Cloud Migration Paths

IaaS, K8s, or DBaaS

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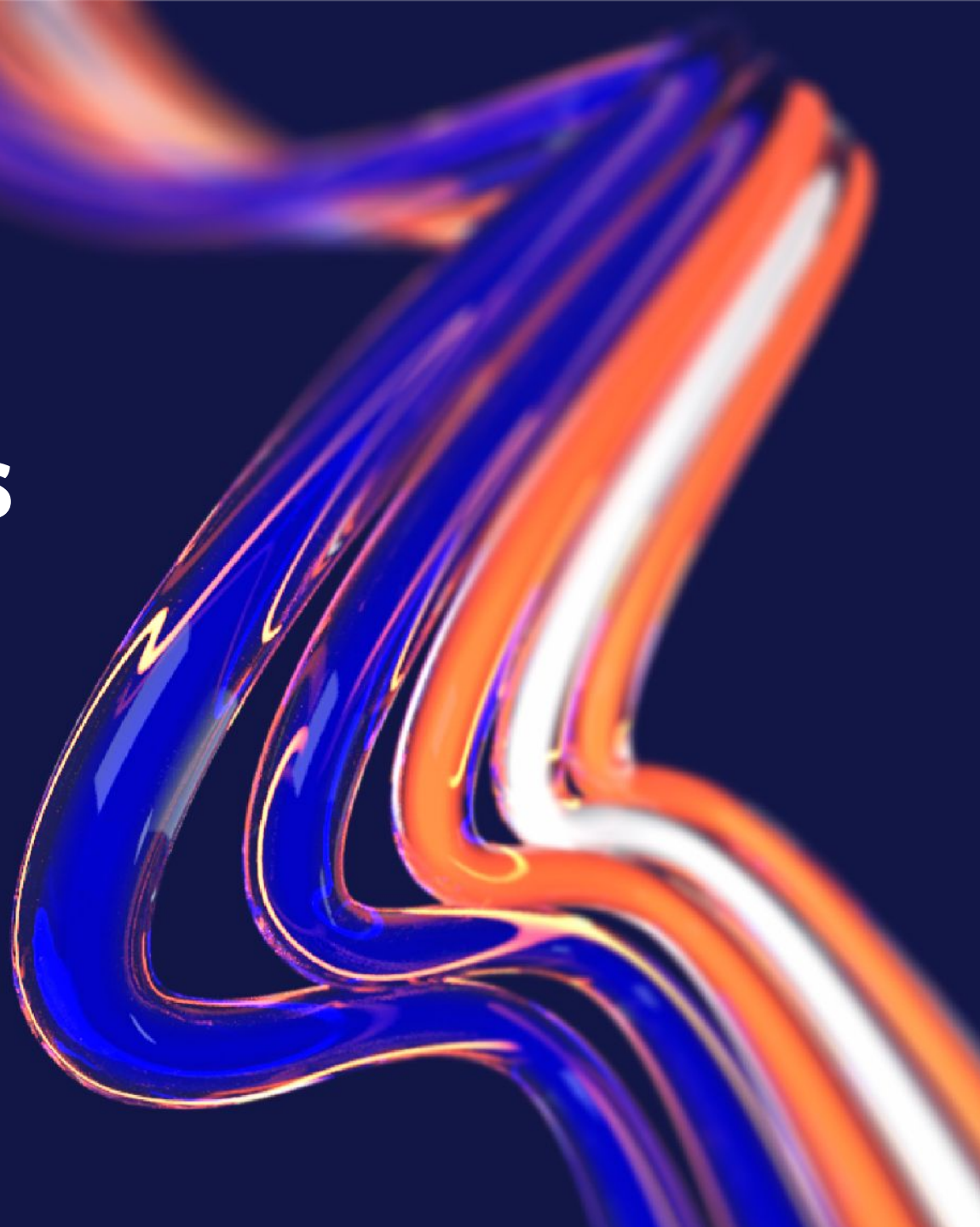
EDB™



Agenda

- Why leave legacy databases?
- Why are enterprises moving to the cloud?
- What is a “Cloud Service”?
- Database options in the cloud
- Kubernetes and DBaaS
- Key considerations

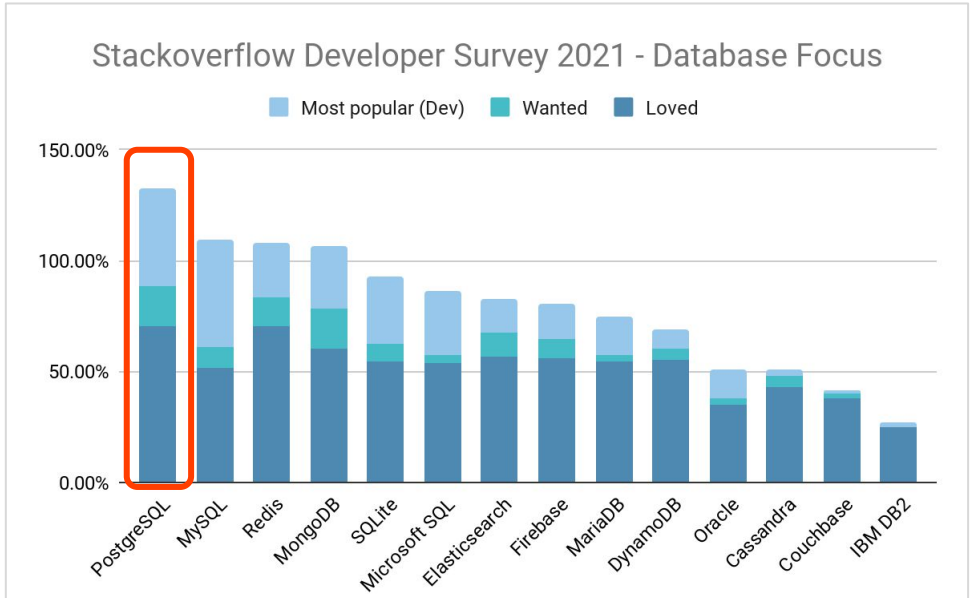
Postgres as the clear winner in the database game

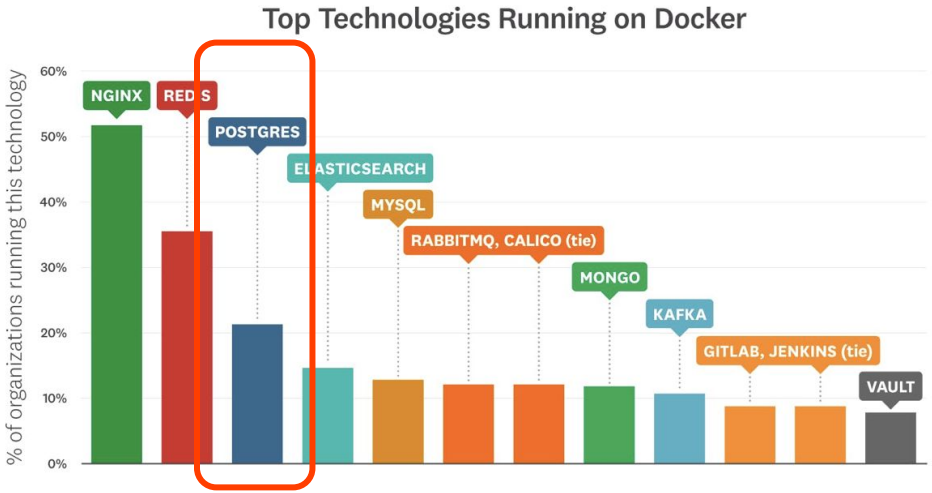
The CNCF End User Community was asked to describe what their companies recommend for different solutions: Adopt, Trial, Assess or Hold. This table shows how the End User companies rated each technology.

Level	Name	Votes
Adopt	Redis	
	Elasticsearch	
	PostgreSQL	
	MySQL	
	Kafka	
	Memcached	
Trial	MongoDB	
	Cassandra	
	Aurora	
	Consul	
	BigQuery	
	CloudSQL	
	AWS DynamoDB	
Assess	MariaDB	
	CockroachDB	
	Vitess	

26 companies contributed 217 data points

Cloud Native Computing Foundation Technology Radar





Source: Datadog

Why are enterprises leaving legacy databases?

Price

High cost

Restrictive and complicated contracts

Agility

70% of new apps use open source

Adopt modern software architectures

Deployment Options

Organizations move to any Cloud

Transition to Containers / Cloud Native

Innovation

Legacy software in maintenance mode

Postgres innovates many directions

Consolidation

Focus IT spend on fewer platforms

PostgreSQL fits many workloads

Future proof

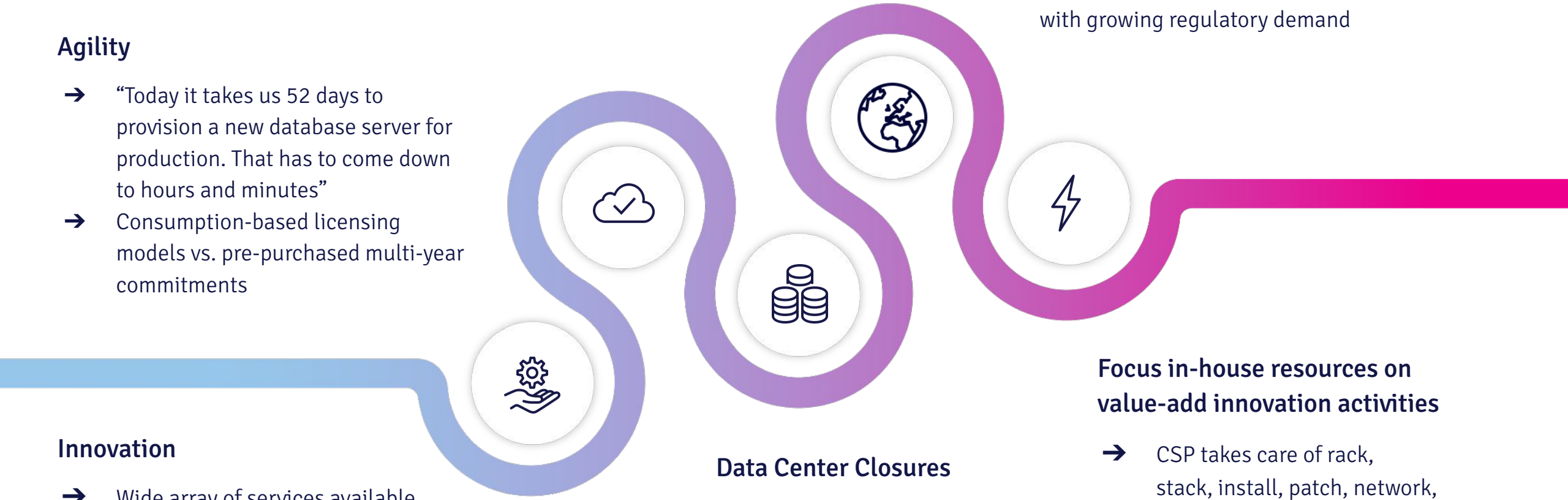
PostgreSQL inherently innovates

to where the market goes

Why are enterprises moving to the cloud?

Agility

- “Today it takes us 52 days to provision a new database server for production. That has to come down to hours and minutes”
- Consumption-based licensing models vs. pre-purchased multi-year commitments



Innovation

- Wide array of services available
- Experimentation and single projects
- Great support for trying something new and ‘Fail Fast’

Global Markets

- Near impossible and prohibitively expensive to cover from in-house data centers
- Too slow to open up new markets, especially with growing regulatory demand

Data Center Closures

- Major enterprise trend
- Move from huge long-term investments to ‘on demand’

Focus in-house resources on value-add innovation activities

- CSP takes care of rack, stack, install, patch, network, storage, etc

Poll Question

Marc Linster
Chief Technology Officer at EDB
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On Wednesday **Bruce Momjian** and I will have a webinar on 'Cloud Migration Paths: Kubernetes, IaaS, or DBaaS' (**https://lnkd.in/eaPXiqnP**).
How are you planning to move your Postgres databases to the cloud?

#postgresql #dbaas #iaas #kubernetes

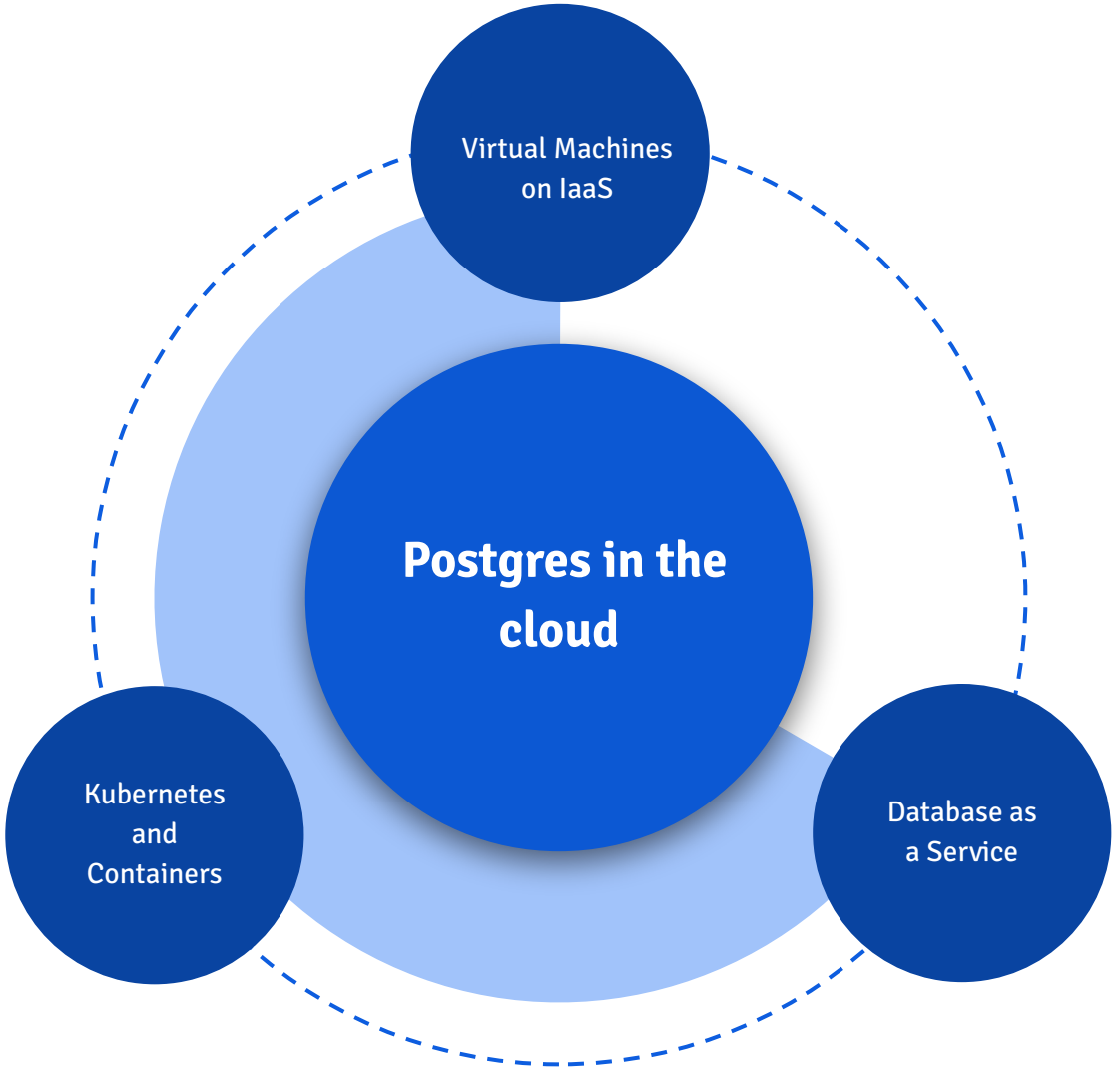
How are you moving your databases to the cloud?

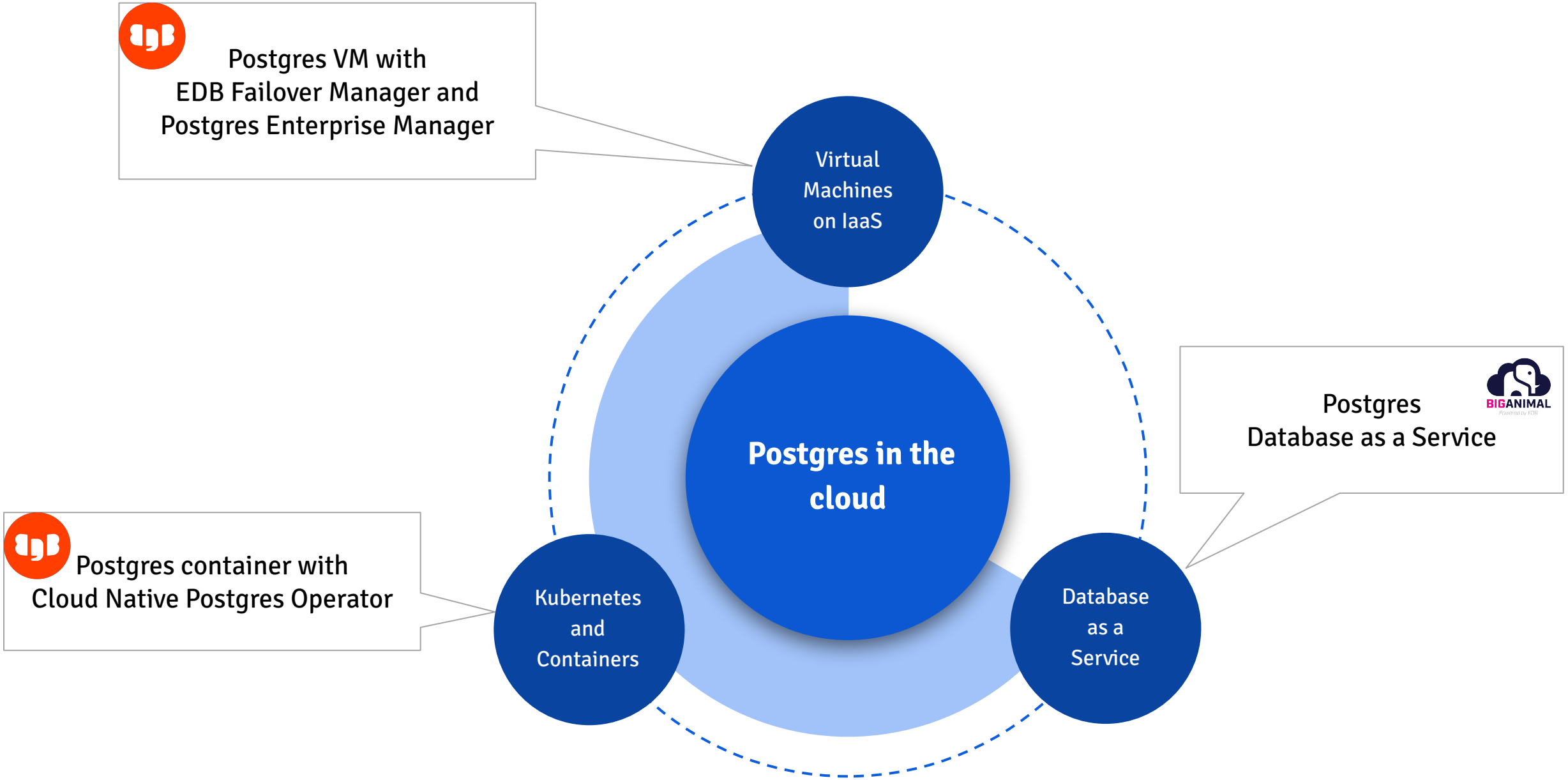
You can see how people vote. **Learn more**

Virtual Machines on IaaS	**11%**
K8s and Containers	**39%**
Database as a Service	**50%**

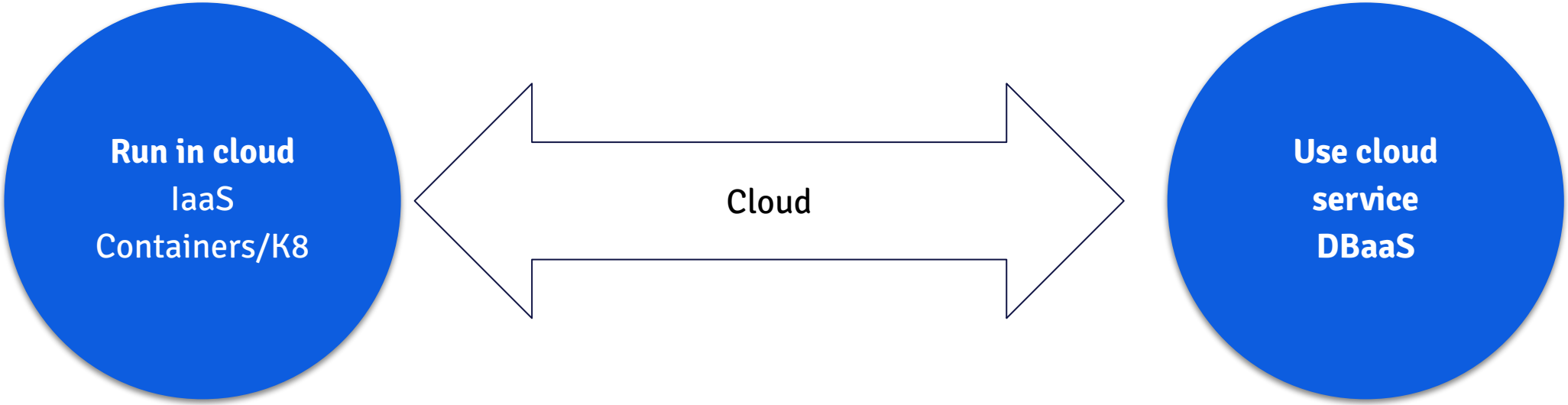
Three options for Postgres in the cloud

Which is the right path for you?





Two classes of cloud deployments



- Outsourced compute and network
- Easy to add/remove new servers, storage, etc.
- 3rd party responsible for ping, pipe and power

- Outsourced database services and operations
- Easy to add/remove new databases
- 3rd party runs my database for me
- They make sure the database is up and running, backups happen, patches are applied, etc

What do most enterprises look for?

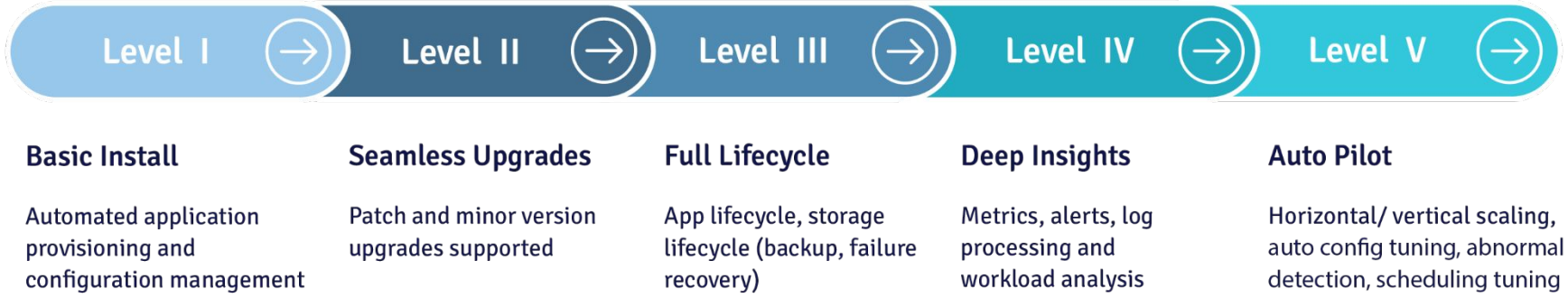
Essential characteristics of a cloud service*

- **On-demand self-service** - Automated provisioning without human intervention
- **Broad network access** - Access from anywhere from any number of platforms
- **Resource pooling** - Multi-tenant utilization of hardware and software (with boundaries) to allow for greater flexibility and greater utilization of resources vs idle servers sitting in a datacenter
- **Rapid elasticity** - Rapidly scale and release provision resources based on demand
- **Measured service** - Utilization is monitored, controlled and reported by the cloud service provider which provides transparency for both the provider and consumer - consumer is billed for what is used

*Based on NIST Definition of Cloud Computing (NIST SP 800-144)

IaaS, K8s, DBaaS - which one is a *Cloud Service*?

- **VMs on IaaS are not cloud services**
  - Provisioning scripts, infrastructure as code, or Ansible are not enough to provide on an demand, self service, and flexible service
- **K8s is getting closer - but still not a cloud service**
  - Advanced K8s operators will provide the right foundation



  - Infrastructure provisioning and dealing with infrastructure events is not part of the operator evolution
- **DBaaS provides the essential characteristics**
  - Self-service, on demand, rapid elasticity, measured service
  - Tradeoff between self-service and control

	VMs on IaaS	K8s and containers	DBaaS
Examples	➔ Postgres with RepMgr on EC2 ➔ EDB Postgres Advanced Server with EFM and PEM on EC2	➔ Postgres with Patroni operator on EKS ➔ EDB Cloud Native Postgres on AKS	➔ RDS Postgres ➔ EDB BigAnimal
On demand	No (Infrastructure as code will help)	Improved (Level III+ K8s operator automates failover, upgrades, backup/recovery)	Yes
Broad network access	Yes	Yes	Yes
Resource pooling	No	Yes	
Rapid elasticity	No (Infrastructure as code will help)	Improved (Level V K8s operator will address database elasticity)	Yes
Measured service	No (IaaS only)	Improved (Level IV K8s operator will address database metering)	Yes

Summary of tradeoffs

	Advantages	Things to consider
VMs on IaaS	• Full control • Ultimate configurability and tuning at the database and OS level • Any extensions and versions • Highest performance and lowest 3rd party cost	• Need infrastructure DBAs • Needs 24 X 7 monitoring • You are responsible for configuration and day to day operation • Minimal automation
K8s on Containers	• K8s operator automates many lifecycle tasks (installation, failover, backup/recovery, upgrade, ...) • Upgrades under your control	• Works best when application is containerized and K8s is used for the whole stack • Configuration options are limited • Need K8s expertise and you have to buy into the K8s way of doing things • Needs 24 X 7 monitoring
Managed Database Service	• SRE team monitors and operates • SRE applies upgrades • You focus on innovation, they keep the lights on	• Relinquish significant control • No OS tuning • Limited database extensions

Key considerations when moving a database to the cloud

- Determine database deployment requirements Ansible, Puppet, Chef, containers, K8
- How will data be moved? replication?
- How will swichover be handled? Downtime?
- How will middleware, monitoring, load balancing, backup, failover be handled?
- If DBaaS is chosen, will it have the needed features, extensions, and flexibility?
- How can you determine the proper cloud resource sizing?
- Getting your data out of the cloud
- https://www.enterprisedb.com/blog/cloud-migration-move-database-from-on-premise-to-cloud

Cloud Migration Paths

- Multiple paths to take Postgres to the cloud
  - VMs with Infrastructure as Code
  - Containers with K8s
  - Managed Postgres Service (DBaaS)
- Understanding the pros and cons of each path is key
- The choice depends on the application and the enterprise strategy
- Some considerations are shared, no matter which path is chosen

Resources

- Blog: Migrating Postgres to the Cloud
- Blog: Harness the Full Potential of Postgres in the Cloud
- Blog: 5 Cloud Architecture Considerations
- Infrastructure as code for Postgres: (Ansible Galaxy)
- K8s and containers: Cloud Native Postgres