



Exploring the Capacity Limits of Business Central Online



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What's on the menu?

1. What limits?
2. Environments
3. Companies and Storage
4. Performance
5. Data Volume and Processing



What limits?

- SaaS is fantastic, but read the fine print
- Limitations lurk in many areas

- You won't know what you don't know...
- Your business may change in 1-5 years...



Environments

- 1 Production and 3 Sandboxes
- Essentials vs. Premium
- Multiple Production Environments

Environments

| Name | Application Family | Type | State | Country/region | Current Version |
|----------------------------|--------------------|------------|--------|----------------|------------------|
| Production | Business Central | Production | Active | US | 23.5.16502.16589 |
| CD Sandbox | | | | | |
| mx | | | | | |
| Sandbox | | | | | |

Note

The Premium and Essential subscription types give each Business Central customer one production environment and three sandbox environment free of extra charge. If the customer requires more production environments, they can buy additional environments through their CSP partner. Each additional production environment comes with three additional sandbox environments and 4 GB additional, tenant-wide database capacity. In addition, starting in 2023 release wave 2, there's a limit on how many companies you can have on a single tenant (see [Operational limits](#)).

Business Central, licensed by assigned user, is available with Essentials or Premium levels of capabilities. Customers may deploy Business Central Essentials and Business Central Premium in separate environments, on the same tenant. However, licensed users can only access the environment for which they are entitled. See [Microsoft Product Terms](#) for service specific terms.



Companies and Storage

- 300 Companies per Environment
- 80 GB Storage

Company limit (per environment)

| Setting | Description | Limit |
|---------------|---|-------|
| Max companies | The maximum number of companies that can be contained in one environment. | 300 |

Tip

This company limit will take effect in 2023 wave 1 release. When in effect, exceeding the limit will prevent you from doing some environment operations. For information about the consequences of exceeding the limit, go to [Operational challenges with many companies per environment](#).

If you already have more than 300 companies in one environment, distribute them across more environments to avoid problems later.

- + 2 GB per Essentials User

Capacity

Storage capacity usage (?)

Database

170.63 of 144.00 GB used



Case Study – Storage Capacity

- ☰ Environments
- ✉ Notification Recipients
- 🗄 Microsoft Entra Apps
- 📏 Telemetry
- 🛡 Reported Outages
- ⚙ Operations
- 📦 Capacity

Capacity

Storage capacity usage [\(?\)](#) 🔄 Refresh

📦 Database

66.87 of 98.00 GB used 31.13 GB available

Storage usage by environment

| Environment | Type | Country/region | Database usage (in GB) | Storage per table |
|-------------|------------|----------------|------------------------|--------------------------------|
| Production | Production | US | 42.70 | List of tables |
| Sandb | | | | |

| Table Name | Table No. | No. of Records | Record Size | Size (KB) ↓ | Data Size (KB) | Index Size (KB) | Compression |
|------------------------------|-----------|----------------|--------------|-------------|----------------|-----------------|-------------|
| ⋮ Incoming Document Attac... | 133 | <u>24540</u> | 1,662,665.55 | 39848592 | 39845520 | 3072 | Page |
| Change Log Entry | 405 | 6194413 | 100.03 | 1730240 | 605128 | 1125112 | Page |
| G/L Entry | 17 | 1243567 | 188.05 | 818592 | 228376 | 590216 | Page |
| Integration Record | 5151 | 434463 | 88.64 | 171656 | 37608 | 134048 | Page |



Performance

- Difficult to anticipate
- Large volumes: Master records, imports, lines, posting
- Multi-step processes
- Posting
- Reporting



Case Study – Large Invoices

- Hundreds of orders per customer per month
- Orders -> Warehouse Shipment -> Consolidated Invoice
- Monthly invoice with over 20,000 lines
- Over 3 hours processing time per invoice
- Unable to reproduce in Docker Container on laptop

- Customization + Process Change: < 5 minutes per invoice



The Shift to Per User Limits

MS is migrating from "per environment" capacity limits to "per user" limits in same areas

- This is good news, expanding overall concurrency and capacity and increasing scale
- But there are some catches and things to think through to take advantage of this new feature
- In Public Preview. General Availability TBD

| | Old (per environment) | New (per user) | Notes |
|----------------------------------|---|---|--------|
| Scheduled Tasks (Job Queues) | 3 | 5 | Q4CY24 |
| Web Services / API (Speed Limit) | 600 / minute (per env.) | 6,000 per 5-minute window (per user) | Q1CY24 |
| Web Services / API (Concurrency) | 100 (5 processing / 95 queued) (per env.) | 100 (5 processing / 95 queued) (per user) | Q1CY24 |



To Maximize Per User Limits

Concurrency per user is not pooled. It's literally per user. Which means:

- If you schedule all your job queues with one user ID, you'll get one user concurrency limits
- If you call all your inbound API calls with one S2S (Service-to-Service) user, you'll get one user concurrency
 - o Service-to-Service accounts don't require a license

So, if you need more throughput

- Schedule job queues and tasks with more than one user account
- For API calls, create multiple Service-to-Service user accounts (Azure -> App Registrations) and use a round-robin approach to your API calls or split into batches by distinct user ID



Considerations by Activity Type

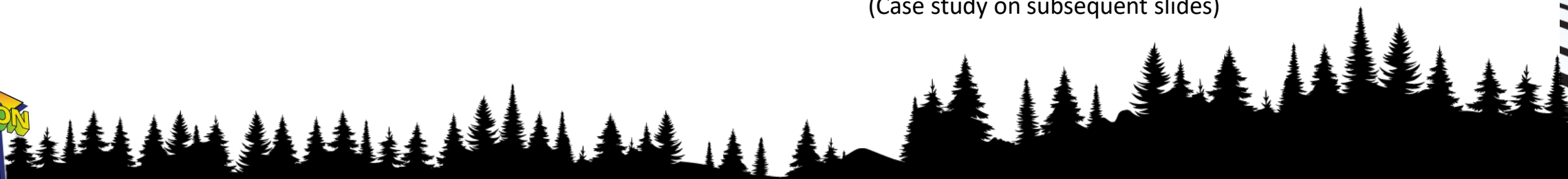
Master Data
(Items, Customers,
Vendors, etc.)

Documents
(Sales Orders, Purchase
Orders, Production
Orders, etc.)

Posting (Entries)
Ship and Invoice,
PO Receipt, Output &
Consumption, Inv.
Adjustment, G/L JE,
etc.)

No posting, no "entries" tables impacted. Higher volumes possible without locking / contention issues.

Impacts "Entries" tables. Higher chance of locking + need for retry strategy. More testing & tuning. (Case study on subsequent slides)



Case Study – Create Sales Orders from Shopify

Using the BC built-in Shopify connector + an order generating app from the Shopify store + Excel file with fake customer info, performed iterative inbound SO creation testing.

- Generate orders in Shopify
- Sync orders to BC using the BC Shopify Connector (API calls)
- Create new customers if they don't exist

| | Per Minute | Per Hour |
|---------------------------------------|------------|----------|
| S.O. Create + Create New Customers | 24.2 | 1,452 |
| S.O. Create + Customer Already Exists | 33.33 | 2,000 |



Case Study – Ship & Invoice Sales Orders (1)

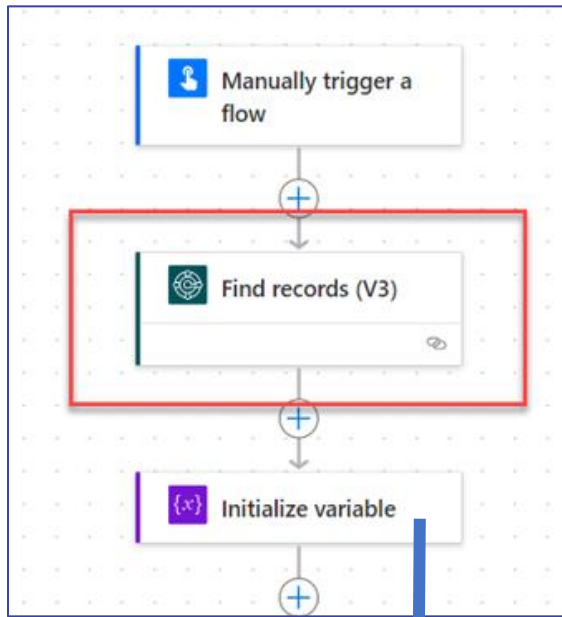
- Highly seasonal business – up to 6,000 sales order shipments per day, 4-5 times per year (or 11,000 in 3-4 days)
 - Third Party fulfillment service (shipments sent via API)
- Customer is in the **pre-sales BC selection process** but needs to confirm ability to process shipments in a timely manner.

• How? (more next slide)

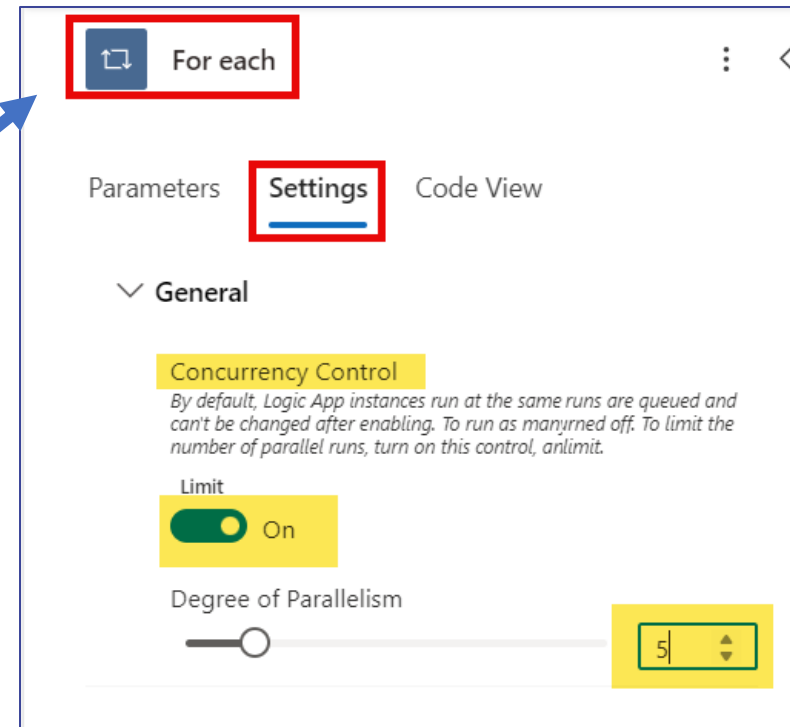
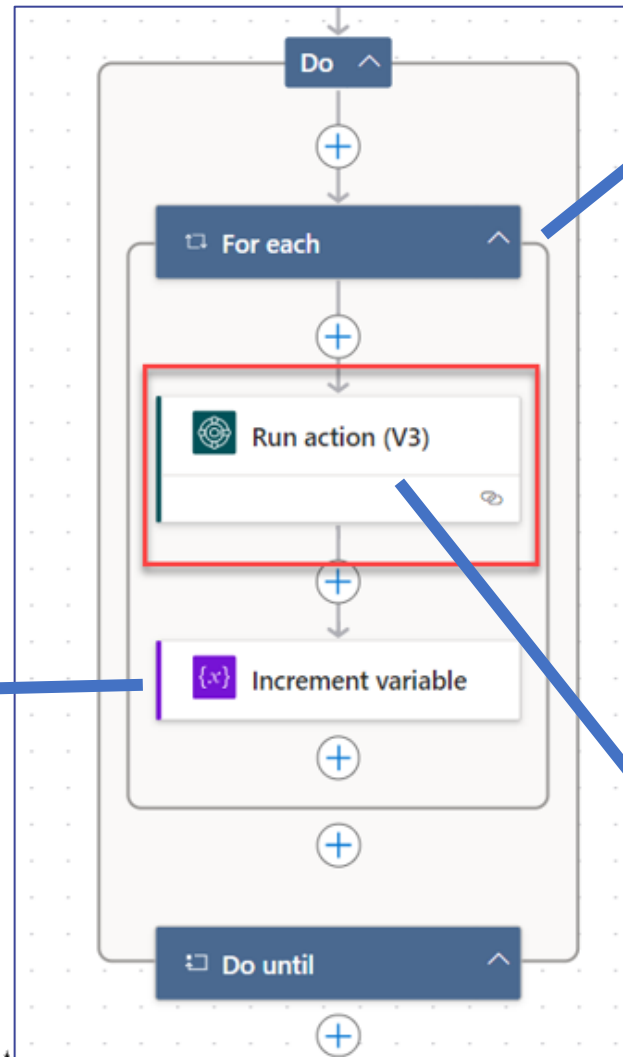
- Cronus sample company in BC
- Generated 1,000's of orders using automation tools
- Used Power Automate to simulate external API calls (ship and invoice orders) (no code)
- Tested batches of 100-ish orders and worked on optimizing concurrency and performance

The screenshot shows a Dynamics 365 Sales Order form for 'School of Fine Art' (S-ORD101003). The form includes fields for Customer No., Customer Name, Sell-to, Address, Address 2, City, and Sell-to State (FL). A modal dialog is open over the form, displaying three radio button options: 'Ship', 'Invoice', and 'Ship and Invoice'. The 'Ship and Invoice' option is selected. The dialog also features 'OK' and 'Cancel' buttons.

Ship & Invoice Sales Order - API calls with Power Automate



Variable just counts from 1 to 4. Allows re-try loop in case of lock issues. Do Until loop exits when count = 4



salesOrder-shipAndInvoice

Ship & Invoice Sales Order - Results

Ran over 1,500 orders, in batches of around 100 each, monitoring settings and outcomes:

- Single Thread (no concurrency) = 1.18 seconds per 1, 20 min per 1,000, no locking issues *
- Concurrency = 2 with retry loop = .73 seconds per 1, 12.2 min per 1,000, no locking issues *
- Concurrency = 5 with retry loop = .52 seconds per 1, 8.7 min per 1,000, three passes due to locking issues
 - Test Size: 126 Sales Orders
 - Pass 1: 113 of 126 posted with no issue, 13 had locking issues (caused by Concurrency setting)
 - Pass 2: 12 of 13 posted with no issue, 1 had a locking issue
 - Pass 3: 1 of 1 posted with no issue. Do Until exited since all were processed.

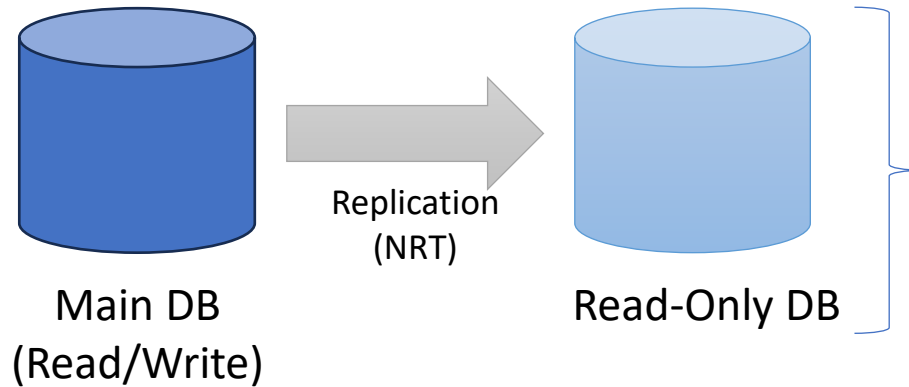
The retry logic built into the Power Automate test flow mirrors Microsoft best practices:

[Transient fault handling - Best practices for cloud applications | Microsoft Learn](#)

**no other users or activity on the system. Results will vary based on other system and user activities.*



Maximize Your Capacity - Read-Only Database Copy



Leverage as much as possible for:

- Power BI
- AL code (query)
- Data Warehouse Extracts
- BC reports that don't need up-to-the second data (below)

- Activate Feature "Report read-only data access" (enabled by default on SaaS)
- In BC, use "Database Access Intent List" to point read-only reports at the Read-Only database (screen shot)
- For calls to read data that you control (AL, API, etc.), set the DataAccessIntent property to ReadOnly
 - (PowerBI default since 03/22)

The screenshot shows the 'Database Access Intent List' interface. It features a search bar, a toggle for 'Analyst', and several menu options: 'Actions', 'Automate', and 'Fewer options'. The main table lists various reports with columns for 'Object Type', 'Object Name', 'Object Caption', and 'Access Intent'. The 'Detail Trial Balance' report is highlighted in yellow. A red box highlights the 'Access Intent' dropdown menu for this report, which is currently set to 'Default'. The dropdown menu shows options: 'Default', 'Read Only', 'Allow Write', and 'Default'.

| Object Type ↑ | Object Name | Object Caption | Access Intent |
|---------------|-----------------------------|-----------------------------|---------------|
| Report | General Journal - Test | General Journal - Test | Default |
| → Report | Detail Trial Balance | Detail Trial Balance | Default |
| Report | Receivables-Payables | Receivables-Payables | Default |
| Report | Trial Balance/Previous Year | Trial Balance/Previous Year | Default |
| Report | Trial Balance/Budget | Trial Balance/Budget | Default |
| Report | G/L - VAT Reconciliation | G/L - Tax Reconciliation | Default |

The background features a stylized landscape with mountains and trees. The sky is a gradient of blue, with numerous thin, white lines radiating from the top center, creating a sense of depth and movement. The mountains are rendered in various shades of blue, with the foreground being the darkest and the background being the lightest. The trees are simple, dark blue silhouettes. The overall aesthetic is clean and modern.

Questions?

Bonus Slides



Tenants and Regions

Create environment

Learn more about capacity and quotas

i You can also create an environment that inherits from an existing environment. Just go to that existing environment's details page and click the **Create environment** button.

Environment Name: *

SV

Do not add personal data to the environment name.

Type:

Sandbox

Country: *

SV

You are responsible for any interference on any integration; please review [here](#).

Your organization is responsible for managing and honoring any Data Subject Rights (DSR) requests within the sandbox environment.

Create

Cancel

Business Central

Something went wrong

Please try again later. If you continue to see this message, contact support.

Technical Details

Cannot connect to the server.

Date and Time: 2024-04-12T23:44:56.479Z

Microsoft Entra tenant ID: [redacted]

Session ID: 748e53ed-aba5-47c7-97dc-27a78d5deb7d

Operation ID: c189bc3940f34edc80bac3f24e06e820

Environments > SV

Details

Active ⓘ

| | | | |
|---------|--------------------|--------------------|--|
| Name | Application Family | Country/region | Azure Region |
| SV | Business Central | SV | Brazil South |
| Type | Telemetry (?) | Security Group | Access with Microsoft 365 Licenses (?) |
| Sandbox | Not Set (Define) | Not Set (Define) | |

URL

<https://businesscentral.dynamics.com/449b1-bd62-e691471e706>

Environments > mx

Details

Active ⓘ

| | | | |
|---------|--------------------|--------------------|--|
| Name | Application Family | Country/region | Azure Region |
| mx | Business Central | MX | South Central US |
| Type | Telemetry (?) | Security Group | Access with Microsoft 365 Licenses (?) |
| Sandbox | Not Set (Define) | Not Set (Define) | Off (Modify) |

URL

<https://businesscentral.dynamics.com/2a963268-ef24-4930-ac4c-0bdb6914c219/mx>



MAY 2024



Technical Limits

- API throttling
- 10,000 objects in data
- 350 MB file
- 1 MB stream
- 10 second search
- 10 background sessions
- 100 queued sessions
- 5 child sessions
- 3 scheduled tasks per user
- 5 scheduled tasks ?



Technical Limits

- 200 merged documents with Word layout (default, max 500)
- 500,000 rows in a report (default, max 1m)
- 1m rows in a query



API / OData Batch Request

- "Use cases exist where it is beneficial to enable a client of a data service to "batch" up a group of requests and send that Batch to the data service in a single request. This section defines a Batch request type that reduces the number of roundtrips to a data service for applications that need to make numerous requests and a change set syntax as a way to logically group a set of requests in a single unit within a batch."
- [\[MS-ODATA\]: Batch Request | Microsoft Learn](#)



API Operational Limits (similar to your Technical Limits...)

- [Current API Limits in Dynamics 365 Business Central - Business Central | Microsoft Learn](#)
 - [Operation Limits in Dynamics 365 Business Central - Business Central | Microsoft Learn](#)
- OData Batch Request:

Higher throughput for
your integrations and
automation

Web Service calls

6000

requests per 5 minutes
per user (or MS Entra app)

Scale with more users:

1 user = 6K requests/5min

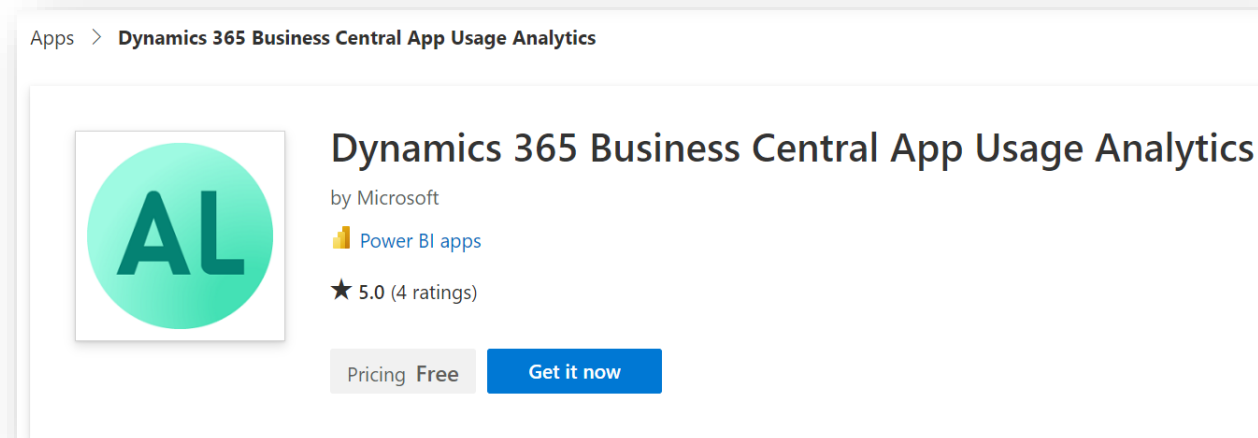
2 users = 12K requests/5min

10 users = 60K requests/5min

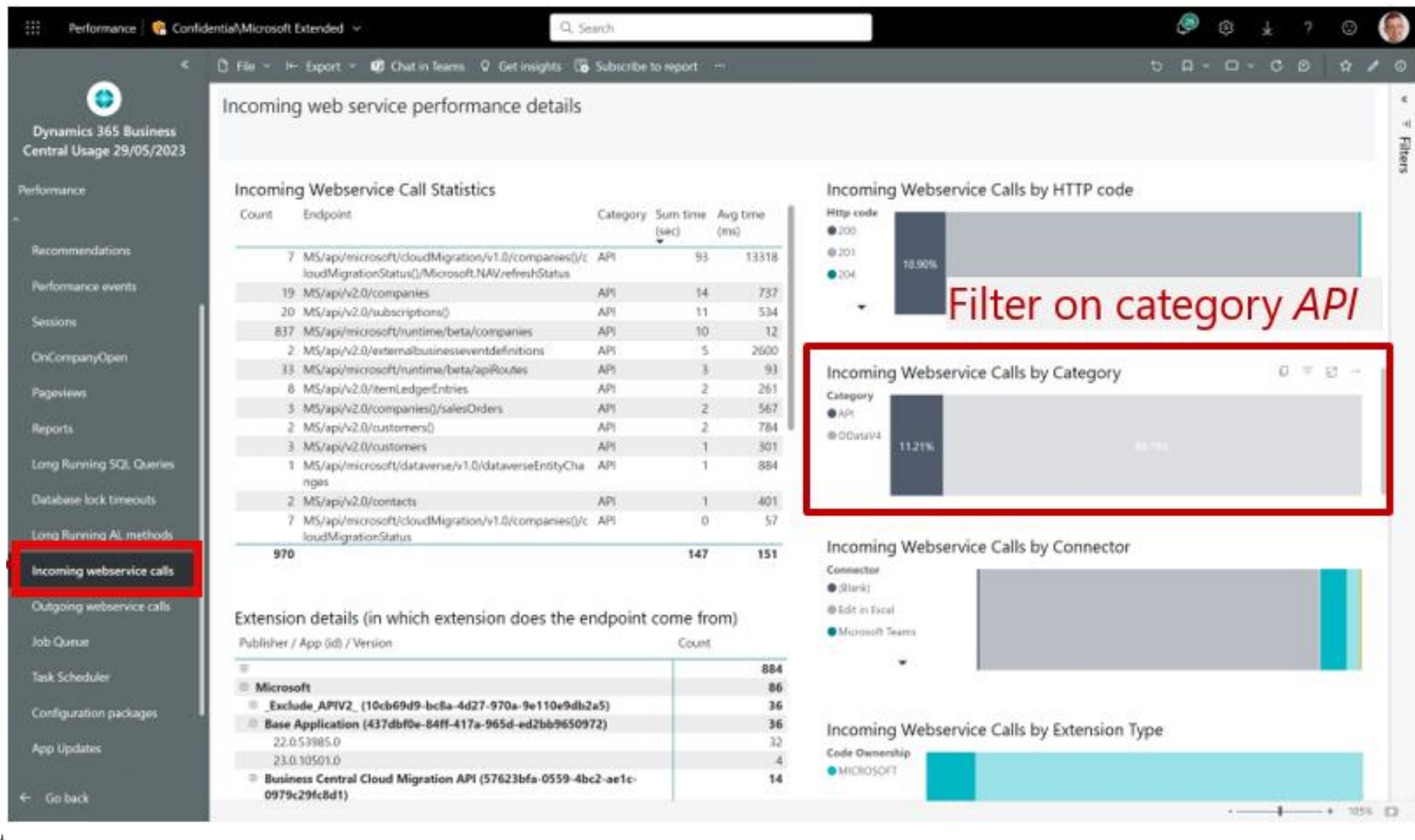


Not just for Partners (Telemetry)

- Pre-built Power BI reports for
 - Usage
 - Performance
 - Errors
 - Code Changes
 - API / Web Service Errors
 - Get the Power BI app below and it has sample data to preview



Sample: Inbound API / WS Calls



Maximize Your Capacity - Hours

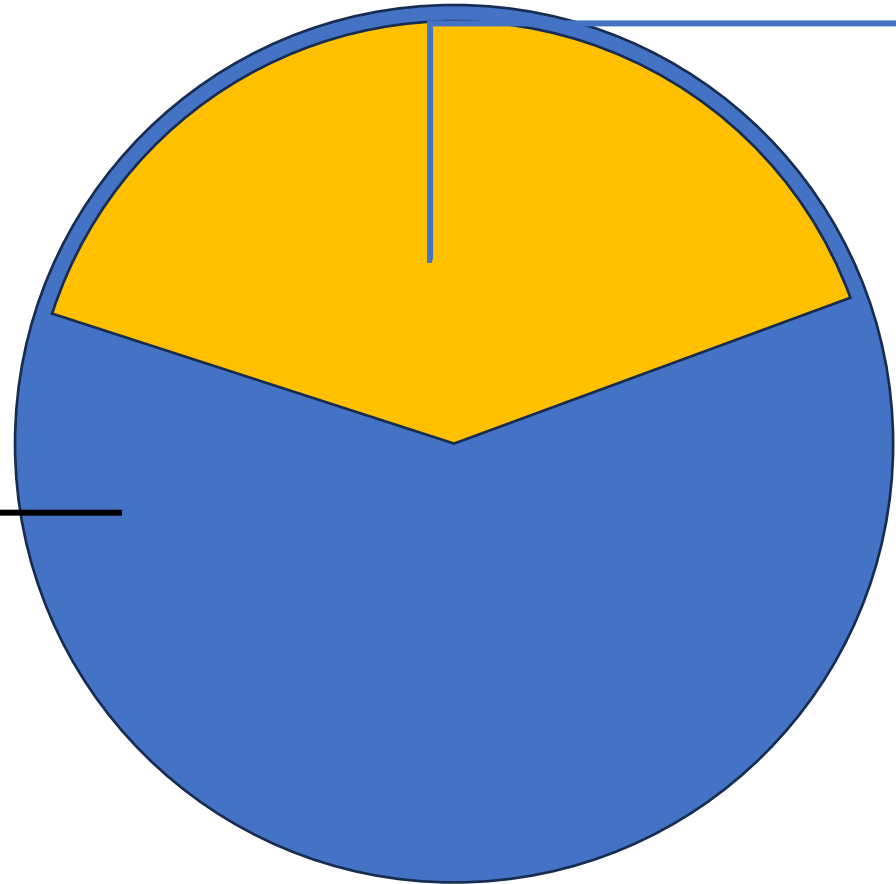
4:01 am to 6:59 pm
(15 hours)

User Activity:

- Manual orders
- Returns
- Cust. Service
- Ops
- Projects
- Financial / G/L

Automated Activity:

- Web orders
- Inventory Adjustments
- A/P Automation
- CRM Integration



7:00 pm to 4:00 am
(9 hours)

Automated Activity:

- Send Sales Orders
- Process and post Shipments
- Inventory Adjustments
- Adjust Cost
- Data Warehouse extracts

**Push back on "real time, daylight hours"
and ask for use cases / justification,
especially if new to BC.**

**As system stabilizes, re-evaluate
workloads and timing.**

