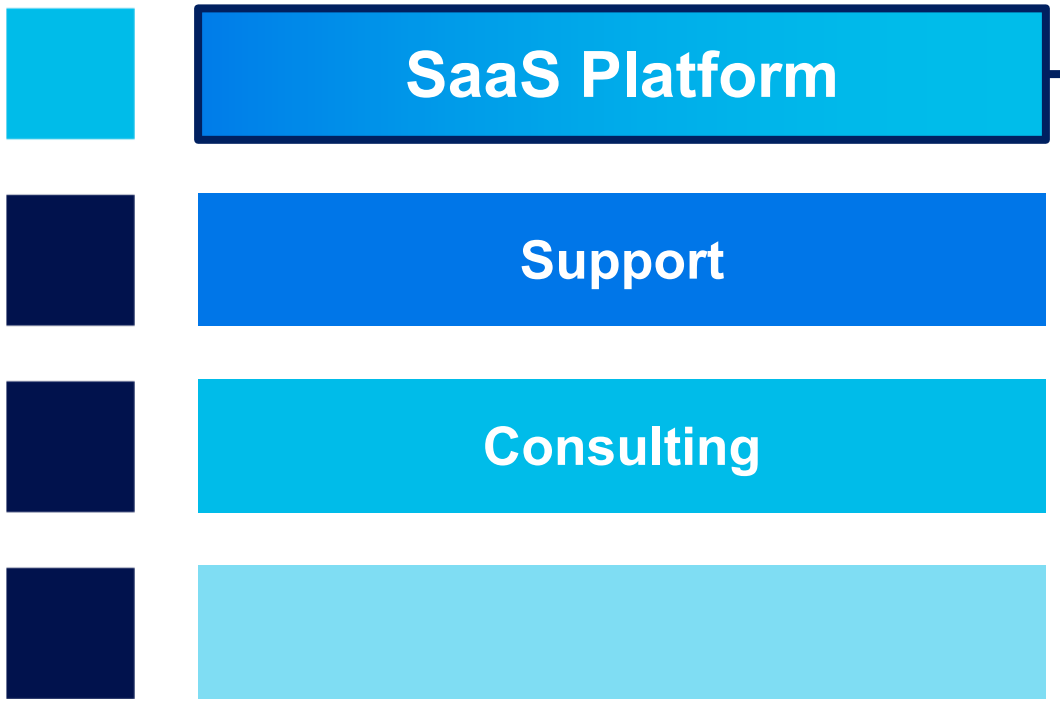
Instaclustr Managed Platform for PostgreSQL



Instaclustr Managed Platform

- In YOUR cloud
- In Instaclustr cloud
- On-premises
- Instaclustr managed PostgreSQL
- Enterprise SLAs Included 99.99%
- Expert Support Included

Reliability @ scale

Managed and supported open source

Extensive and unmatched expertise

aws

Google Cloud

HEROKU

On-Prem

cassandra

kafka

OpenSearch

Redis

APACHE Spark

PostgreSQL

Cadence

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Let’s build a PostgreSQL® service

The Instaclustr advantage

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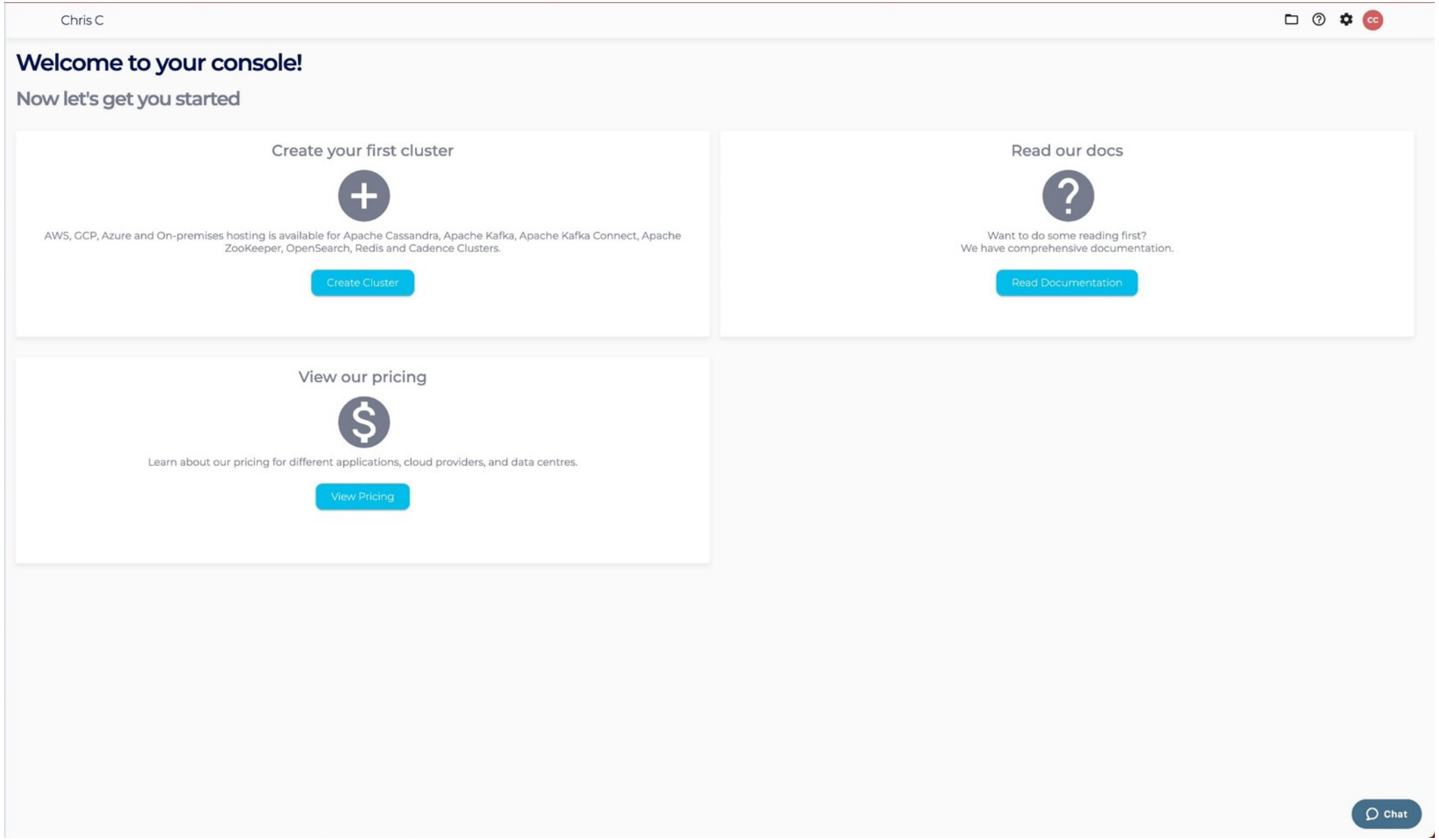

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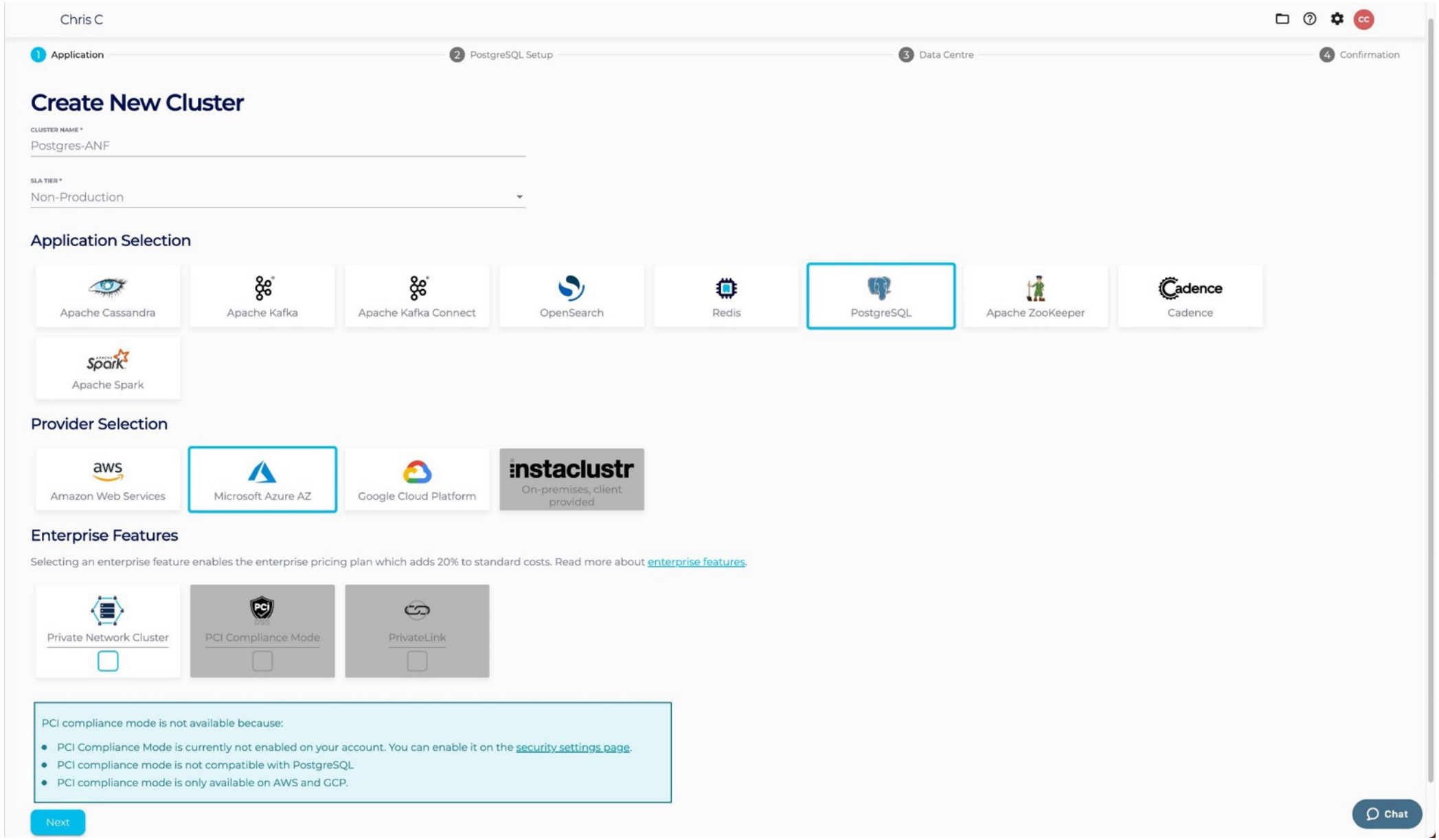

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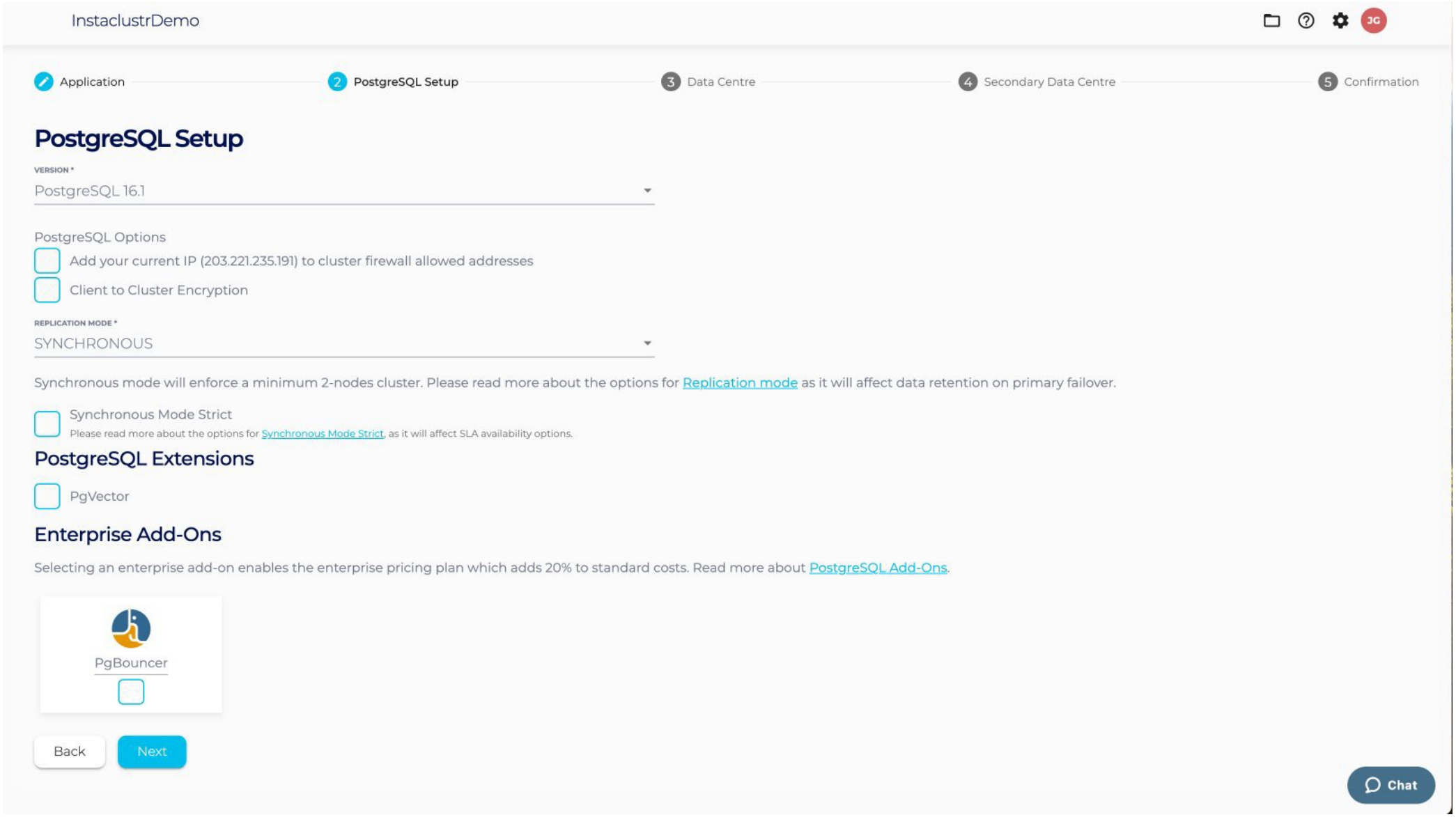

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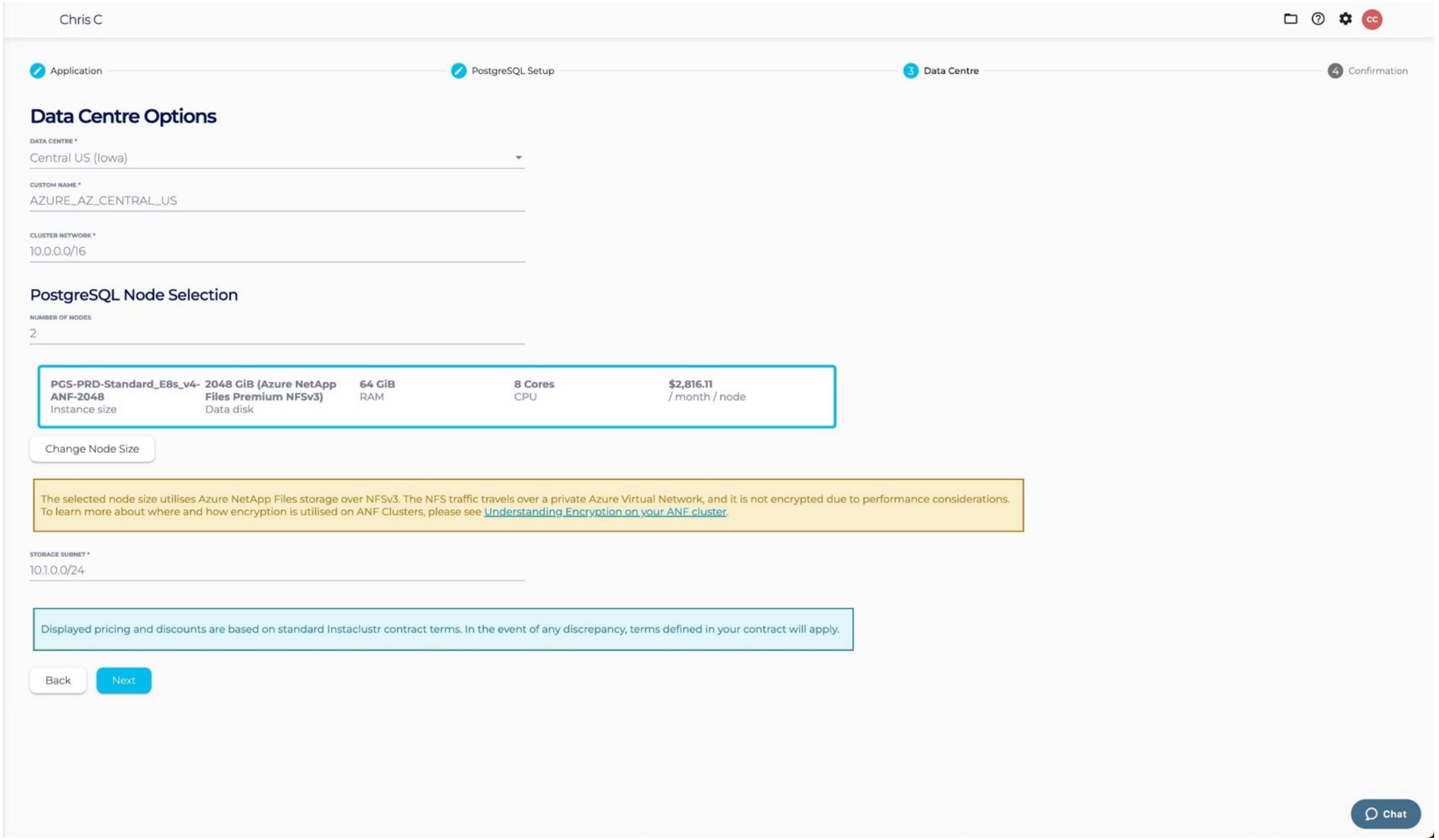

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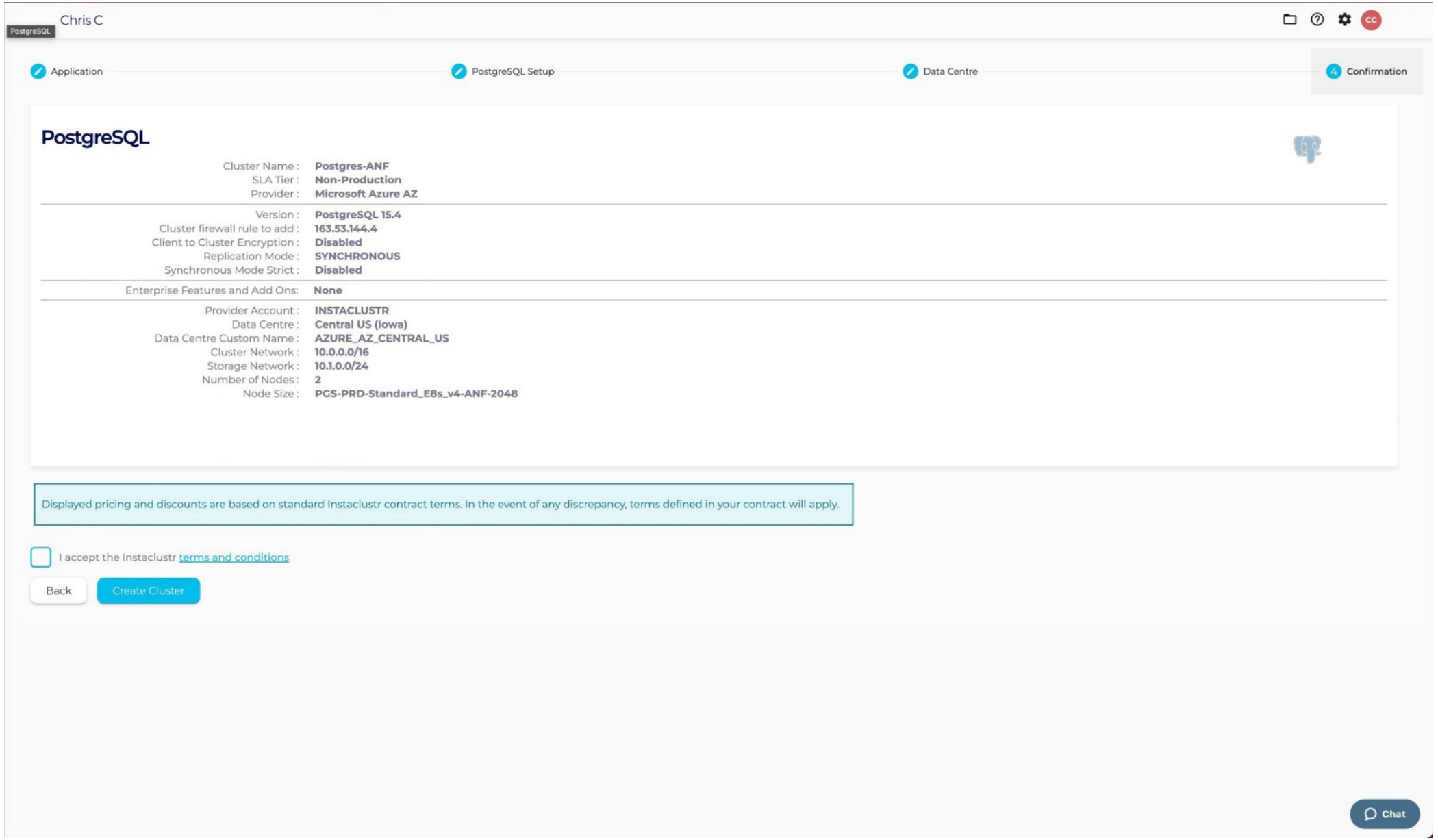

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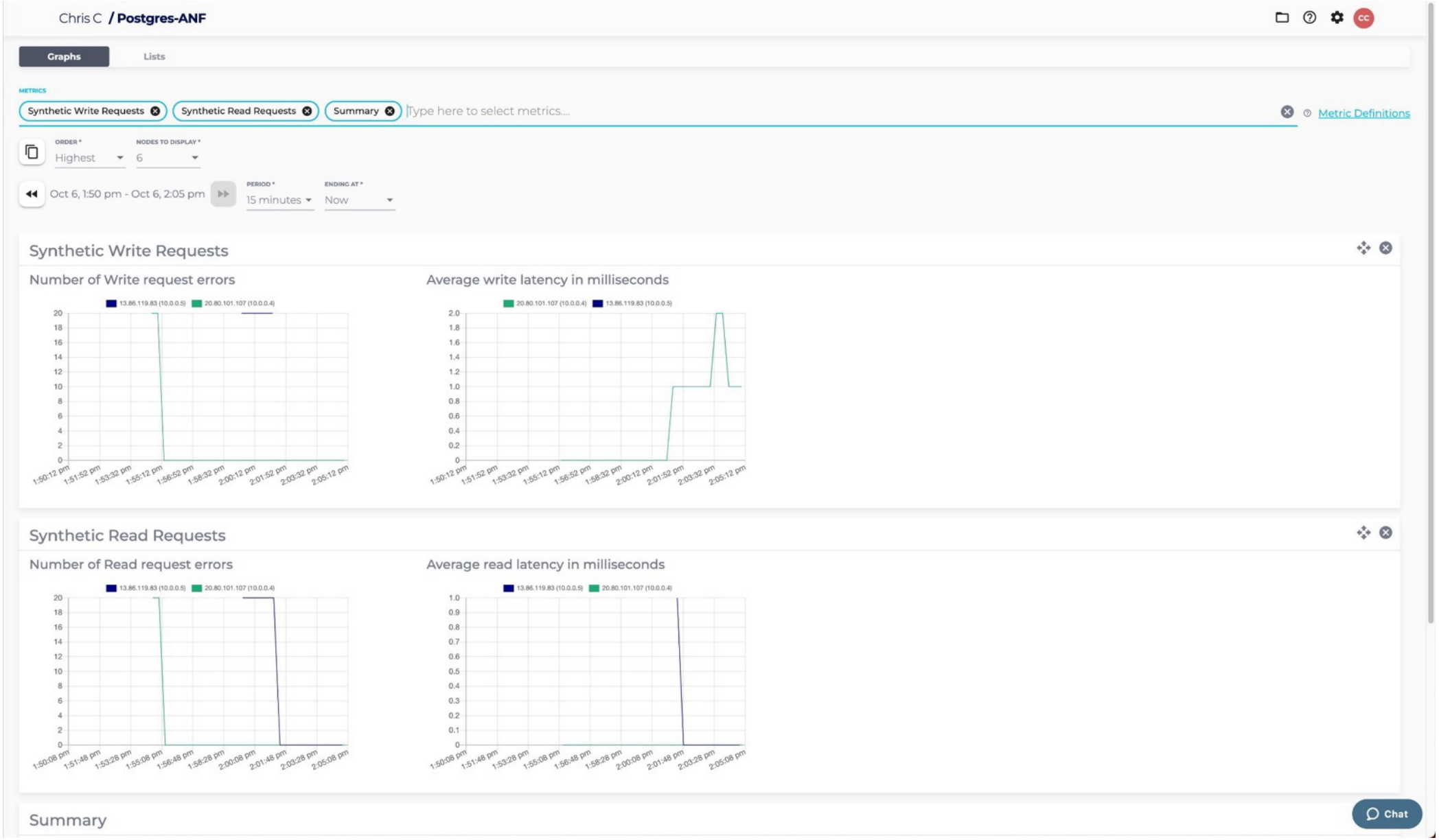

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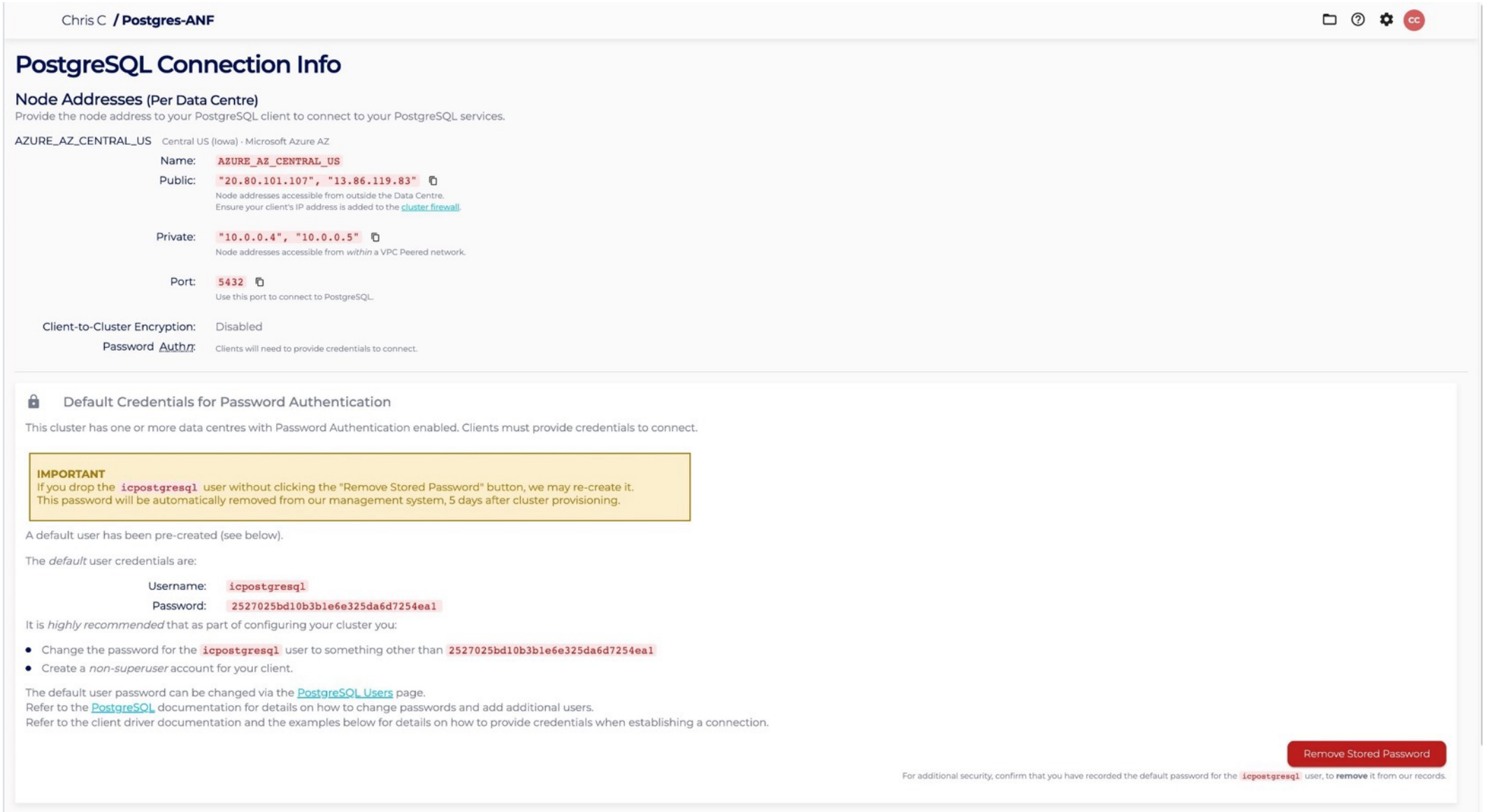

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Let’s start benchmarking

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How did we test?

Before testing, we loaded the databases with 1.5TB of data to ensure this was a good simulation of a production real world performance workload. (*Watch out for cached memory results!*)

Looped over different client counts to research scalability. The test was performed 3 times per configuration and the results averaged.

Minimal variance was seen between repeated runs. In our pgbench configuration, scale was set to 10,000, clients were looped through 4, 8, 16, 32, 64, and 96.

Full scripts we used for testing can be found on our GitHub (https://github.com/instaclustr/Postgres-ANF).

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Performance tuning

Initial testing showed that the **Postgres-ANF server performed very well when clients=cores** BUT **performance would drop off unexpectedly beyond that.**

Investigation and metric logging showed that bottlenecks were being created in the **WAL compression** and **bgwriter_delay**.

Adjusting these parameters allowed us to push **well past the 8-client count** and get the results.

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Results

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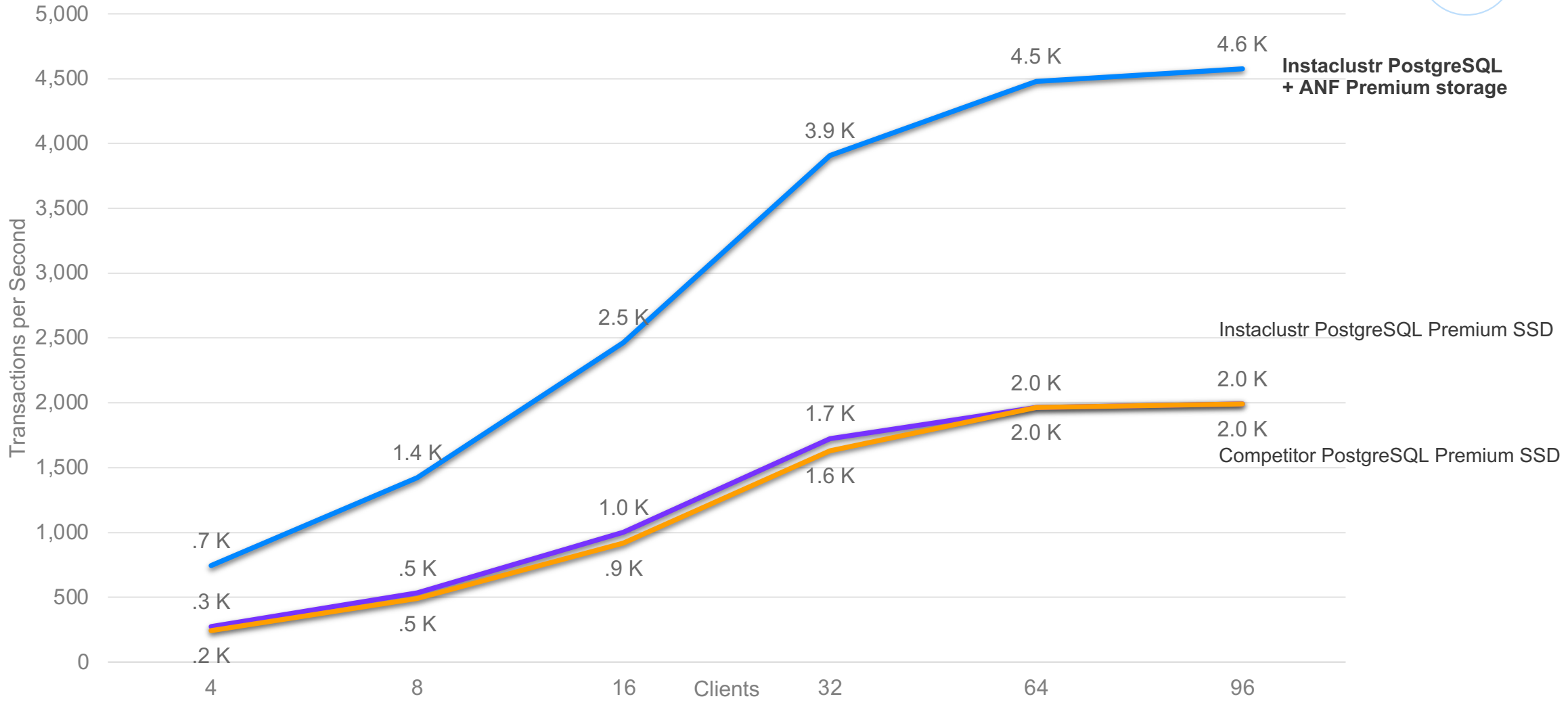
Read/Write TPS by Client Count



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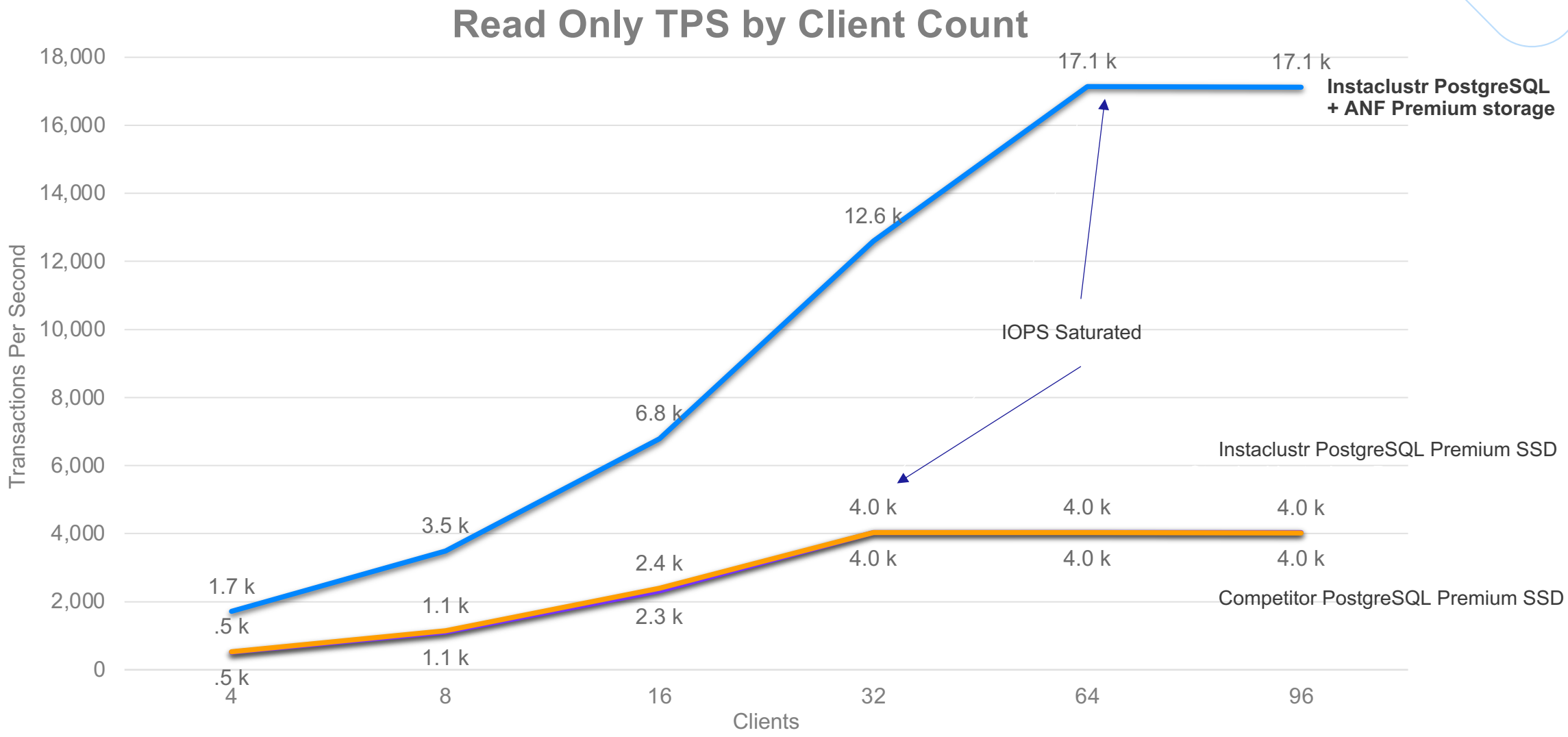

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Analysis

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Price vs. performance

	DS13_v2-2000 (Azure Premium SSD)	E8s_v4-ANF-2048 (Azure NetApp Files)
TPS (Read only)	4,030	**17,140**
TPS (Read/Write)	1,963	**4,479**
Management Price	$1,500	$1,500
Instance Cost (On-Demand)	$541.3	$368.17
Storage Cost (On-Demand)	$259.05	$602.50
Network Cost (estimated)	$340	$348.16
Backup Cost	$52.8	$54.07
Price per month	**$2,693.15**	**$2,872.90**
$/TPS (Read only)	$0.67	**$0.17**
$/TPS (Read/Write)	$1.37	**$0.64**

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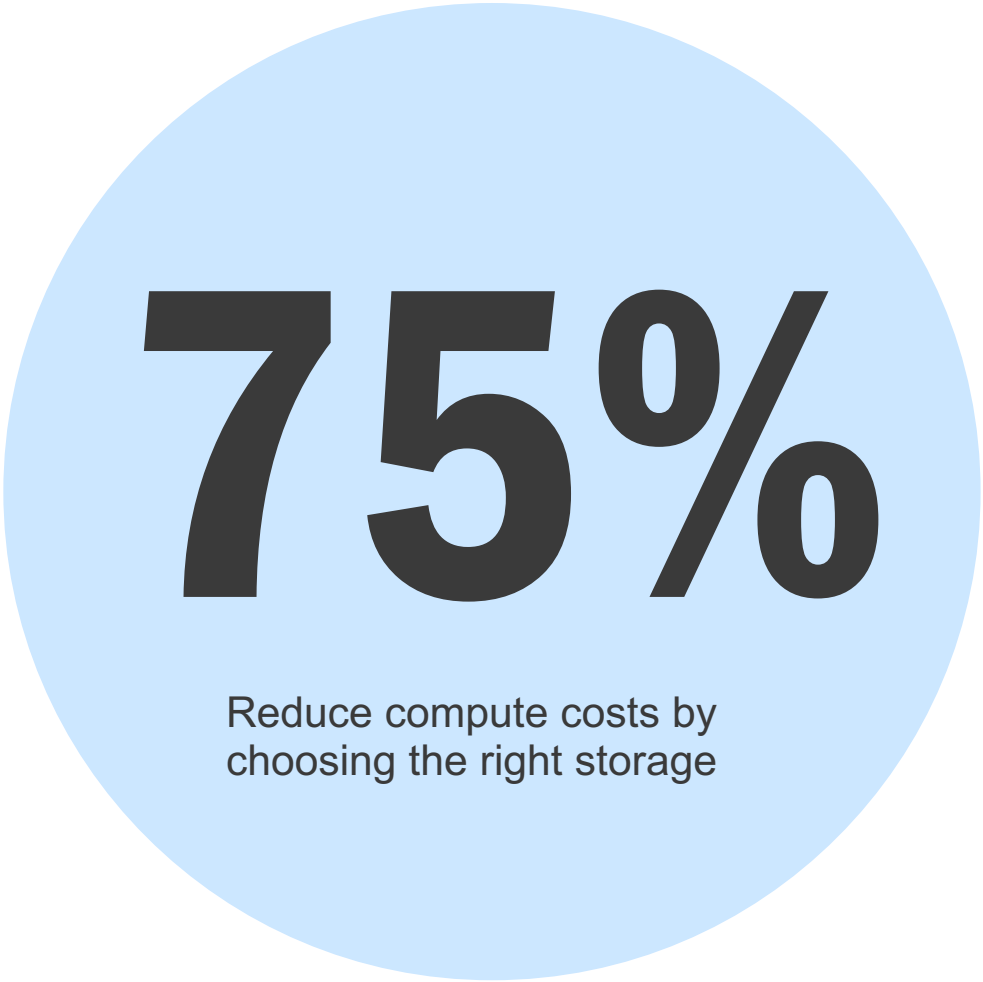
Reduce compute costs by choosing the right storage



Reduce TCO

Reduction in $/TPS

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PostgreSQL Azure NetApp Files roadmap

Exciting things to come

Ultra-fast backups

Database forking

Disaster recovery

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One more test

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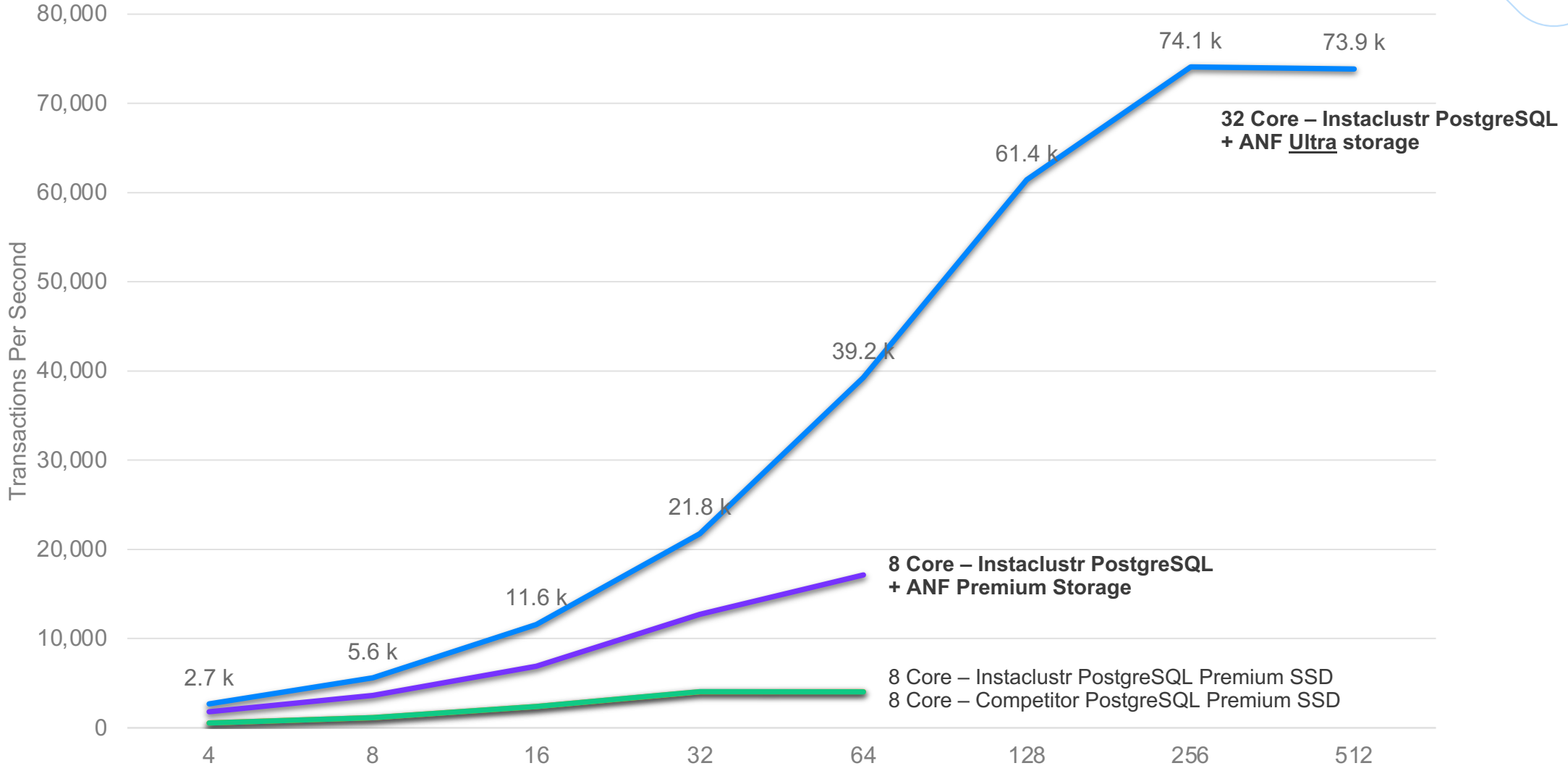
Read Only TPS by Client Count



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Summary

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Scenario Wrap Up

Application Users

- ✓ High Performance
- ✓ Highly Available

Your Manager

- ✓ Application migrated to the cloud
- ✓ No performance complaints from application users

You

- ✓ More time back in your day
- ✓ Access to experts when it matters

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Chance to win

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Thank you

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