



# CYBERTEC SCALEFIELD

## TECHNICAL GUIDE

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## SCALEFIELD: COMPREHENSIVE POSTGRESQL

**Scalefield** is a unified platform built on Kubernetes / OpenShift that integrates all our solutions into a single, easy-to-use system.

This document provides an overview of the general architecture and highlights use cases to help customers utilize the platform as efficiently as possible.



## SYSTEM ARCHITECTURE

This section describes the general system architecture of CYBERTEC Scalefield and outlines the deployment options available to customers.

## TECHNICAL REQUIREMENTS

Scalefield is capable of operating on various platforms, which include:

- Bare metal servers
- Virtual machines (VMWare, Promox, etc.)
  - On-premise
  - Cloud deployments
- Kubernetes / OpenShift / Rancher
  - On-premise
  - Cloud deployments

The following system architectures are supported:

- Linux on x86\_64 (Intel, AMD)
  - Ubuntu 22.04 or higher
  - Debian 12 or higher
  - RedHat compatible Linux (RHEL 8/9 or higher)
- Linux on ARM

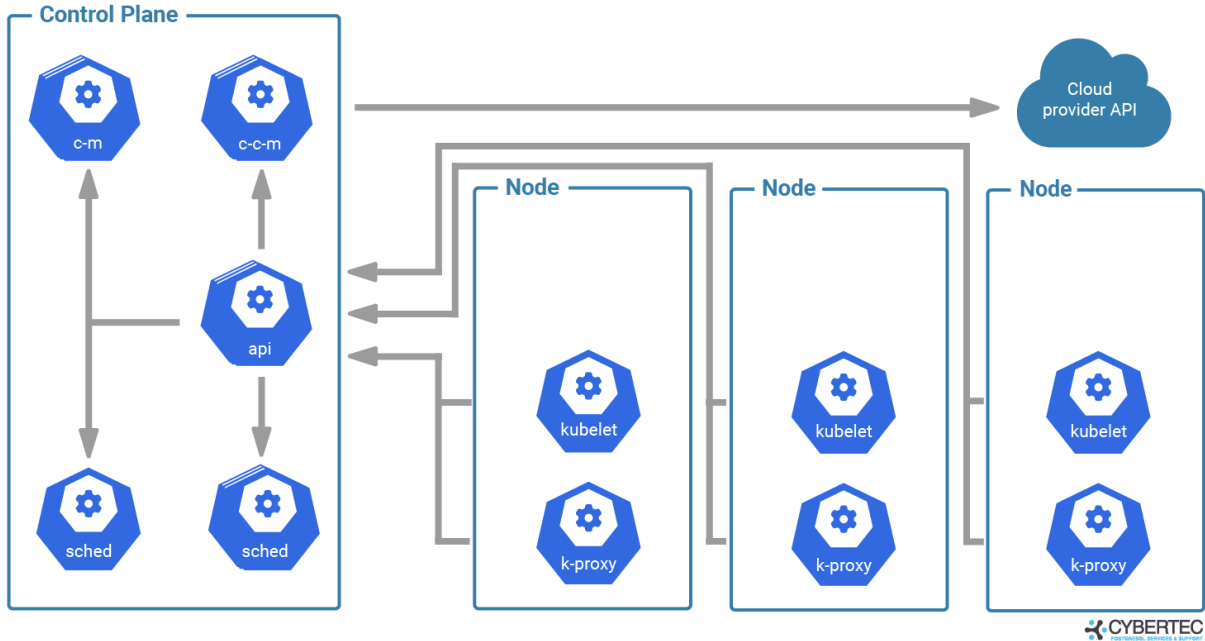
**NOTE:** For local test deployments, we offer a standalone OS X version (with some restrictions), mostly intended for demonstration purposes.

Scalefield requires a minimum of **16 GB or RAM per Kubernetes node**, with significantly more recommended for large deployments.

**Support versions of Kubernetes:** v1.21 - 1.28.3

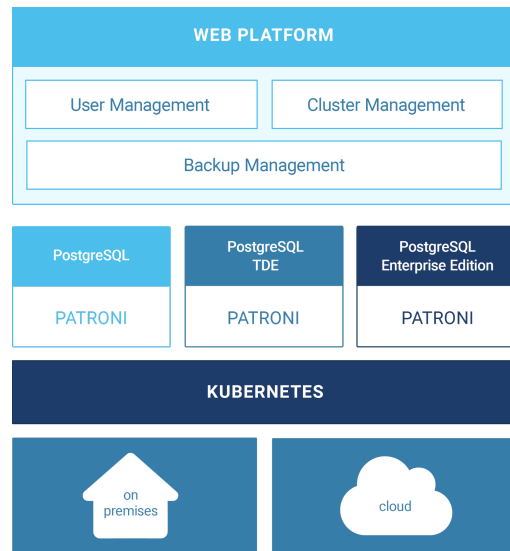
## SCALEFIELD CLUSTER LAYOUT

Kubernetes provides us with all the scalability needed to operate Enterprise database deployments at scale. The general layout of a cluster running Scalefield is as follows:



On top of Kubernetes / OpenShift container orchestration, Scalefield will run all services essential to a cutting edge user experience. This includes various components, including:

- Graphical user interface
- Backup and recovery automation
- Inventory database
- CYBERTEC Services
  - PostgreSQL
  - CYBERTEC Enterprise PostgreSQL
  - CYBERTEC Migrator
  - CYPEX low code
  - Babelfish MS SQL compatibility
- Monitoring and log management
- Compliance and security modules



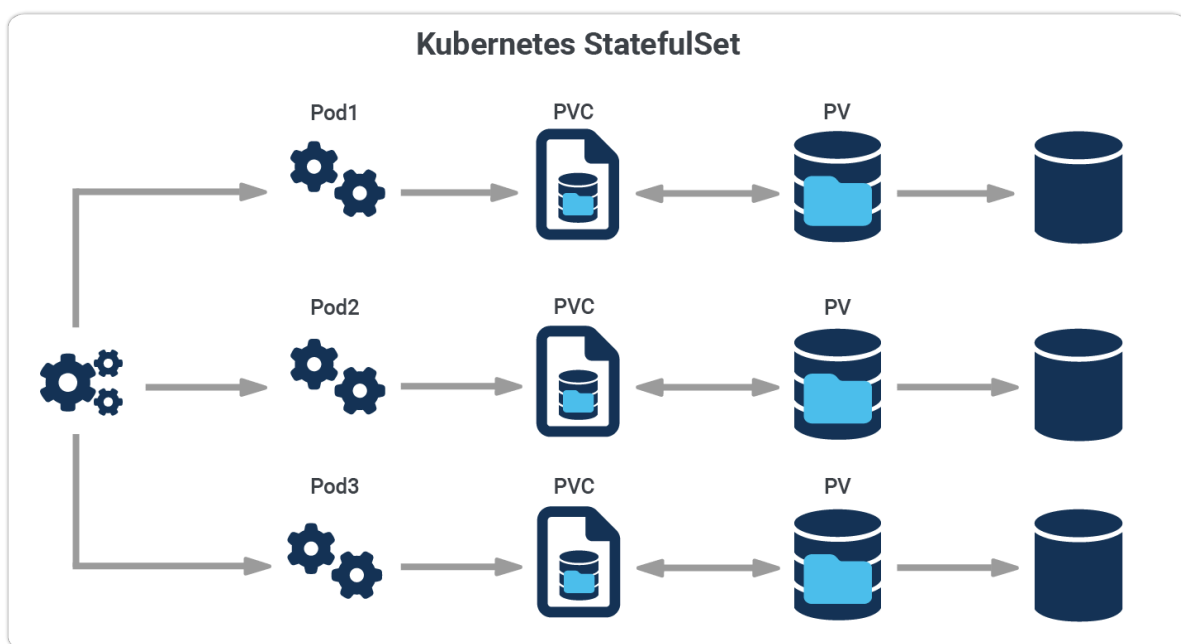
## SCALEFIELD STORAGE OPTIONS

Scalefield supports various storage options provided by Kubernetes. The following options are available:

Storage type	Performance	Scalability
Local storage	Extreme performance	Limited by local disk
Distributed block storage	High performance	High-Scalability
SAN storage	Extreme performance	High-Scalability
Cloud storage	-	High-Scalability

Scalefield is based on Kubernetes-compatible services, including OpenShift, SUSE Rancher, or publicly available cloud services, such as Amazon EKS.

As far as storage is concerned, Scalefield needs a "PVC" (= Persistent Volume Claim) provided by Kubernetes.



Scalefield can operate with storage classes of your choice to run small, as well as scalable database services.

Kubernetes / OpenShift provide all the abstraction needed to integrate Scalefield with Enterprise storage solutions:

- Dell EMC PowerMax and PowerStore
- Hewlett Packard Enterprise (HPE) Primera and Nimble
- Hitachi Vantara Virtual Storage Platform (VSP)
- IBM FlashSystem
- Infinidat InfiniBox
- NetApp All Flash FAS (AFF)
- Pure Storage FlashArray

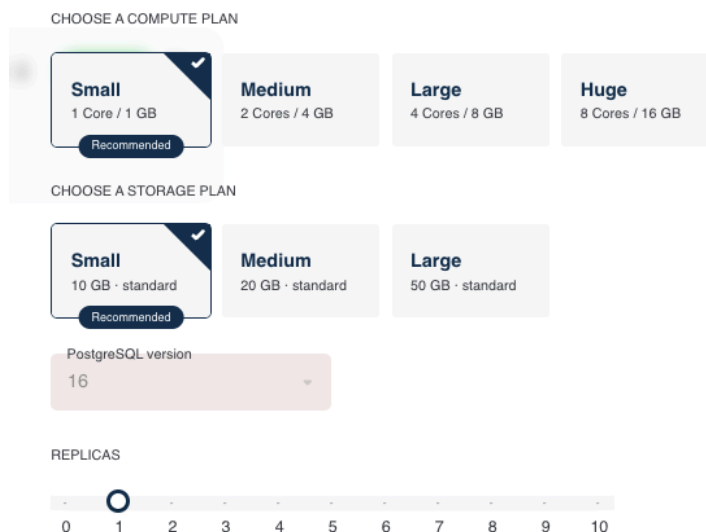
This capability enables Scalefield to operate in diverse environments with scalability while adhering to industry standards.

## HIGH-AVAILABILITY BY DESIGN

Database work is by definition, critical, and downtime is not acceptable. To reflect this reality, Scalefield provides High-Availability by design and out of the box.

“High-Availability by design from the start”

By default, Scalefield allows you to configure the desired level of redundancy. Simply move the slider and make the system handle as many replicas as needed:



CHOOSE A COMPUTE PLAN

<b>Small</b> 1 Core / 1 GB Recommended	<b>Medium</b> 2 Cores / 4 GB	<b>Large</b> 4 Cores / 8 GB	<b>Huge</b> 8 Cores / 16 GB
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CHOOSE A STORAGE PLAN

<b>Small</b> 10 GB · standard Recommended	<b>Medium</b> 20 GB · standard	<b>Large</b> 50 GB · standard
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PostgreSQL version  
16

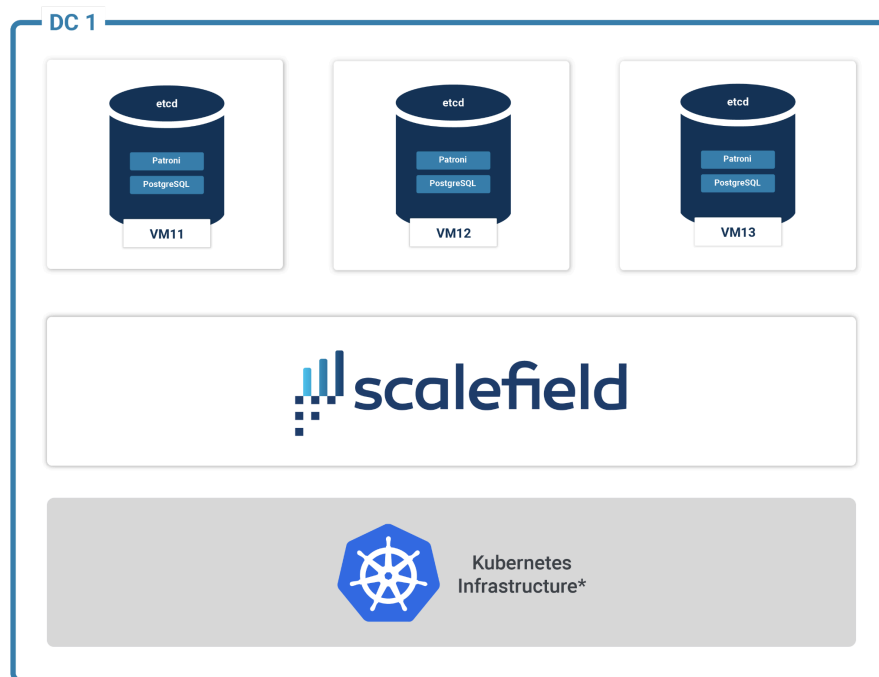
REPLICAS

0 1 2 3 4 5 6 7 8 9 10

Behind the scenes, Scalefield will deploy a **Patroni cluster** which provides us with

- Automatic failover
- Fully automated recovery
- Shared nothing architecture

Scalefield will deploy various PostgreSQL nodes inside the Kubernetes cluster, ensuring 100% redundancy in case of a node failure. By careful orchestration, Scalefield makes sure that all members of the cluster reside on different host systems to guarantee fault tolerance and scalability at every level:



\*Can be Kubernetes or a Kubernetes distribution such as OpenShift or Rancher.

To external applications, Scalefield exposes the cluster using different IPs and ports, simplifying the use of replicas for purposes such as:

- Read scalability and load balancing
- Analytics and statistics

## ORCHESTRATION AND API ACCESS

Scalefield not only provides an intuitive user interface but also enables seamless integration through ready-to-use API endpoints, simplifying connectivity with other systems and applications.

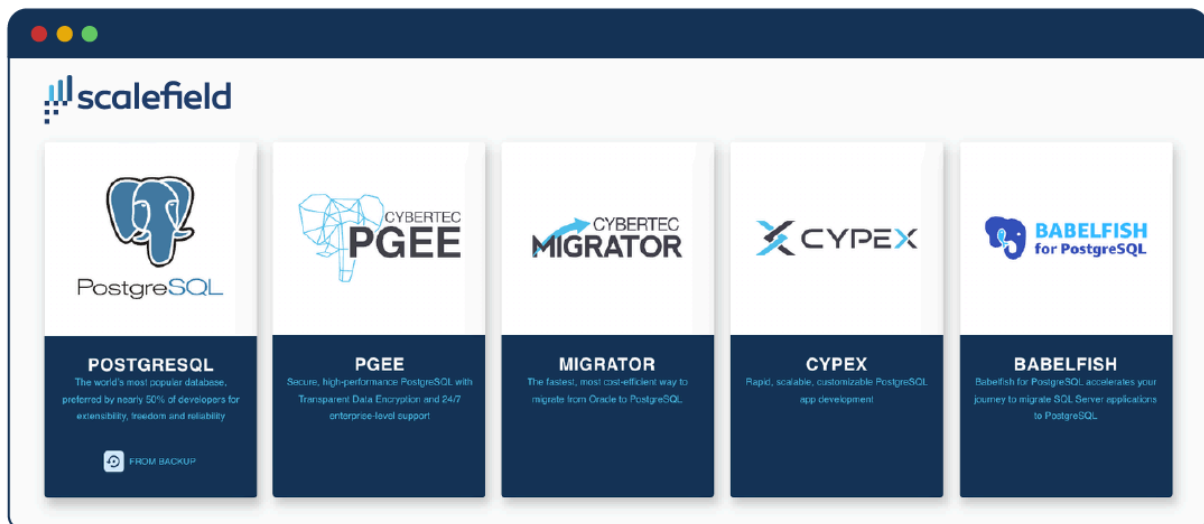
The Scalefield REST API offers a JSON-based interface, exposing all key aspects of the infrastructure for advanced orchestration.



## SCALEFIELD PRODUCTS

Scalefield incorporates the main product stack, including:

- Scalefield PostgreSQL Automation:
  - PostgreSQL as a Service for Kubernetes / OpenShift
  - PGEE: PostgreSQL Enterprise Edition
- CYBERTEC Migrator: Oracle to PostgreSQL Migration
- CYPEX: Low Code Application Development
- Babelfish for PostgreSQL: MS SQL compatibility for PostgreSQL
- pg\_deep\_thinker: “Machine driven PostgreSQL consulting”
- Scalefield Secure: Compliance Monitoring for Oracle, PGEE and PostgreSQL



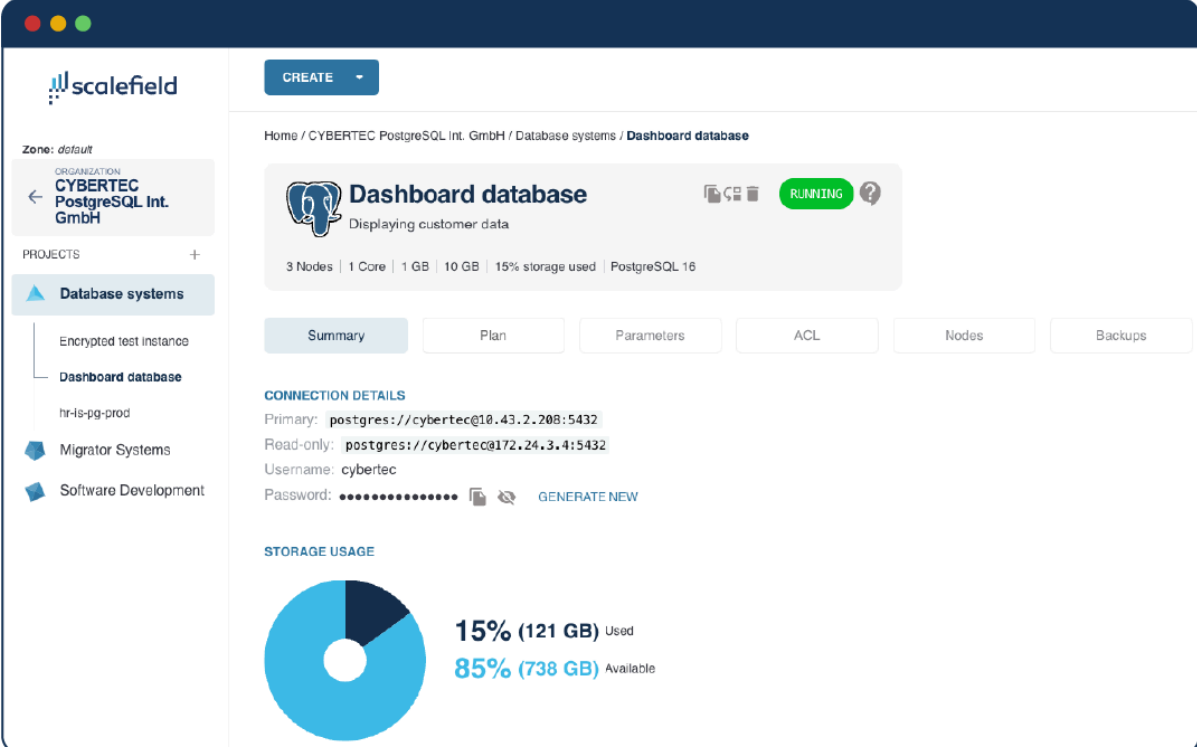
**Scalefield** is a 100% Kubernetes-based solution that allows customers to directly deploy their own private cloud and integrate with public clouds. It is 100% visualized.

All products are also available separately. However, **full integration** offers customers numerous benefits that are not available when deployed separately:

- A single **compliance report**
- **Automatic backups** for all products
- Integrated automation
- Faster **security updates**
- **Better** user **experience**

## SCALEFIELD POSTGRESQL AUTOMATION

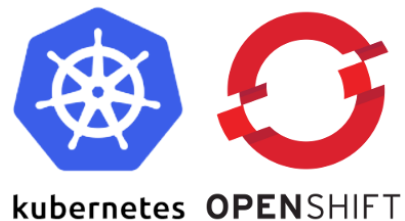
Scalefield PostgreSQL **Automation** allows you to quickly deploy various flavors of PostgreSQL, such as PostgreSQL and CYBERTEC PostgreSQL Enterprise Edition (**PGEE**). Quickly **deploy** and automate your database platform in a **user friendly** environment:



The screenshot shows the Scalefield PostgreSQL Automation interface. On the left, there is a navigation sidebar with 'Database systems' selected. The main content area displays the details for a 'Dashboard database' instance, which is currently 'RUNNING'. The instance is described as 'Displaying customer data' and has the following specifications: 3 Nodes, 1 Core, 1 GB memory, 10 GB storage, 15% storage used, and PostgreSQL 16. Below the instance details, there are tabs for 'Summary', 'Plan', 'Parameters', 'ACL', 'Nodes', and 'Backups'. The 'CONNECTION DETAILS' section shows the primary connection string as 'postgres://cybertec@10.43.2.208:5432', a read-only connection string as 'postgres://cybertec@172.24.3.4:5432', and the username as 'cybertec'. The password is masked with dots, and there is a 'GENERATE NEW' button. The 'STORAGE USAGE' section features a donut chart showing that 15% (121 GB) of storage is used, and 85% (738 GB) is available.

Scalefield PostgreSQL Automation provides ready-to-use services, including:

- High-Availability out of the box
- Easy scalability and dynamic resizing
- Integration with backup and recovery tooling
- Automated monitoring
- Compliance enabled



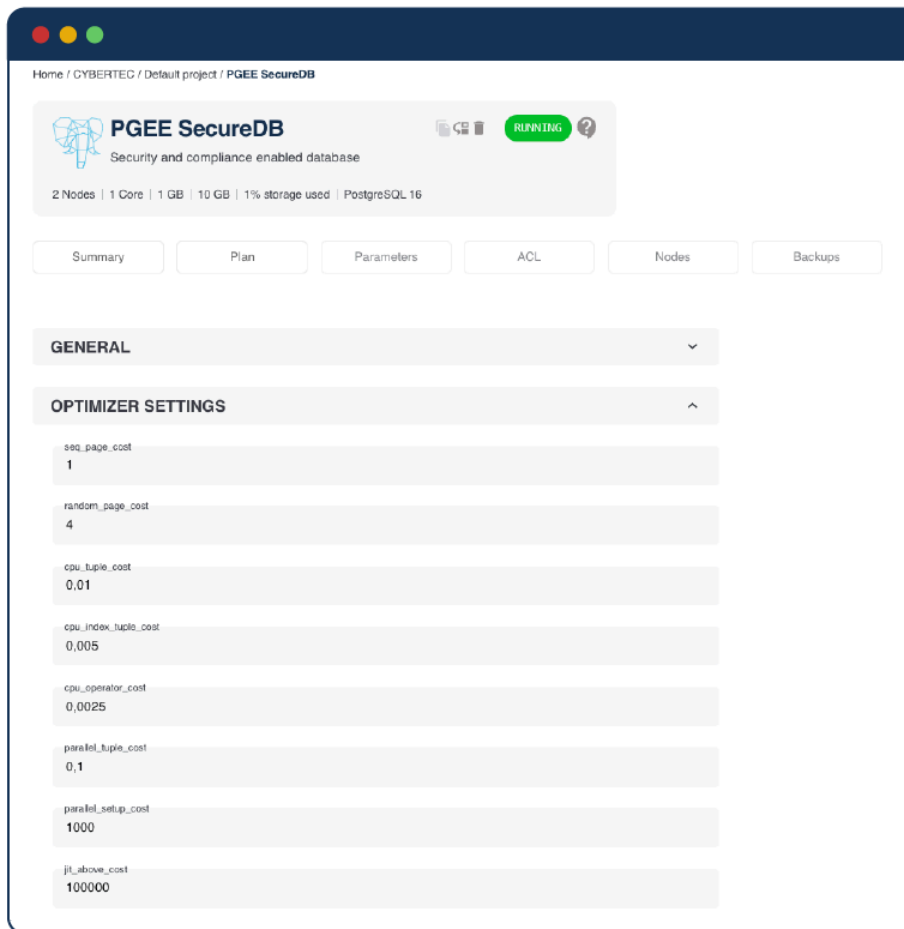
## PGEE: CYBERTEC ENTERPRISE POSTGRESQL

PGEE is a commercial version of PostgreSQL that allows customers to make use of advanced features, such as

"Transparent Data Encryption"

It provides countless features which make it **attractive to clients** across various industries, including but not limited to:

- **Finance** and **Banking**
- High-**Security** computing
- Medical and health
- **Government** and law enforcement agencies

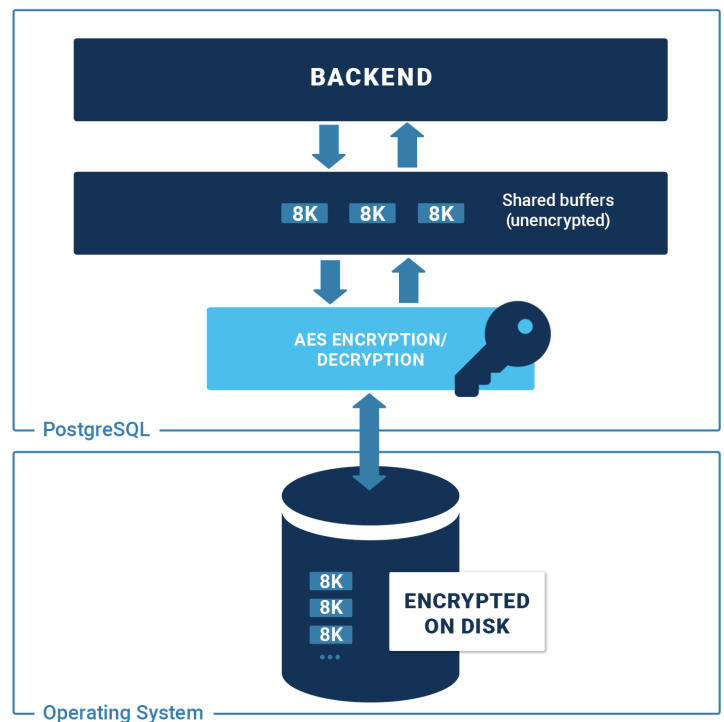


We offer **additional features** on top of PostgreSQL, such as:

- Transparent Data **Encryption** (TDE)
- Stored Procedure **Encryption**
- Enterprise-level **auditing**
- Anomaly detection
- Data masking and **obfuscation**
- **Advanced optimizer** improvements

CYBERTEC PostgreSQL Enterprise Edition (PGEE) is important to all clients needing extra security as well as **compliance** with modern IT standards:

- ISO 27001
- TISAX
- SFCA
- POPI-A
- GDPR
- HIPAA
- ... and many more ...



“Professional database compliance for PostgreSQL”

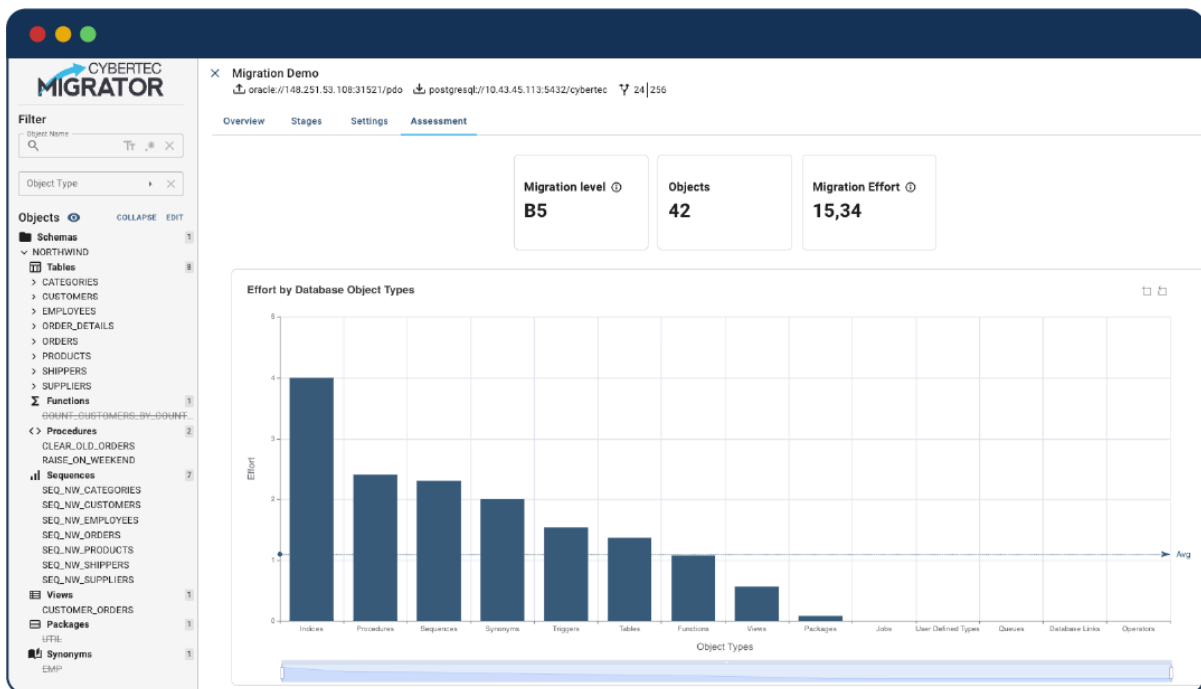
Fixing real world problems

## CYBERTEC MIGRATOR FOR ORACLE

The **CYBERTEC Migrator** is the entry ticket into our ecosystem, enabling customers to migrate their legacy databases to a new infrastructure.

We offer expert level tooling for high-performance migration, designed to serve various purposes:

- **Bulk assessment** for large **Oracle** customers
  - Get a handle on **big infrastructures** in no time
  - Provide a **migration roadmap** to clients
- **Enable partners and customers** to migrate
  - Provide expert tooling
  - Help with quick migration
- **Migrate to PostgreSQL at scale**
  - Cutting edge transfer speeds (> 1.4 GB / sec)
  - Optional zero downtime migration



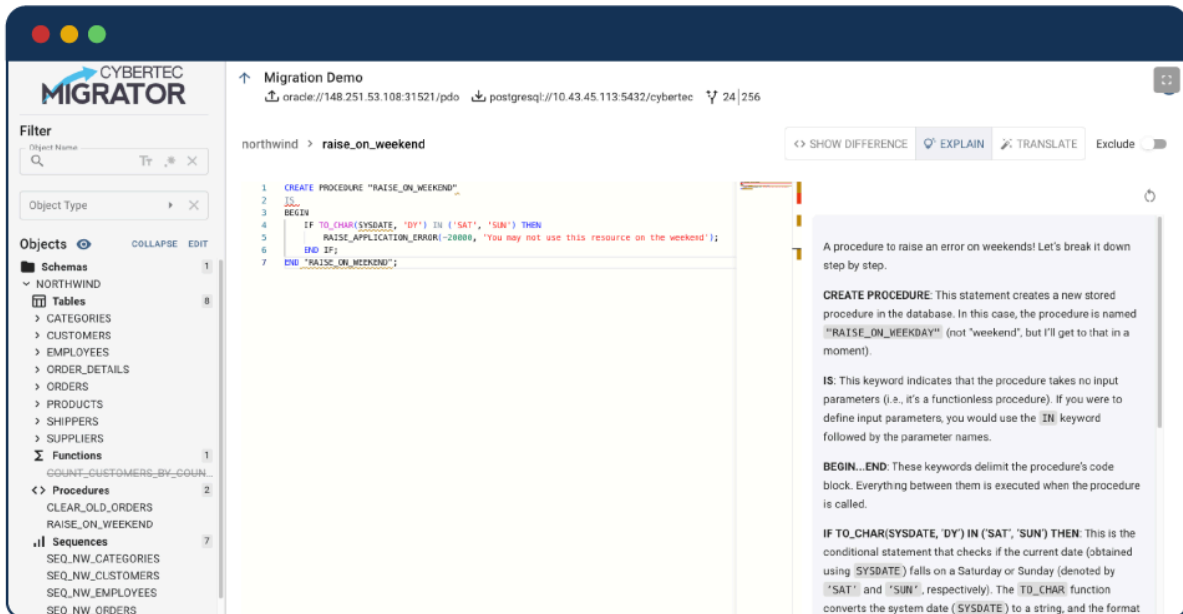
Migration from Oracle to PostgreSQL has never been easier:

- Move Oracle to cloud solutions (Azure, GCP, AWS, etc.)
- Migrate to on-premise solutions

Stored procedures have always been a major hurdle when migrating away from Oracle. CYBERTEC Migrator simplifies this process with modern **AI technology**:

## “AI assisted code explanation”

With AI-assisted code explanation, developers can understand complex code faster and more efficiently:



The screenshot displays the CYBERTEC MIGRATOR interface. On the left, a sidebar shows a tree view of database objects under the 'NORTHWIND' schema, including Tables, Functions, Procedures, and Sequences. The main area shows the SQL code for a stored procedure named 'raise\_on\_weekend'. The code is as follows:

```
1 CREATE PROCEDURE "RAISE_ON_WEEKEND"  
2 IS  
3 BEGIN  
4 IF TO_CHAR(SYSDATE, 'DY') IN ('SAT', 'SUN') THEN  
5 RAISE_APPLICATION_ERROR(-20000, 'You may not use this resource on the weekend!');  
6 END IF;  
7 END "RAISE_ON_WEEKEND";
```

On the right side of the interface, an AI-assisted explanation is provided:

A procedure to raise an error on weekends! Let's break it down step by step.

**CREATE PROCEDURE:** This statement creates a new stored procedure in the database. In this case, the procedure is named "RAISE\_ON\_WEEKEND" (not "weekend", but I'll get to that in a moment).

**IS:** This keyword indicates that the procedure takes no input parameters (i.e., it's a functionless procedure). If you were to define input parameters, you would use the **IN** keyword followed by the parameter names.

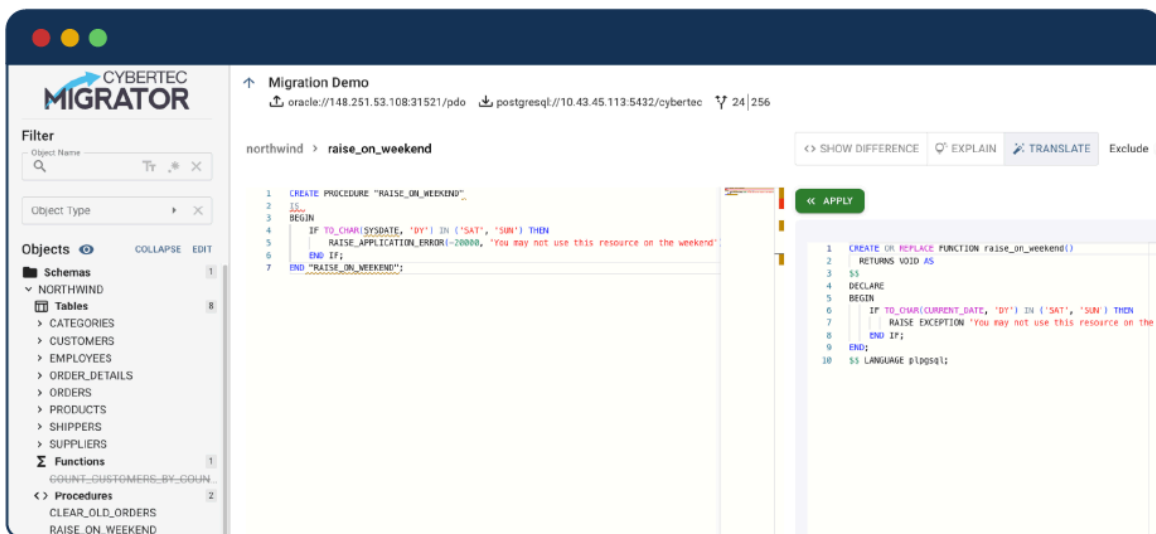
**BEGIN...END:** These keywords delimit the procedure's code block. Everything between them is executed when the procedure is called.

**IF TO\_CHAR(SYSDATE, 'DY') IN ('SAT', 'SUN') THEN:** This is the conditional statement that checks if the current date (obtained using **SYSDATE**) falls on a Saturday or Sunday (denoted by "SAT" and "SUN", respectively). The **TO\_CHAR** function converts the system date (**SYSDATE**) to a string, and the format

The CYBERTEC Migrator assists with **code pre-translation** by using modern technology tailored to the problem.

We fully comply with EU AI regulations. All code processing happens within Scalefield, ensuring that no customer source code is sent to public APIs. This means:

- Maximum **compliance** with regulations
- Maximum **digital independence**
- **Zero external dependencies**



Code translation has many **advantages**:

- **Migrate** code up to 80% **faster**
- Improve code **quality**
- **Finish** migration projects faster
- **Enable developers** to understand code more quickly

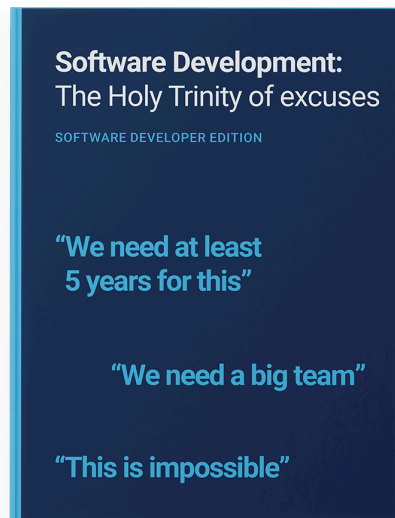
## CYPEX: LOW CODE DEVELOPMENT FOR POSTGRESQL

With **CYPEX**, you can build customer specific applications in remarkably short timeframes. Workflows, dashboards, maps, forms – CYPEX makes it all possible within minutes.

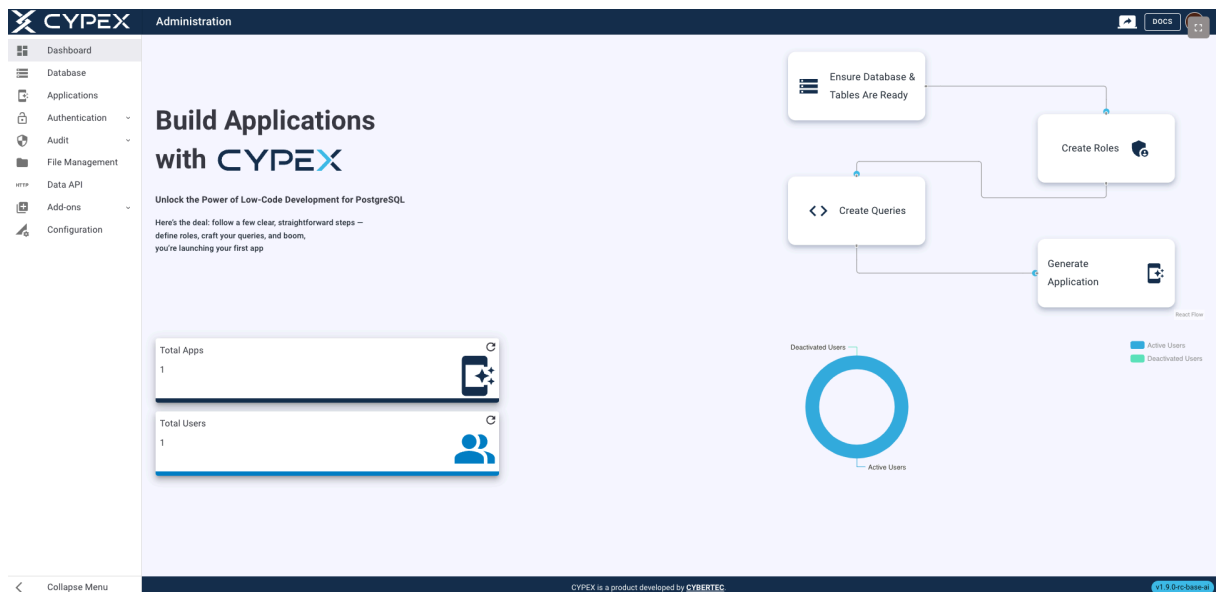
What **problem** are we **solving**?

Modern software development is often hindered by

- Information loss
- Repetitive tasks
- Inefficient requirements gathering
- Slow feedback



CYPEX is addressing these challenges. We enable the creation of data models in hours rather than days, using those data models to predict applications quickly. These applications can then be modified as needed.





Our approach offers numerous benefits::

- Gather specifications **quickly**
- Quick **prototyping** and efficient demos
- Minimal time to market
- **Build applications cheaper** than ever before

The screenshot displays the CYPEX web application interface. The main section is titled "Industrial Fair" and contains a table with the following data:

Name	Description	Start date	End date	Status	Images	Street	Postal code	City	Country	Actions
Industrial Fair 2023	Innovation Fair	2023-05-22	2023-05-26	Coming		3 Butterfield Trail	75780	Novosheshmink	Belgium	
Industrial Fair 2022	Industrial Fair	2022-08-16	2022-08-25	In Progress		8752 Fuller Drive	3261	Pantalowice	Denmark	
Industrial Fair 2021	Health Fair	2021-04-12	2021-04-16	Concluded		99483 Ludington Court	88204	Sinisian	Austria	
Industrial Fair 2020	PostgreSQL Fair	2020-09-07	2020-09-11	Concluded		15914 Clyde Gallagher Circle	10582	5 de Mayo	Germany	

Below the table, there are two sections:

- Location - Industrial Fair 2022:** A map of Europe with several location pins. A red pin is highlighted in the northern part of Europe.
- Devices Assigned:** A table showing assigned devices for the Industrial Fair 2022:

Name	Internal name	Assigned	Type	Image
Asus X515ea	AX515EA	Industrial Fair 2022	Laptop	
Lenovo Yoga Slim 7	LYS7	Industrial Fair 2022	Laptop	
Thinkpad E14	TE14	Industrial Fair 2022	Laptop	

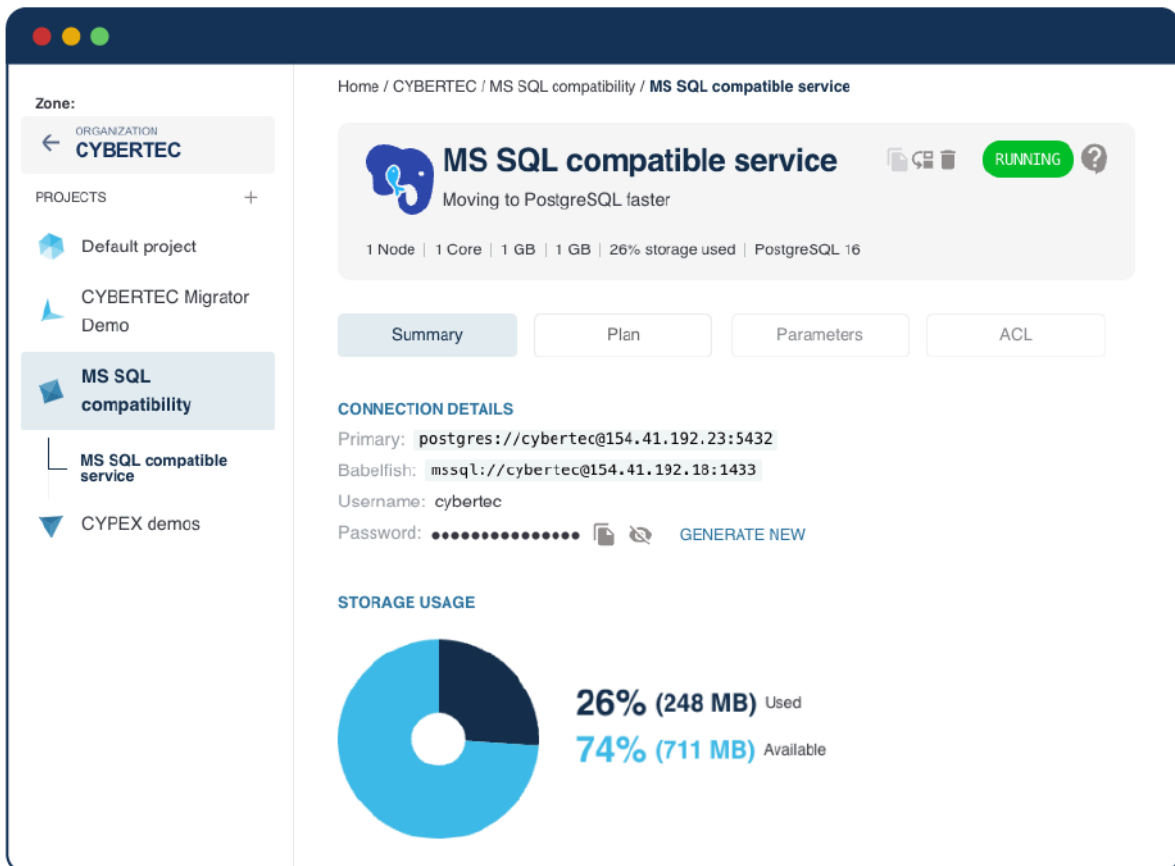
## BABELFISH FOR POSTGRESQL: BRINGING AN END TO MS SQL LICENSING

What are the challenges of Microsoft SQL Server?

- Escalating license costs
- High support cost
- Technically outdated legacy solution
  - Poor locking and concurrency behavior
  - Subpar transactional behavior

These issues drive many customers away from MS SQL. But what does this process look like in real life? Consider a customer running 1.000 MS SQL Server who is eager to migrate:

- They must talk to 200 application owners
- They must launch 200 migration projects
- The migration takes years to complete
  - Meanwhile, license cost keeps piling up



The screenshot shows a web dashboard for the 'MS SQL compatible service'. The left sidebar lists the organization 'CYBERTEC' and several projects, including 'MS SQL compatibility' which is currently selected. The main content area shows the service is 'RUNNING' and provides the following details:

- MS SQL compatible service** (Moving to PostgreSQL faster)
- 1 Node | 1 Core | 1 GB | 1 GB | 26% storage used | PostgreSQL 16

Navigation buttons include Summary, Plan, Parameters, and ACL. The 'CONNECTION DETAILS' section shows:

- Primary: postgres://cybertec@154.41.192.23:5432
- Babelfish: mssql://cybertec@154.41.192.18:1433
- Username: cybertec
- Password: [REDACTED] with a 'GENERATE NEW' button.

The 'STORAGE USAGE' section features a donut chart showing 26% (248 MB) Used and 74% (711 MB) Available.

Babelfish for PostgreSQL comes to the rescue. It can run inside Scalefield providing countless advantages to the customer:

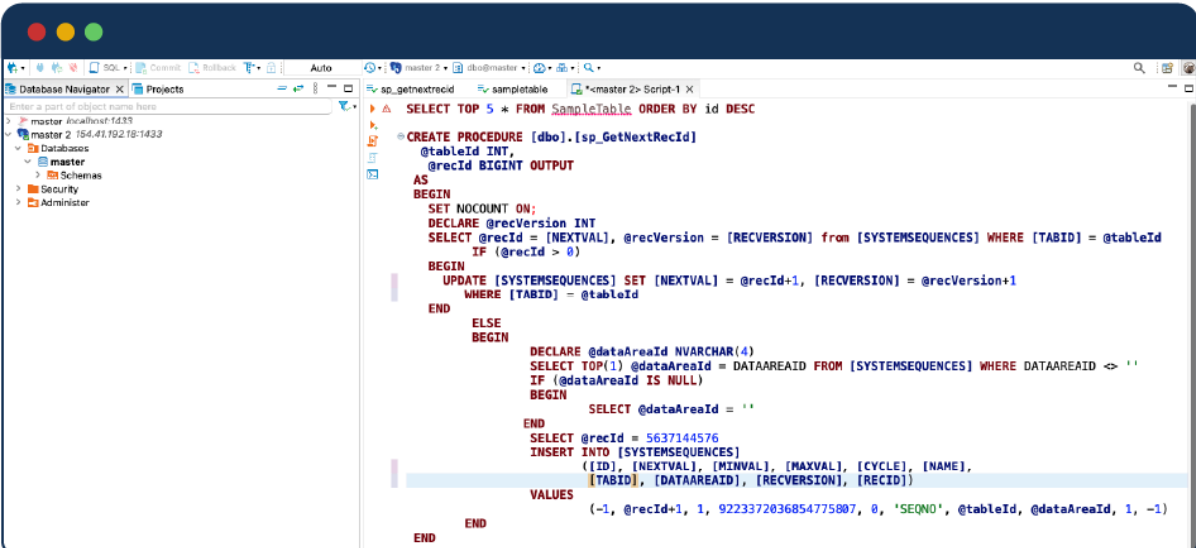
A cheaper solution WITHOUT touching the application

This means we can **move customers** to an MS SQL compatible solution (in 60-80% of all cases) **without launching a migration project**.

Key benefits include:

- Instant cost saving
- No migration project
- Improved automation
- Maintaining compliance

Babelfish behaves just like MS SQL making it an ideal solution for all clients aiming to cut expenses quickly:



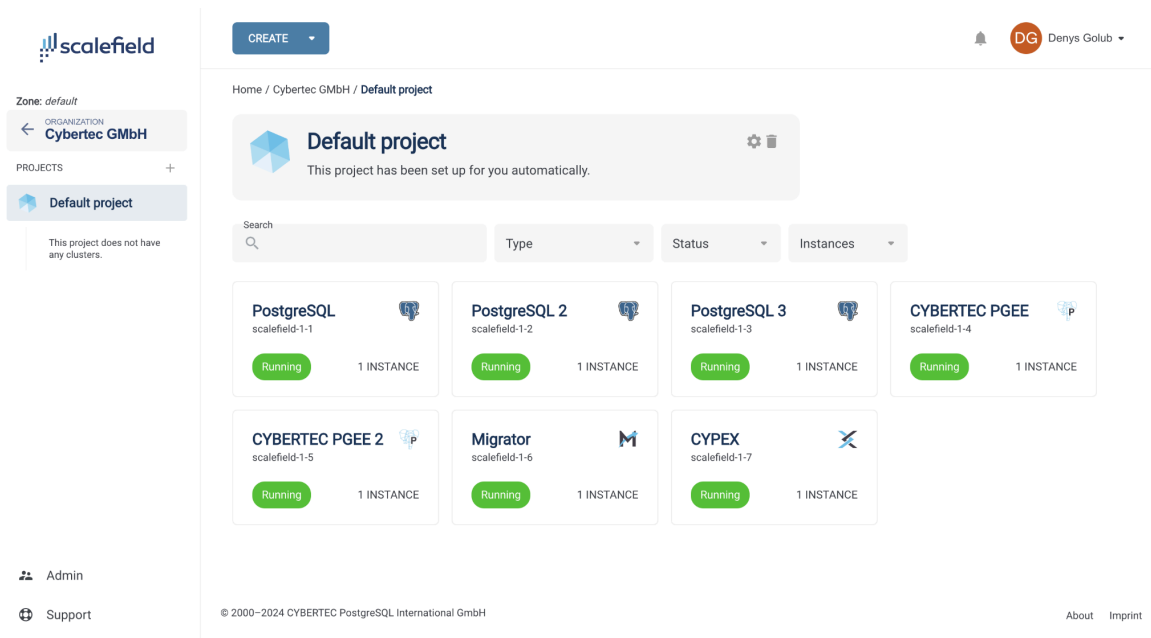
```

SELECT TOP 5 * FROM SampleTable ORDER BY id DESC

CREATE PROCEDURE [dbo].[sp_GetNextRecId]
    @tableId INT,
    @recId BIGINT OUTPUT
AS
BEGIN
    SET NOCOUNT ON;
    DECLARE @recVersion INT
    SELECT @recId = [NEXTVAL], @recVersion = [RECVERSION] from [SYSTEMSEQUENCES] WHERE [TABID] = @tableId
    IF (@recId > 0)
    BEGIN
        UPDATE [SYSTEMSEQUENCES] SET [NEXTVAL] = @recId+1, [RECVERSION] = @recVersion+1
        WHERE [TABID] = @tableId
    END
    ELSE
    BEGIN
        DECLARE @dataAreaId NVARCHAR(4)
        SELECT TOP(1) @dataAreaId = DATAAREAID FROM [SYSTEMSEQUENCES] WHERE DATAAREAID <> ''
        IF (@dataAreaId IS NULL)
        BEGIN
            SELECT @dataAreaId = ''
        END
        SELECT @recId = 5637144576
        INSERT INTO [SYSTEMSEQUENCES]
            ([ID], [NEXTVAL], [MINVAL], [MAXVAL], [CYCLE], [NAME],
            [TABID], [DATAAREAID], [RECVERSION], [RECID])
            VALUES
            (-1, @recId+1, 1, 9223372036854775807, 0, 'SEQNO', @tableId, @dataAreaId, 1, -1)
    END
END
  
```

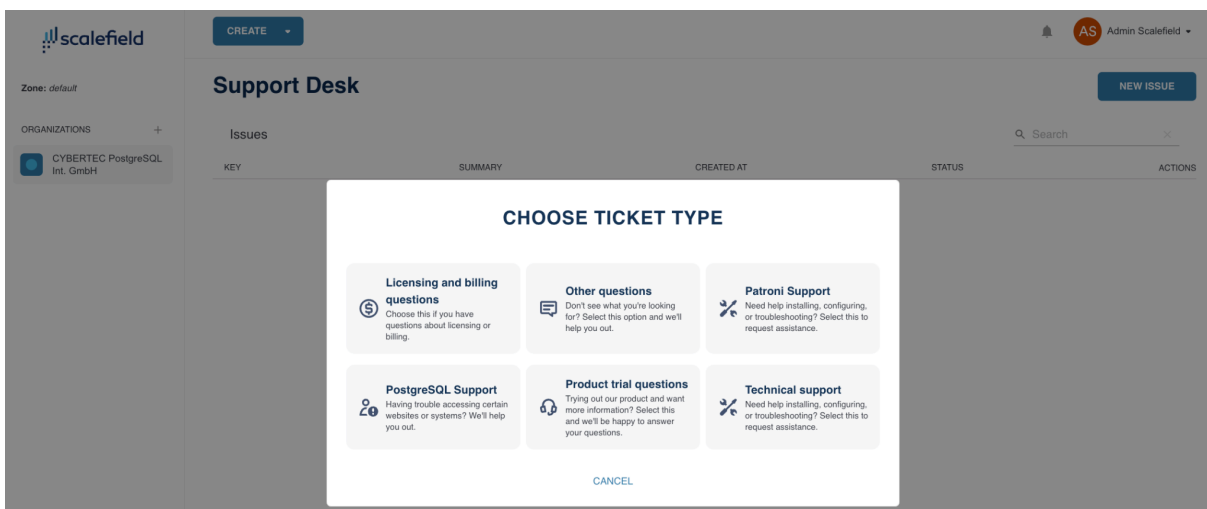
## PROVING VALUE TO CUSTOMERS

Each product can be marketed individually; however, the power of integration enables us to offer a **single package** that includes everything:



By marketing **Scalefield** as a product that allows a customer to deploy every single solution as part of a larger product, we can fully benefit from tight integration:

- Integrated **support** and consulting
- More oversight over **resource** usage
- More streamlined **customer experience**



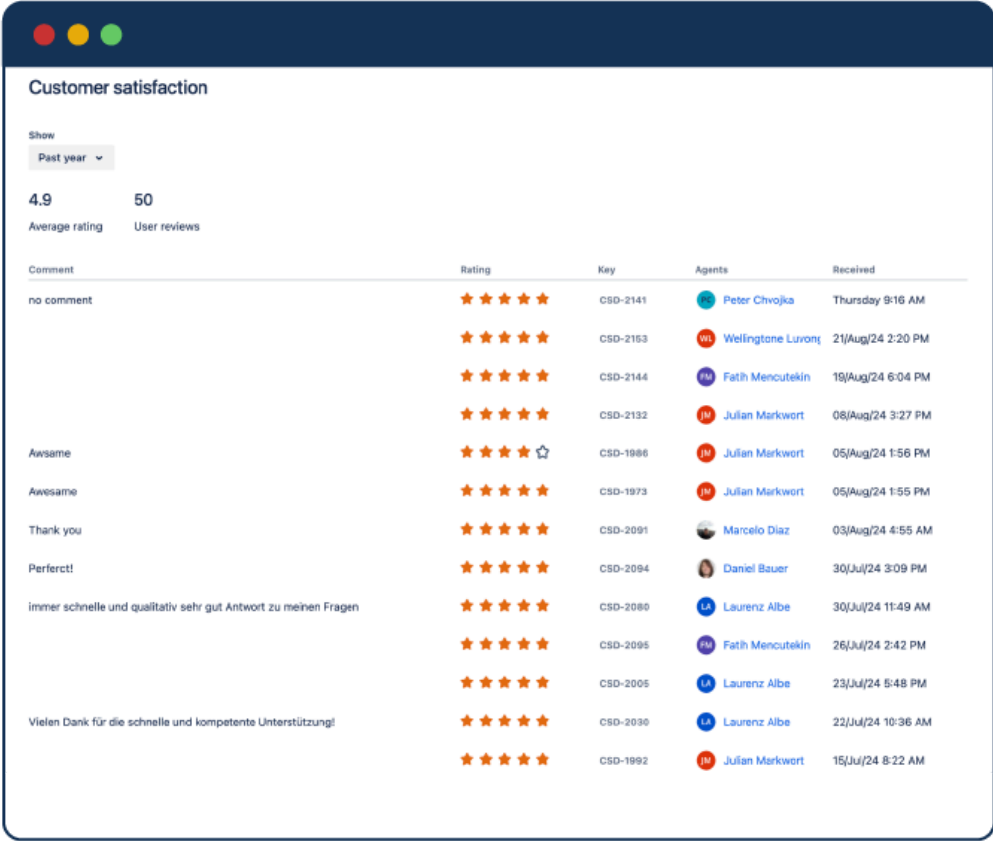
Finally, we fully integrate with **CYBERTEC support services** to ensure that customers have a single point of contact for all potential issues.

## SERVICE STRATEGY: EXCELLENCE MATTERS

We at CYBERTEC focus heavily on **professionalism** at **every level**. This is reflected in our feedback, **SLA** statistics (no misses) and in overall customer **satisfaction** which helps us to achieve:

- **Long term** customer relationships
- Excellent customer **satisfaction**














We never have, and never will, sacrifice short-term profits over long-term **customer satisfaction**, as we consider unhappy customers to be the worst investment known to us.

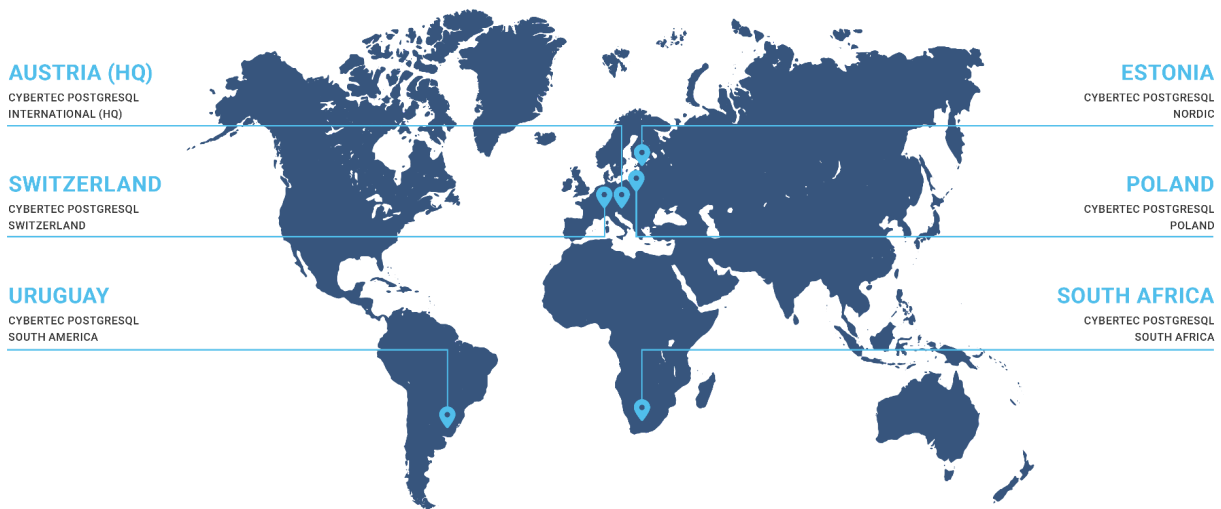


**Customer satisfaction**

Show  
Past year ▾

**4.9**      **50**  
Average rating      User reviews

Comment	Rating	Key	Agents	Received
no comment	★★★★★	CSD-2141	 Peter Chvojka	Thursday 9:16 AM
	★★★★★	CSD-2153	 Wellington Luvoni	21/Aug/24 2:20 PM
	★★★★★	CSD-2144	 Fatih Mencutekin	19/Aug/24 6:04 PM
	★★★★★	CSD-2132	 Julian Markwort	08/Aug/24 3:27 PM
Awesome	★★★★☆	CSD-1986	 Julian Markwort	05/Aug/24 1:56 PM
Awesome	★★★★★	CSD-1973	 Julian Markwort	05/Aug/24 1:55 PM
Thank you	★★★★★	CSD-2091	 Marcelo Diaz	03/Aug/24 4:55 AM
Perferct!	★★★★★	CSD-2094	 Daniel Bauer	30/Jul/24 3:09 PM
immer schnelle und qualitativ sehr gut Antwort zu meinen Fragen	★★★★★	CSD-2080	 Laurenz Albe	30/Jul/24 11:49 AM
	★★★★★	CSD-2095	 Fatih Mencutekin	26/Jul/24 2:42 PM
	★★★★★	CSD-2005	 Laurenz Albe	23/Jul/24 5:48 PM
Vielen Dank für die schnelle und kompetente Unterstützung!	★★★★★	CSD-2030	 Laurenz Albe	22/Jul/24 10:36 AM
	★★★★★	CSD-1992	 Julian Markwort	15/Jul/24 8:22 AM



**AUSTRIA (HQ)**

CYBERTEC POSTGRESQL  
INTERNATIONAL (HQ)

**SWITZERLAND**

CYBERTEC POSTGRESQL  
SWITZERLAND

**URUGUAY**

CYBERTEC POSTGRESQL  
SOUTH AMERICA

**ESTONIA**

CYBERTEC POSTGRESQL  
NORDIC

**POLAND**

CYBERTEC POSTGRESQL  
POLAND

**SOUTH AFRICA**

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sales@cybertec-postgresql.com

## VERSION HISTORY

Version	Effective Date	Description	Author	Reviewed By	Approved By
1.0	2024-12-09	Scalefield technical guide	Hans-Jürgen Schönig	Armin Nesiren	Hans-Jürgen Schönig


### If you need further information


For more information, or if you have any questions about our range of products, tools and services, contact us. There's no obligation—send us an inquiry via email or give us a call.



### Contact

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