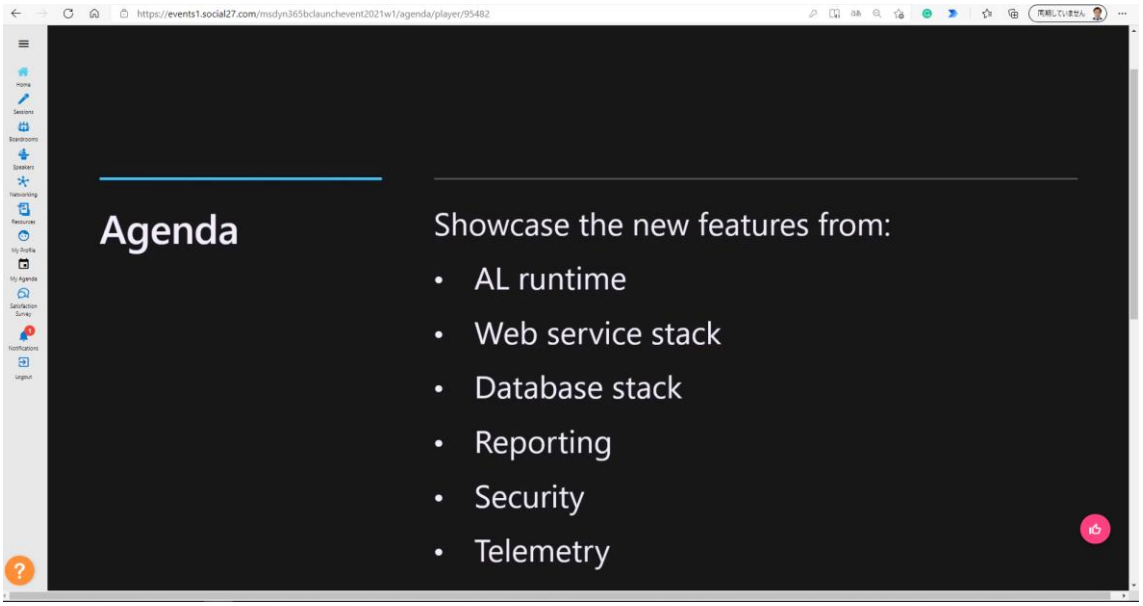
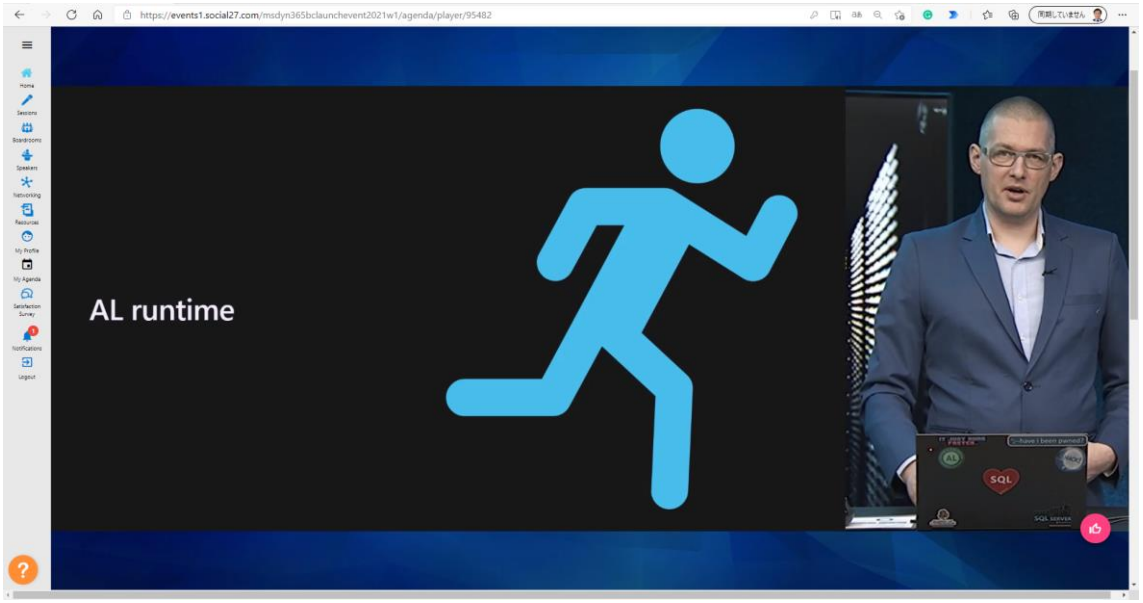
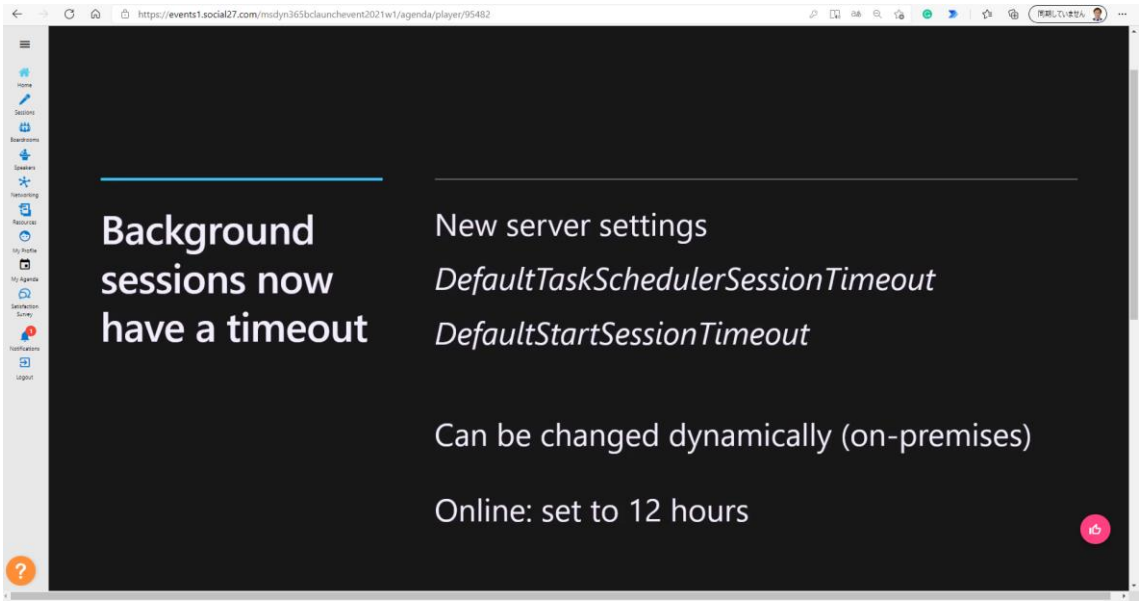
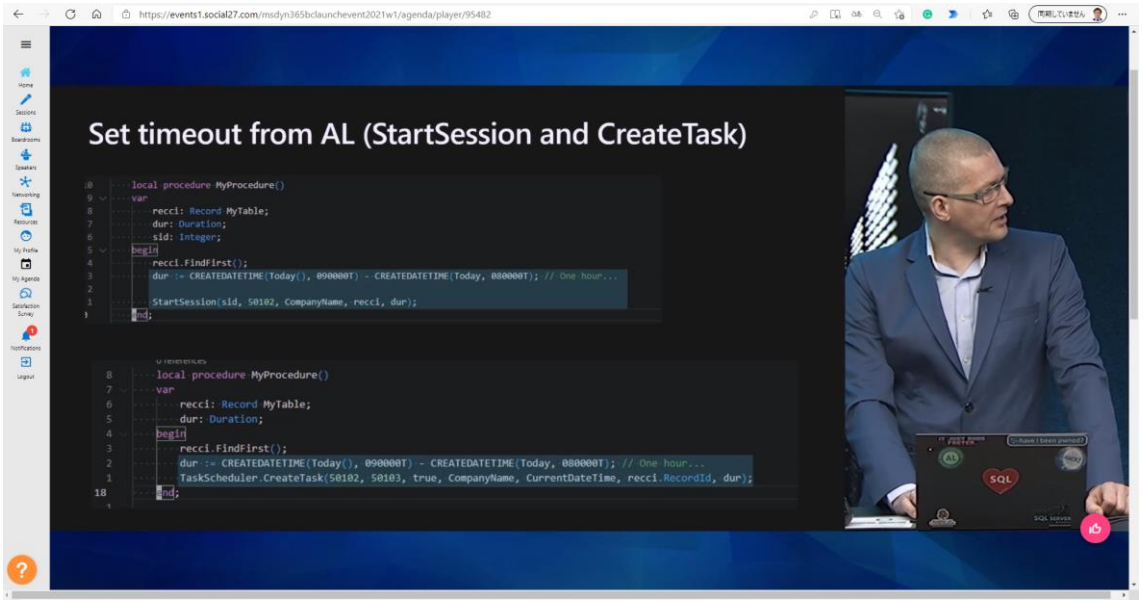
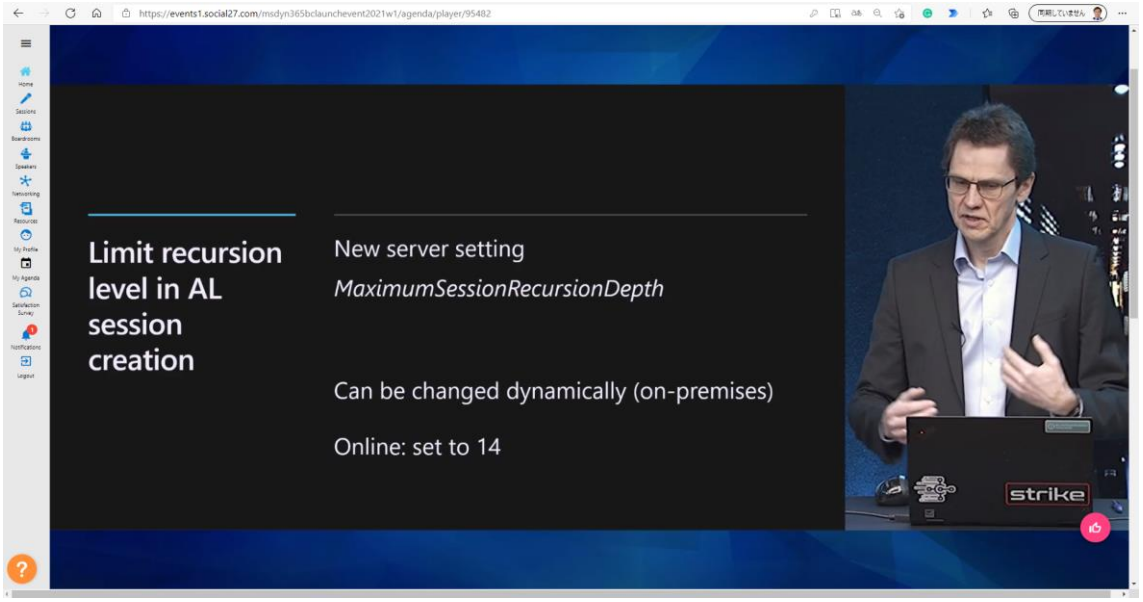
Server and database

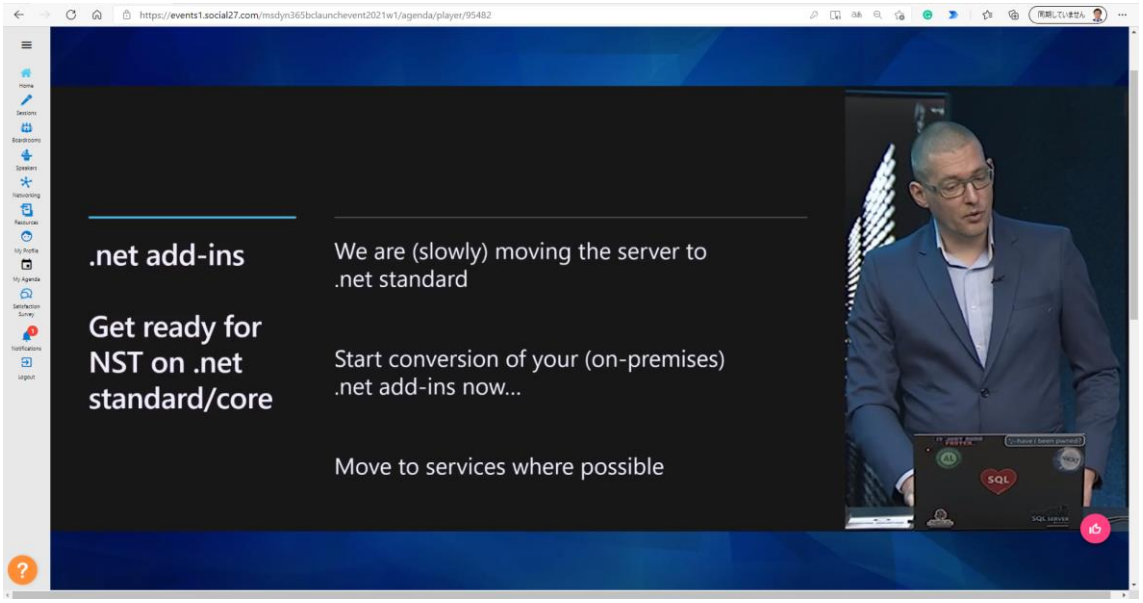


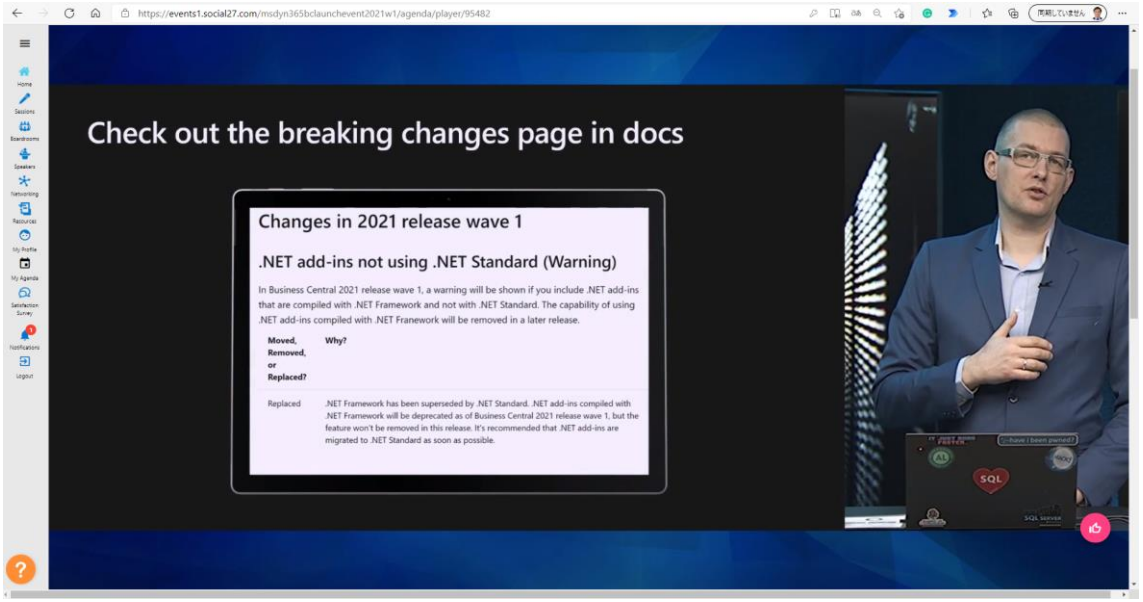


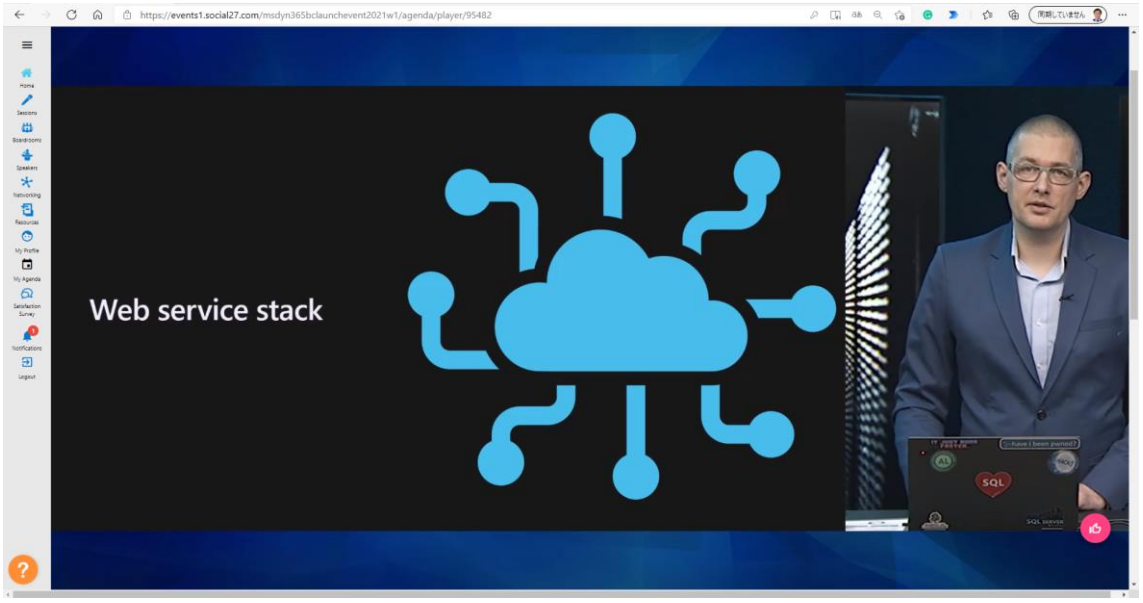

Background sessions now have a timeout
New server settings
DefaultTaskSchedulerSessionTimeout
DefaultStartSessionTimeout
Can be changed dynamically (on-premises)
Online: set to 12 hours

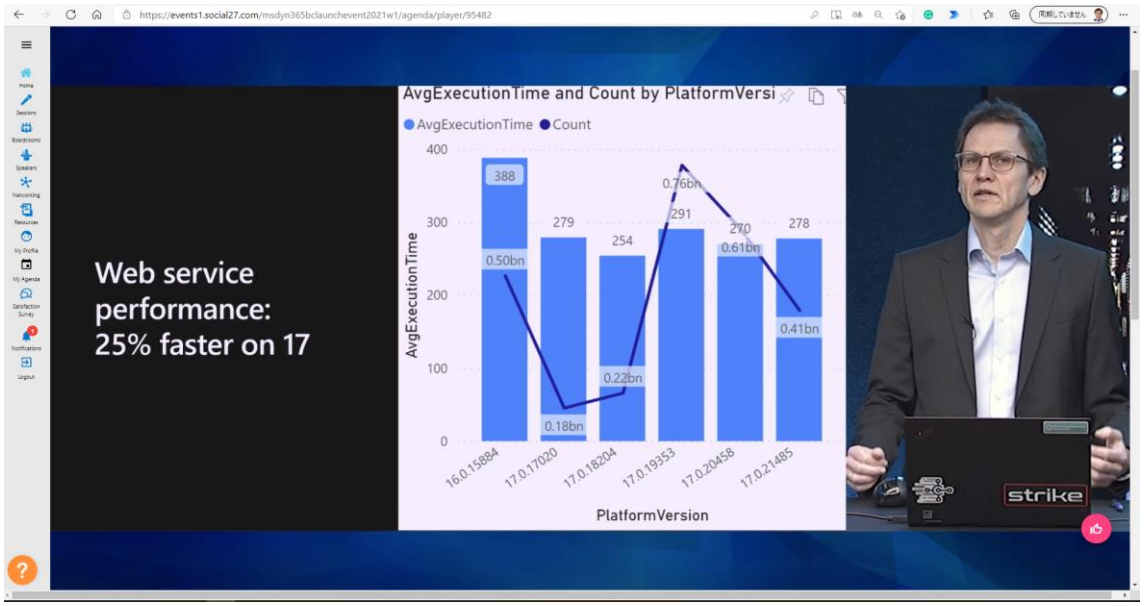

Set timeout from AL (StartSession and CreateTask)
local procedure MyProcedure()
var
recci: Record MyTable;
dur: Duration;
sId: Integer;
begin
recci.FindFirst();
dur := CREATEDATETIME(Today(), 090000T) - CREATEDATETIME(Today, 080000T); // One hour...
StartSession(sId, 50102, CompanyName, recci, dur);
end;
local procedure MyProcedure()
var
recci: Record MyTable;
dur: Duration;
begin
recci.FindFirst();
dur := CREATEDATETIME(Today(), 090000T) - CREATEDATETIME(Today, 080000T); // One hour...
TaskScheduler.CreateTask(50102, 50103, true, CompanyName, CurrentDateTime, recci.RecordId, dur);
end;


Limit recursion level in AL session creation
New server setting
MaximumSessionRecursionDepth
Can be changed dynamically (on-premises)
Online: set to 14
strike

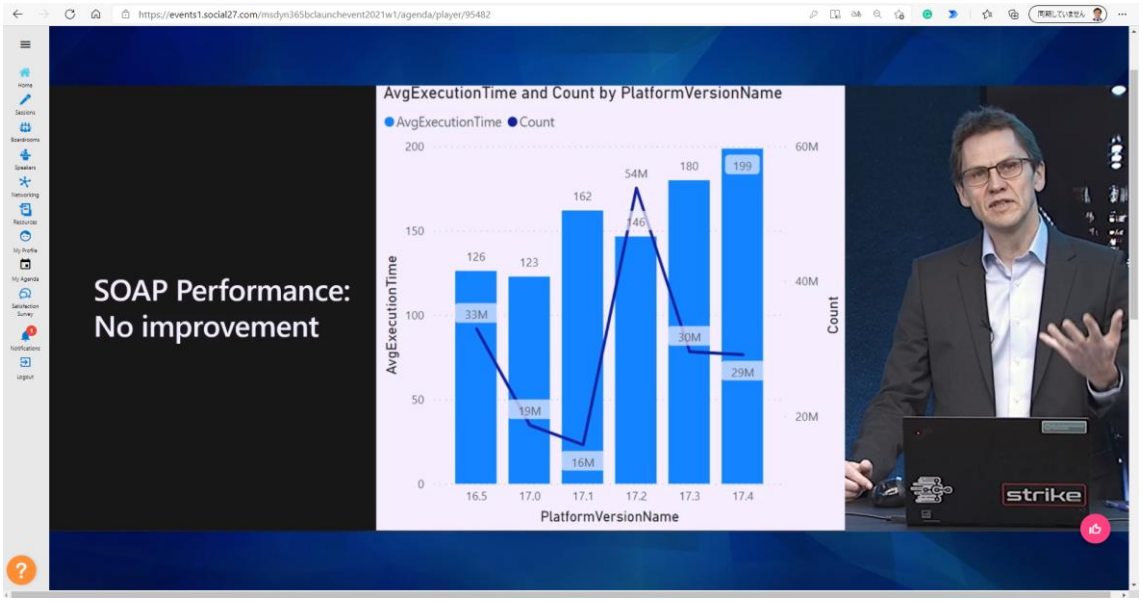

.net add-ins
Get ready for NST on .net standard/core
We are (slowly) moving the server to .net standard
Start conversion of your (on-premises) .net add-ins now...
Move to services where possible
SQL

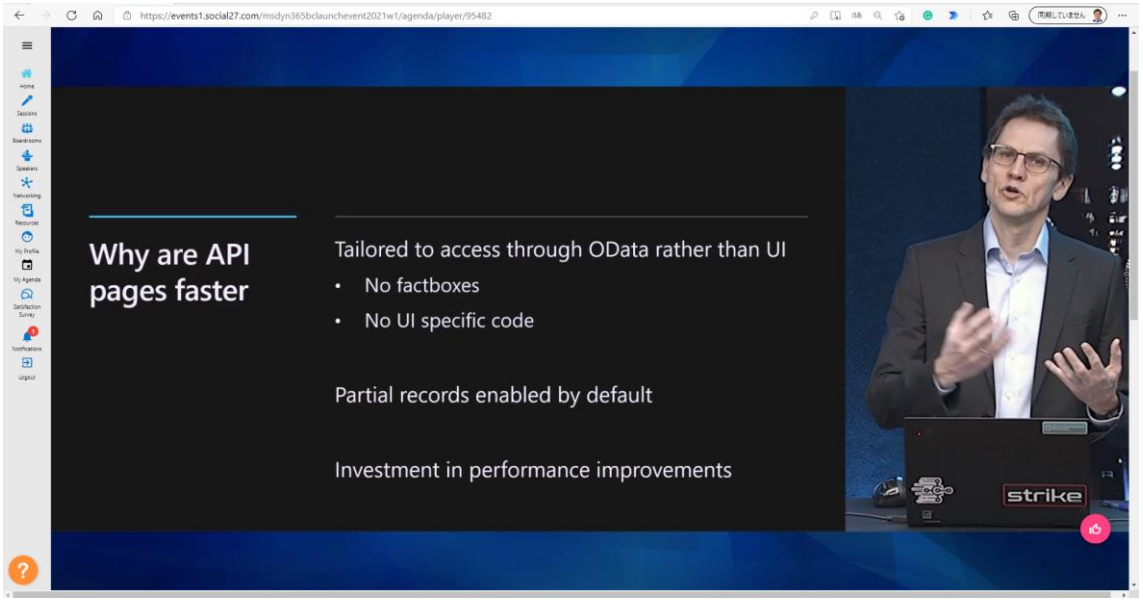

https://events1.social27.com/msdyn365bclaunchevent2021w1/agenda/player/95482
Check out the breaking changes page in docs
Changes in 2021 release wave 1
.NET add-ins not using .NET Standard (Warning)
In Business Central 2021 release wave 1, a warning will be shown if you include .NET add-ins that are compiled with .NET Framework and not with .NET Standard. The capability of using .NET add-ins compiled with .NET Franework will be removed in a later release.
Moved, Removed, or Replaced?
Why?
Replaced
.NET Framework has been superseded by .NET Standard. .NET add-ins compiled with .NET Framework will be deprecated as of Business Central 2021 release wave 1, but the feature won't be removed in this release. It's recommended that .NET add-ins are migrated to .NET Standard as soon as possible.

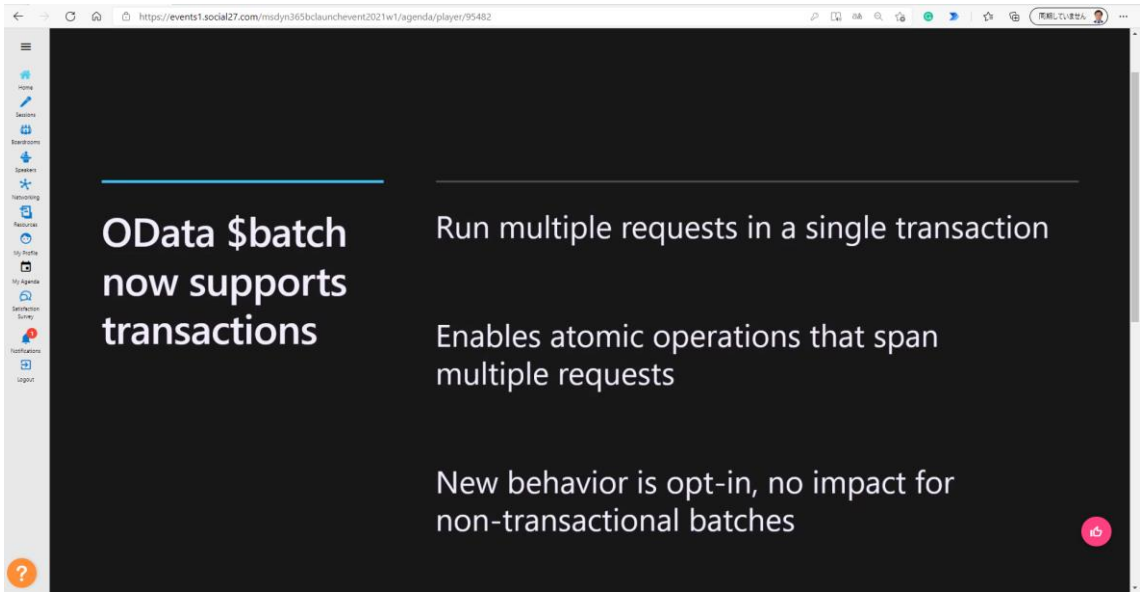

https://events1.social27.com/msdyn365bclaunchevent2021w1/agenda/player/95482
Web service stack

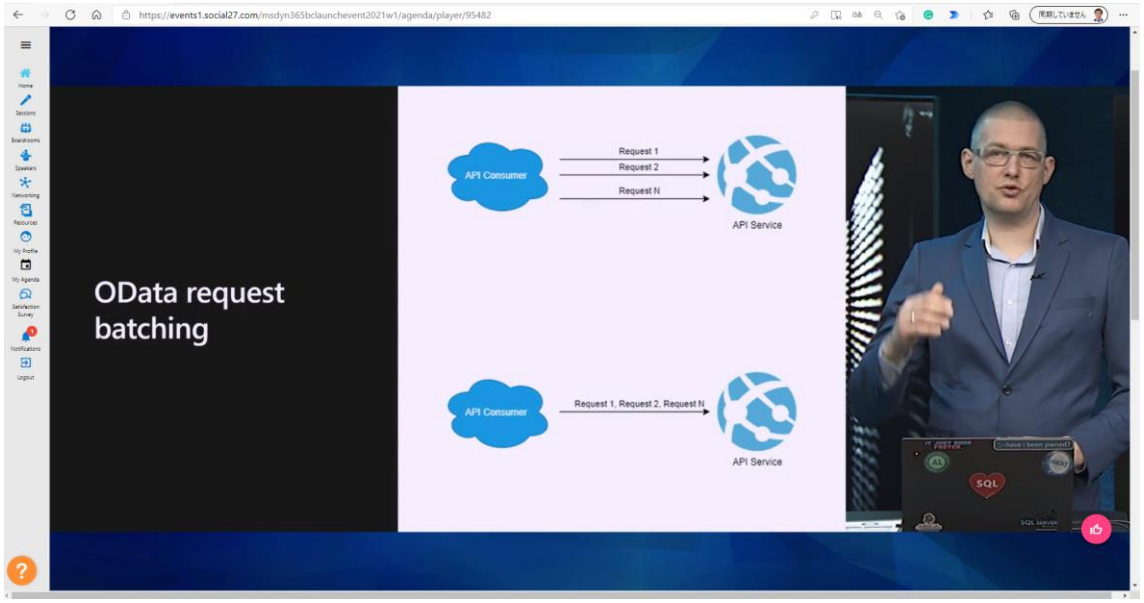

Web service performance: 25% faster on 17
AvgExecutionTime and Count by PlatformVersi
AvgExecutionTime
Count
AvgExecutionTime
PlatformVersion
16.0.15884
17.0.17020
17.0.18204
17.0.19353
17.0.20458
17.0.21485
388
279
254
291
270
278
0.50bn
0.18bn
0.22bn
0.76bn
0.61bn
0.41bn
strike

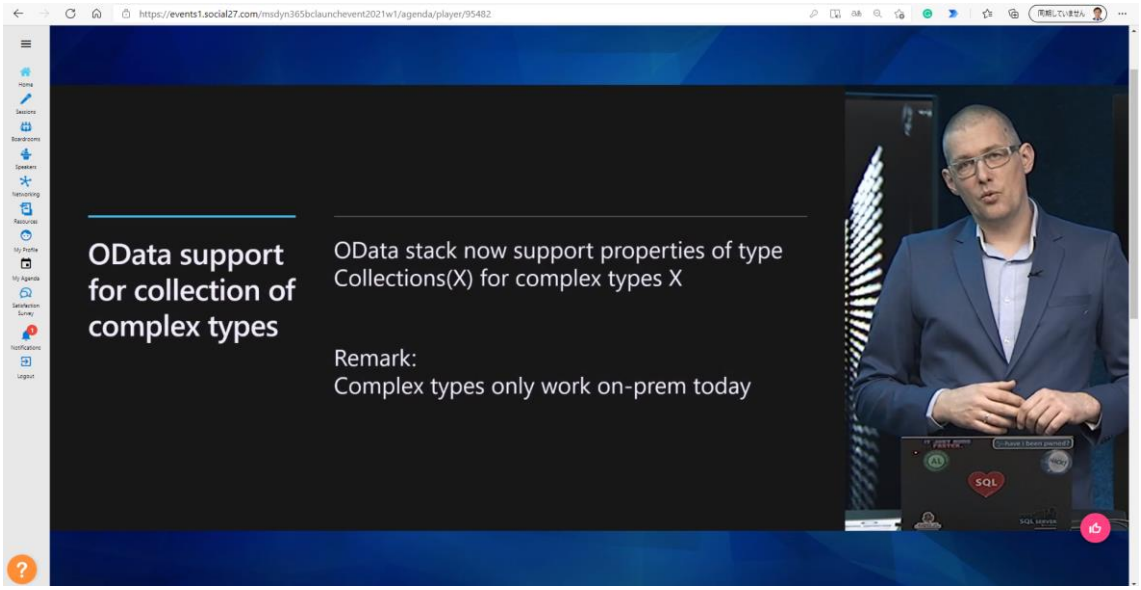
API performance: 5-6x faster
AvgExecutionTime and Count by PlatformVersionName
AvgExecutionTime
Count
AvgExecutionTime
Count
PlatformVersionName
16.5
17.0
17.1
17.2
17.3
17.4
549
251
119
100
111
90
27M
20M
88M
70M
78M
strike

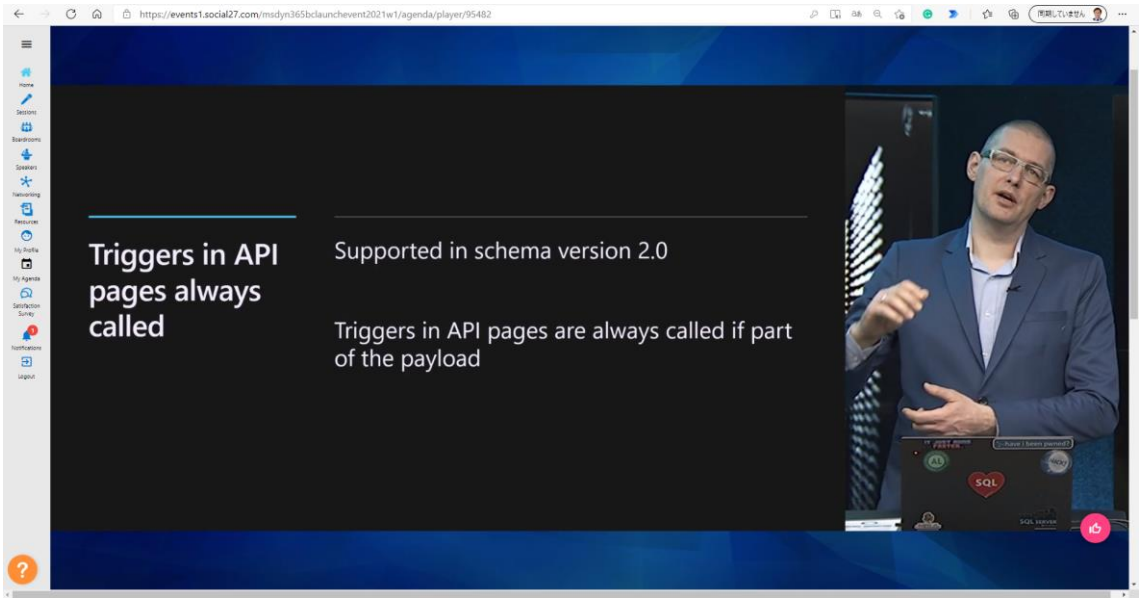

SOAP Performance:
No improvement
AvgExecutionTime and Count by PlatformVersionName
AvgExecutionTime
Count
AvgExecutionTime
Count
PlatformVersionName
16.5
17.0
17.1
17.2
17.3
17.4
strike

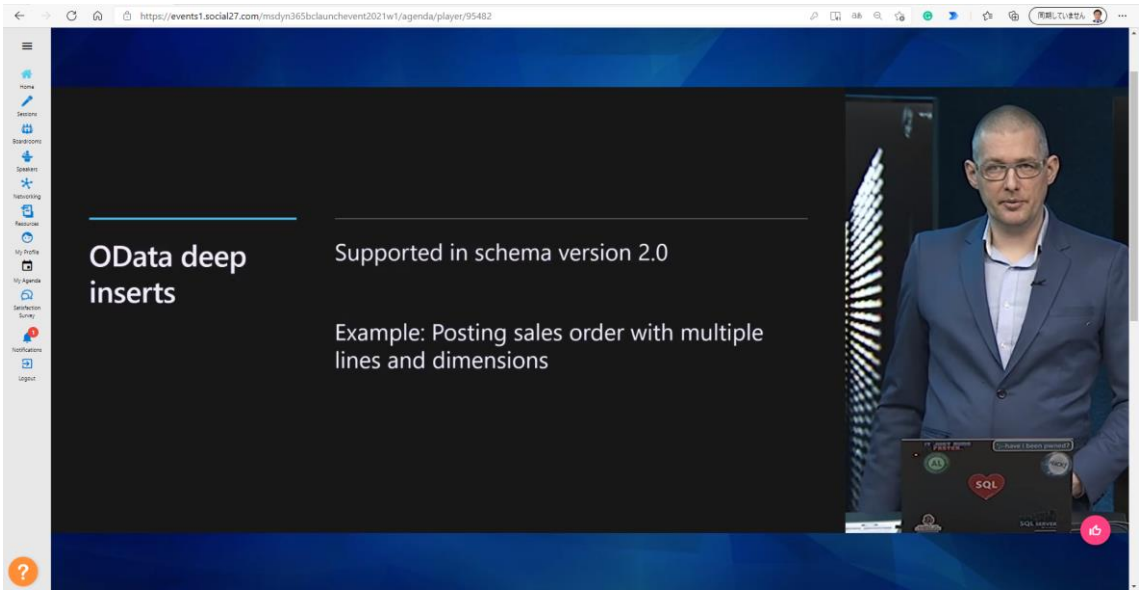

Why are API pages faster
Tailored to access through OData rather than UI
No factboxes
No UI specific code
Partial records enabled by default
Investment in performance improvements
strike

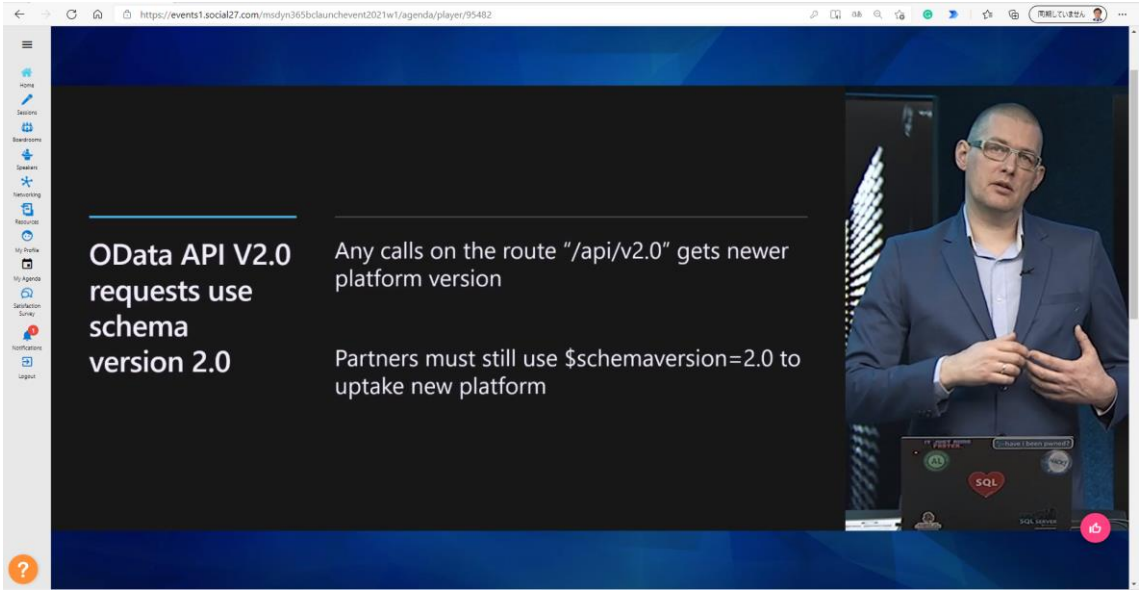

https://events1.social27.com/msdyn365bclaunchevent2021w1/agenda/player/95482
OData $batch now supports transactions
Run multiple requests in a single transaction
Enables atomic operations that span multiple requests
New behavior is opt-in, no impact for non-transactional batches

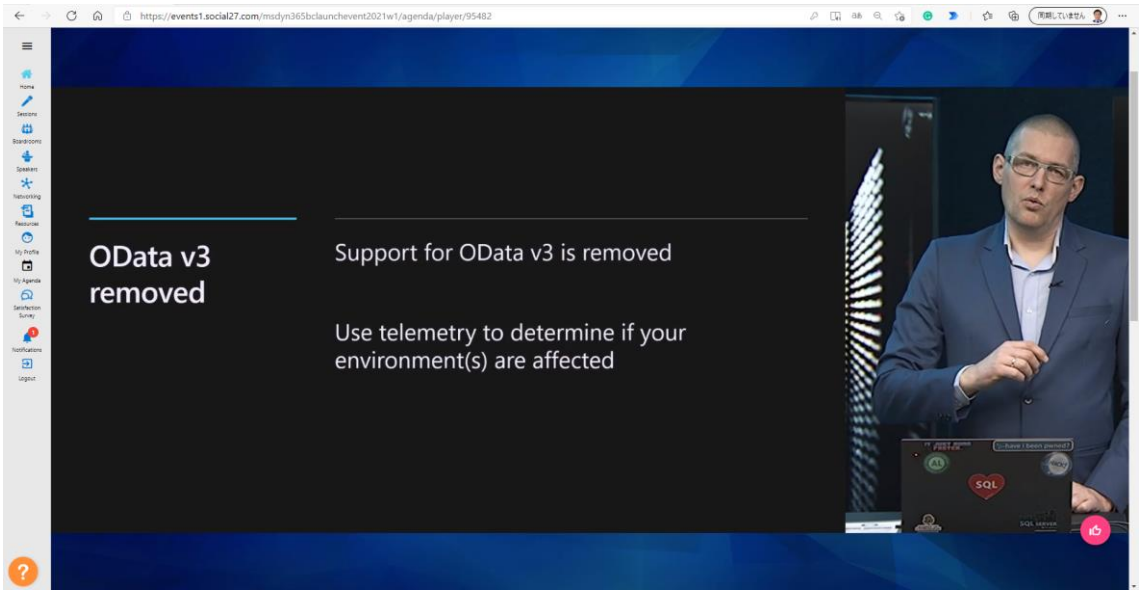

https://events1.social27.com/msdyn365bclaunchevent2021w1/agenda/player/95482
OData request batching
API Consumer
Request 1
Request 2
Request N
API Service
API Consumer
Request 1, Request 2, Request N
API Service

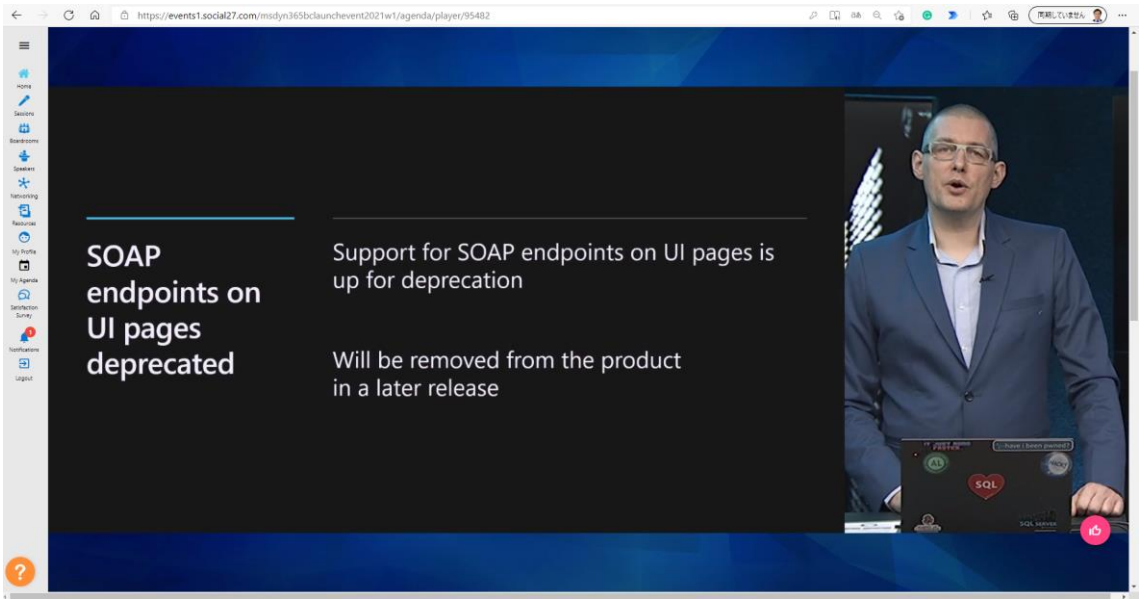

https://events1.social27.com/msdyn365bclaunchevent2021w1/agenda/player/95482
Home
Sessions
Boardrooms
Speakers
Networking
Resources
My Profile
My Agenda
Satisfaction Survey
Notifications
Logout
OData support for collection of complex types
OData stack now support properties of type Collections(X) for complex types X
Remark:
Complex types only work on-prem today
SQL

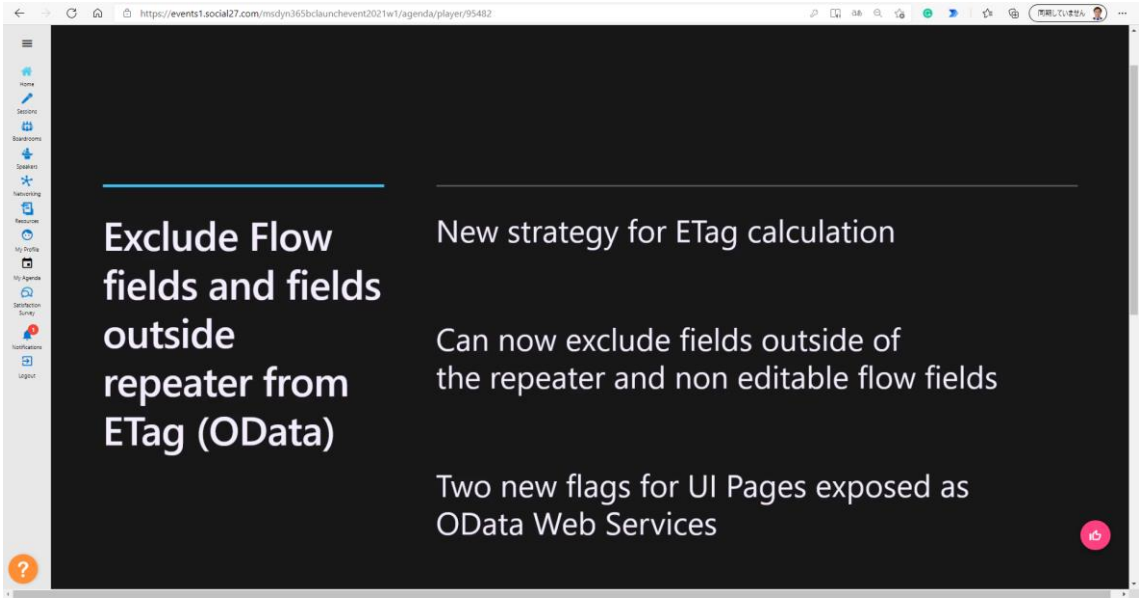

https://events1.social27.com/msdyn365bclaunchevent2021w1/agenda/player/95482
Home
Sessions
Boardrooms
Speakers
Networking
Resources
My Profile
My Agenda
Satisfaction Survey
Notifications
Logout
Triggers in API pages always called
Supported in schema version 2.0
Triggers in API pages are always called if part of the payload
SQL

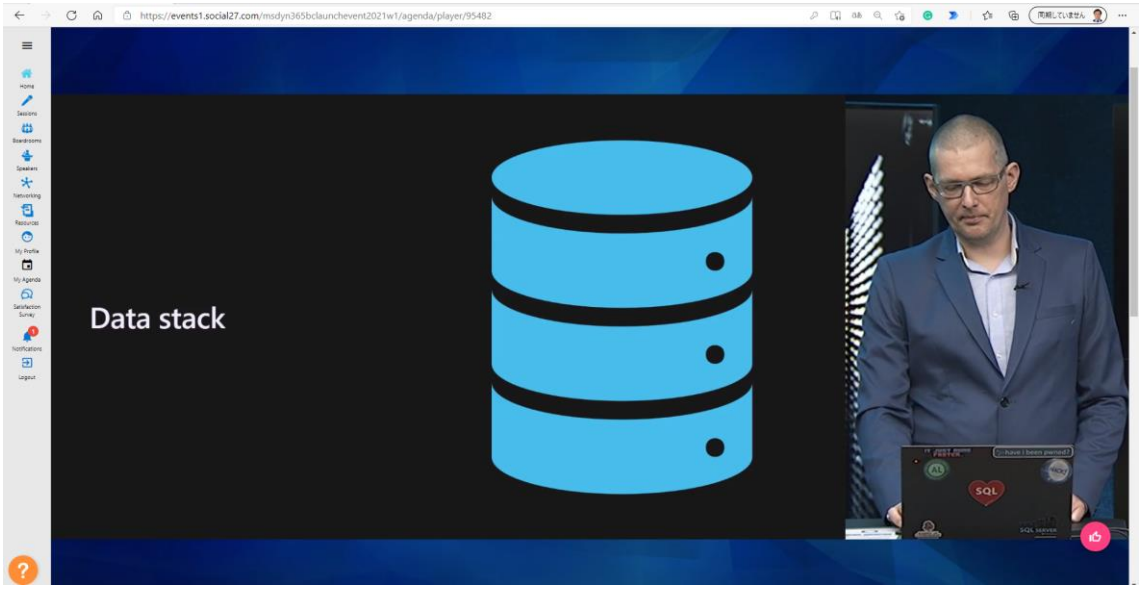

https://events1.social27.com/msdyn365bclaunchevent2021w1/agenda/player/95482
Home
Sessions
Boardrooms
Speakers
Networking
Resources
My Profile
My Agenda
Satisfaction Survey
Notifications
Logout
OData deep inserts
Supported in schema version 2.0
Example: Posting sales order with multiple lines and dimensions
SQL

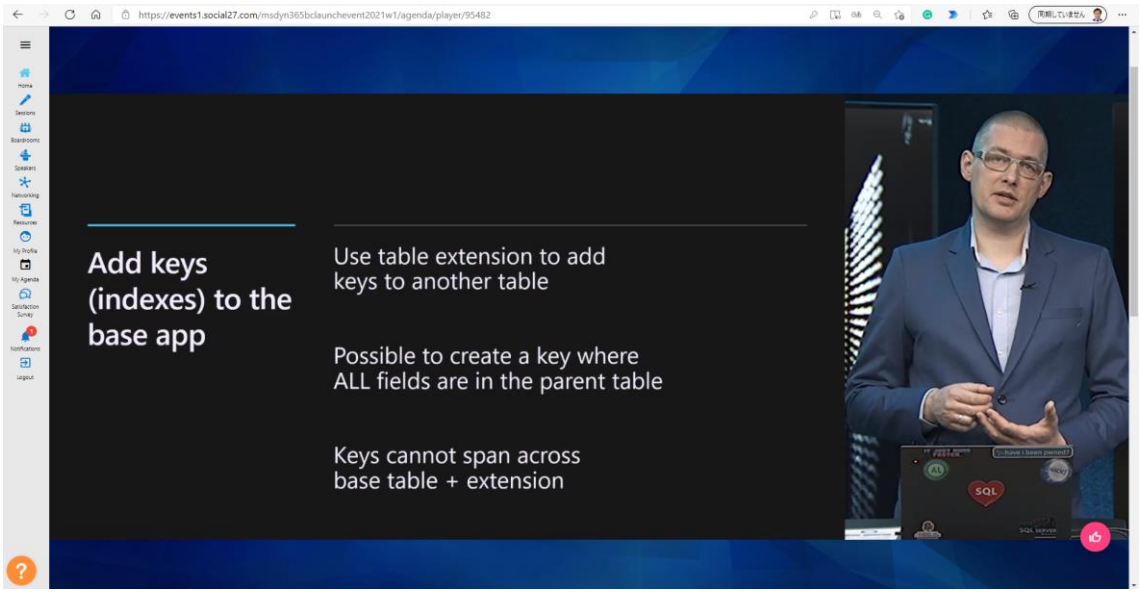

https://events1.social27.com/msdyn365bclaunchevent2021w1/agenda/player/95482
Home
Sessions
Boardrooms
Speakers
Networking
Resources
My Profile
My Agenda
Satisfaction Survey
Notifications
Logout
OData API V2.0 requests use schema version 2.0
Any calls on the route "/api/v2.0" gets newer platform version
Partners must still use $schemaversion=2.0 to uptake new platform
SQL

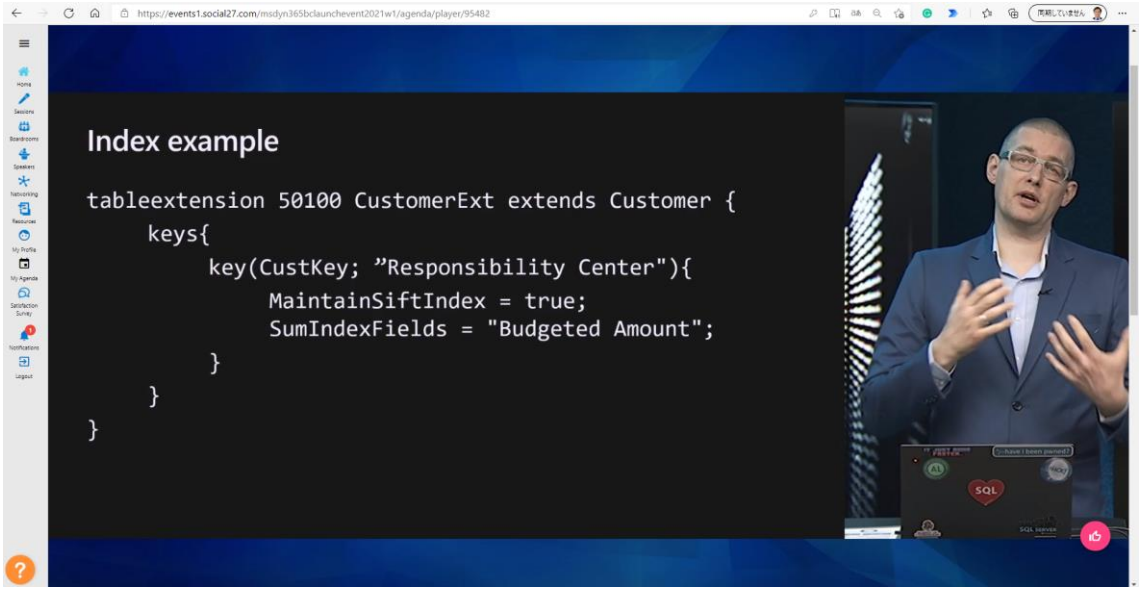

https://events1.social27.com/msdyn365bclaunchevent2021w1/agenda/player/95482
OData v3 removed
Support for OData v3 is removed
Use telemetry to determine if your environment(s) are affected

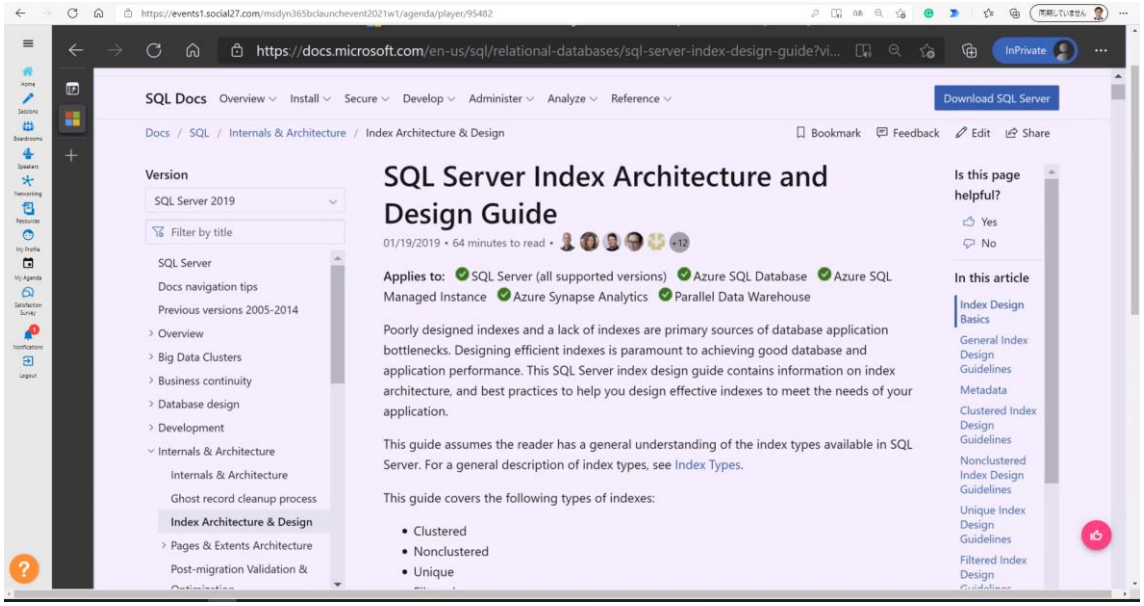

https://events1.social27.com/msdyn365bclaunchevent2021w1/agenda/player/95482
SOAP endpoints on UI pages deprecated
Support for SOAP endpoints on UI pages is up for deprecation
Will be removed from the product in a later release

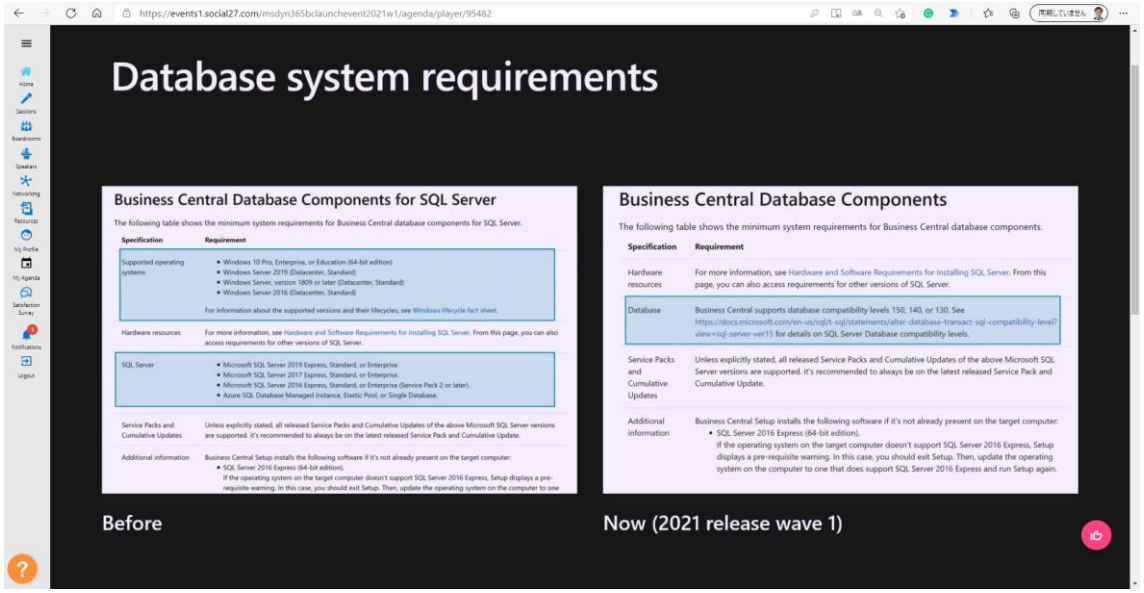

Exclude Flow fields and fields outside repeater from ETag (OData)
New strategy for ETag calculation
Can now exclude fields outside of the repeater and non editable flow fields
Two new flags for UI Pages exposed as OData Web Services

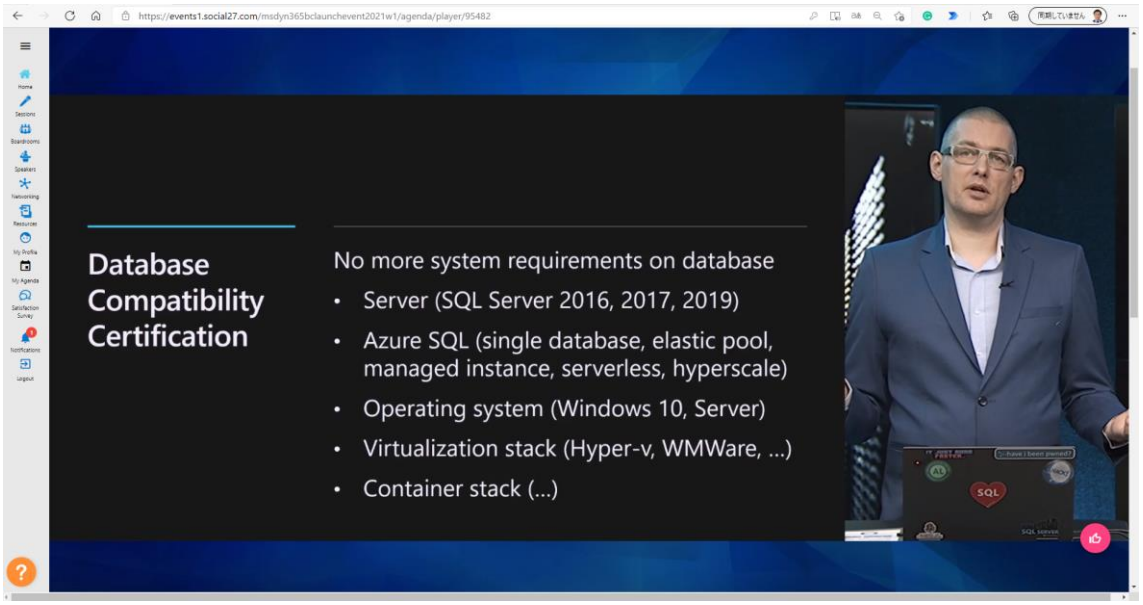

Data stack

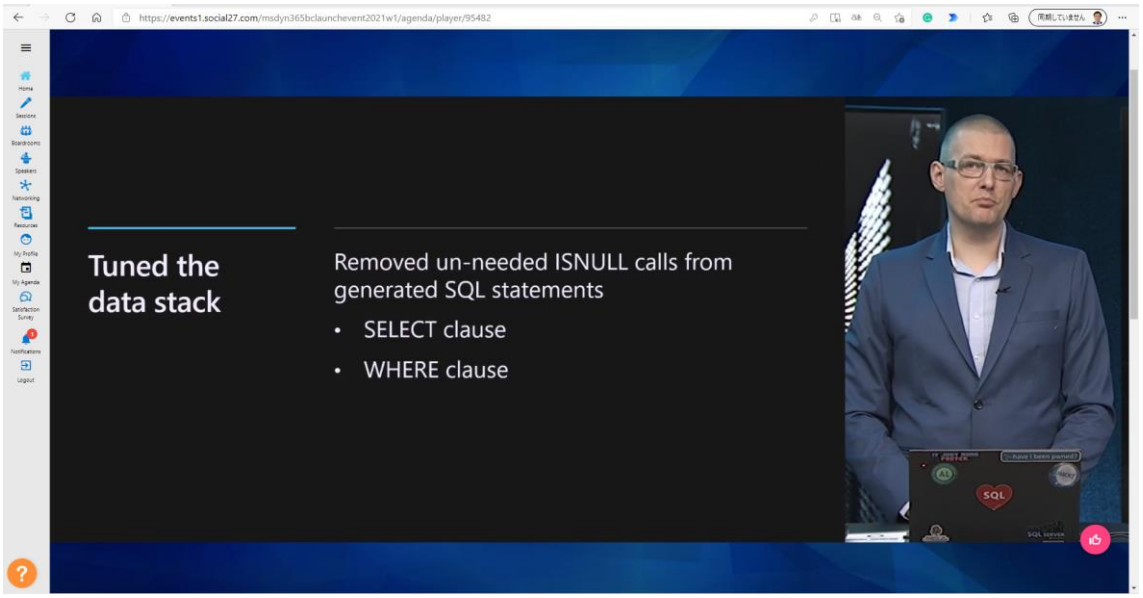

https://events1.social27.com/msdyn365bclaunchevent2021w1/agenda/player/95482
Add keys (indexes) to the base app
Use table extension to add keys to another table
Possible to create a key where ALL fields are in the parent table
Keys cannot span across base table + extension

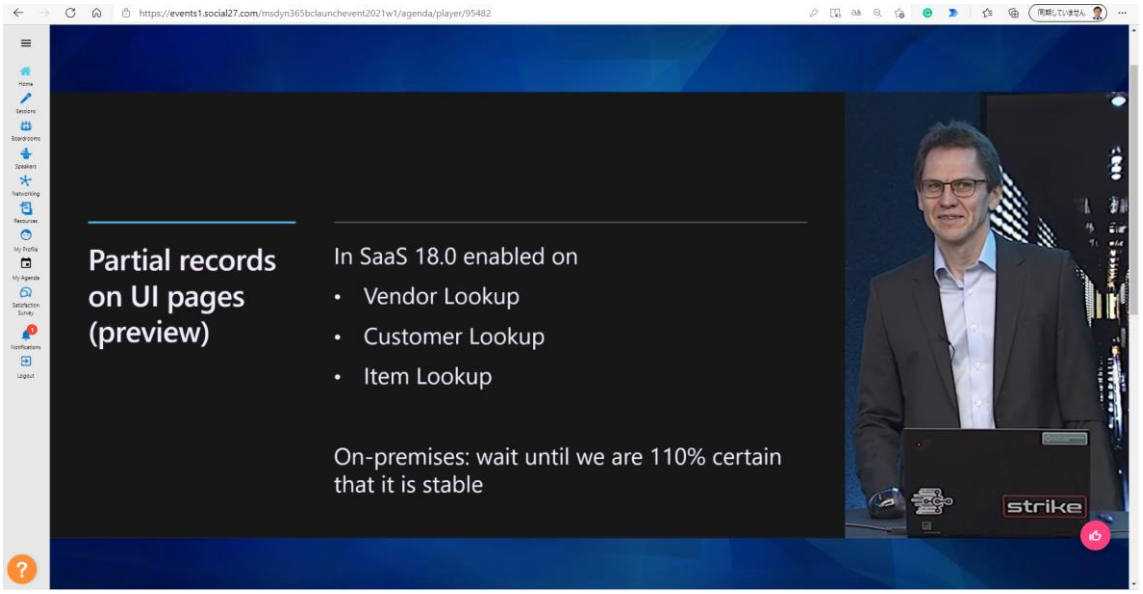

https://events1.social27.com/msdyn365bclaunchevent2021w1/agenda/player/95482
Index example
tableextension 50100 CustomerExt extends Customer {
keys{
key(CustKey; ”Responsibility Center"){
MaintainSiftIndex = true;
SumIndexFields = "Budgeted Amount";
}
}
}

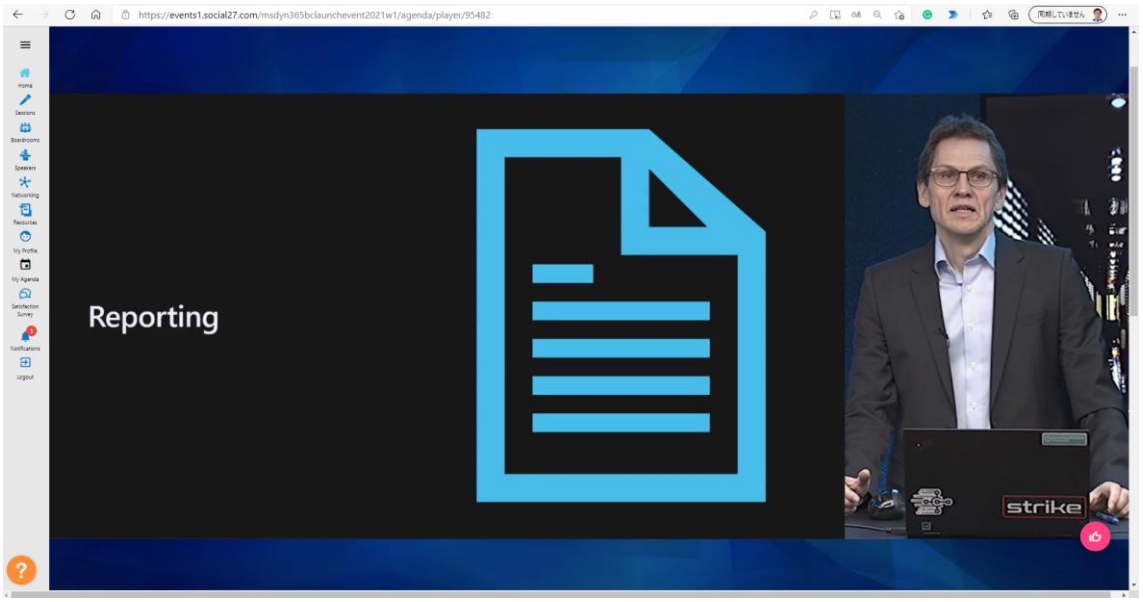

https://events1.social27.com/msdyn365bclaunchevent2021w1/agenda/player/95482
https://docs.microsoft.com/en-us/sql/relational-databases/sql-server-index-design-guide?vi...
InPrivate
SQL Docs
Overview
Install
Secure
Develop
Administer
Analyze
Reference
Download SQL Server
Docs / SQL / Internals & Architecture / Index Architecture & Design
Bookmark
Feedback
Edit
Share
Version
SQL Server 2019
Filter by title
SQL Server
Docs navigation tips
Previous versions 2005-2014
Overview
Big Data Clusters
Business continuity
Database design
Development
Internals & Architecture
Internals & Architecture
Ghost record cleanup process
Index Architecture & Design
Pages & Extents Architecture
Post-migration Validation &
SQL Server Index Architecture and Design Guide
01/19/2019 • 64 minutes to read •
Applies to: SQL Server (all supported versions) Azure SQL Database Azure SQL Managed Instance Azure Synapse Analytics Parallel Data Warehouse
Poorly designed indexes and a lack of indexes are primary sources of database application bottlenecks. Designing efficient indexes is paramount to achieving good database and application performance. This SQL Server index design guide contains information on index architecture, and best practices to help you design effective indexes to meet the needs of your application.
This guide assumes the reader has a general understanding of the index types available in SQL Server. For a general description of index types, see Index Types.
This guide covers the following types of indexes:
Clustered
Nonclustered
Unique
Is this page helpful?
Yes
No
In this article
Index Design Basics
General Index Design Guidelines
Metadata
Clustered Index Design Guidelines
Nonclustered Index Design Guidelines
Unique Index Design Guidelines
Filtered Index Design

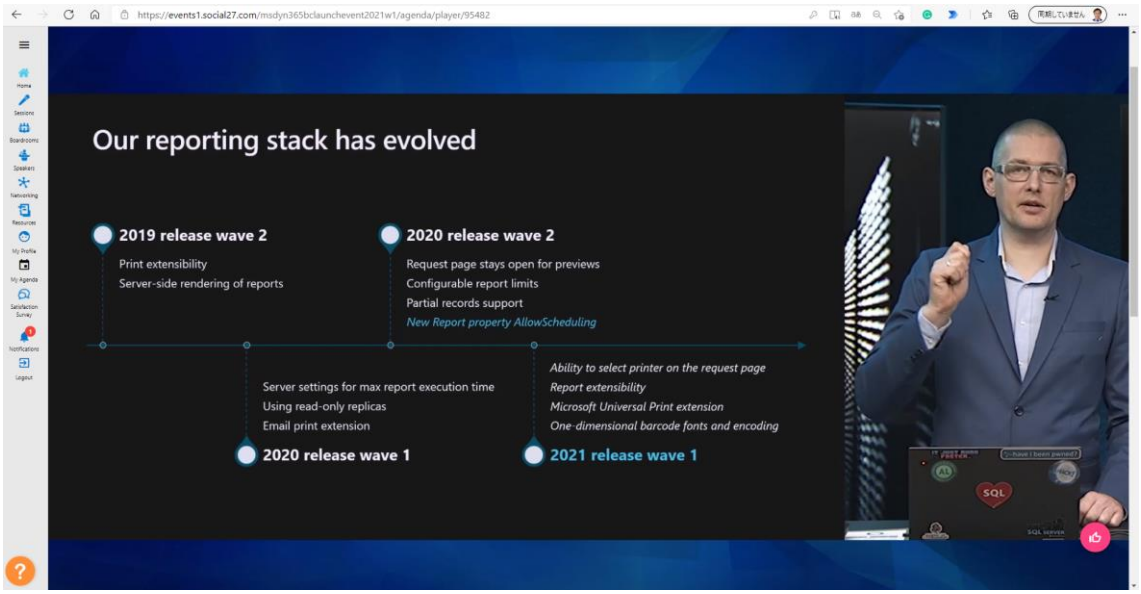

https://events1.social27.com/msdyn365bclaunchevent2021w1/agenda/player/95482
Database system requirements
Business Central Database Components for SQL Server
The following table shows the minimum system requirements for Business Central database components for SQL Server.
Specification
Requirement
Supported operating systems
Windows 10 Pro, Enterprise, or Education (64-bit edition)
Windows Server 2019 (Datacenter, Standard)
Windows Server, version 1809 or later (Datacenter, Standard)
Windows Server 2016 (Datacenter, Standard)
For information about the supported versions and their lifecycles, see Windows lifecycle fact sheet.
Hardware resources
For more information, see Hardware and Software Requirements for Installing SQL Server. From this page, you can also access requirements for other versions of SQL Server.
SQL Server
Microsoft SQL Server 2019 Express, Standard, or Enterprise.
Microsoft SQL Server 2017 Express, Standard, or Enterprise.
Microsoft SQL Server 2016 Express, Standard, or Enterprise (Service Pack 2 or later).
Azure SQL Database Managed Instance, Elastic Pool, or Single Database.
Service Packs and Cumulative Updates
Unless explicitly stated, all released Service Packs and Cumulative Updates of the above Microsoft SQL Server versions are supported. It's recommended to always be on the latest released Service Pack and Cumulative Update.
Additional information
Business Central Setup installs the following software if it's not already present on the target computer:
SQL Server 2016 Express (64-bit edition).
If the operating system on the target computer doesn't support SQL Server 2016 Express, Setup displays a pre-requisite warning. In this case, you should exit Setup. Then, update the operating system on the computer to one
Before
Business Central Database Components
The following table shows the minimum system requirements for Business Central database components.
Specification
Requirement
Hardware resources
For more information, see Hardware and Software Requirements for Installing SQL Server. From this page, you can also access requirements for other versions of SQL Server.
Database
Business Central supports database compatibility levels 150, 140, or 130. See https://docs.microsoft.com/en-us/sql/t-sql/statements/alter-database-transact-sql-compatibility-level?view=sql-server-ver15 for details on SQL Server Database compatibility levels.
Service Packs and Cumulative Updates
Unless explicitly stated, all released Service Packs and Cumulative Updates of the above Microsoft SQL Server versions are supported. It's recommended to always be on the latest released Service Pack and Cumulative Update.
Additional information
Business Central Setup installs the following software if it's not already present on the target computer:
SQL Server 2016 Express (64-bit edition).
If the operating system on the target computer doesn't support SQL Server 2016 Express, Setup displays a pre-requisite warning. In this case, you should exit Setup. Then, update the operating system on the computer to one that does support SQL Server 2016 Express and run Setup again.
Now (2021 release wave 1)

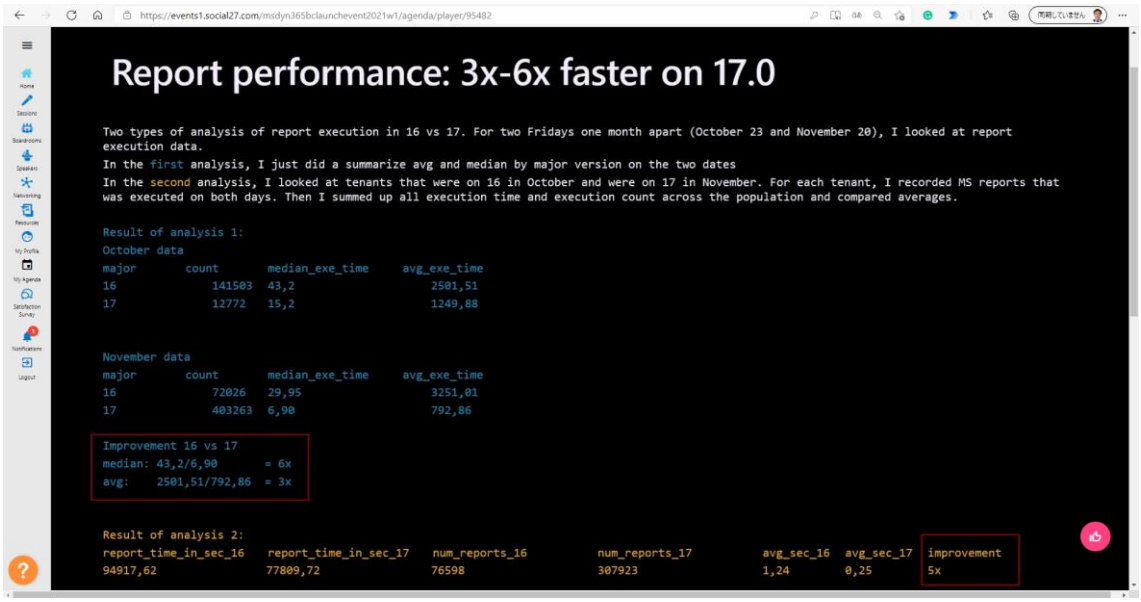

https://events1.social27.com/msdyn365bclaunchevent2021w1/agenda/player/95482
Database Compatibility Certification
No more system requirements on database
• Server (SQL Server 2016, 2017, 2019)
• Azure SQL (single database, elastic pool, managed instance, serverless, hyperscale)
• Operating system (Windows 10, Server)
• Virtualization stack (Hyper-v, WMWare, ...)
• Container stack (...)
SQL


https://events1.social27.com/msdyn365bclaunchevent2021w1/agenda/player/95482
Tuned the data stack
Removed un-needed ISNULL calls from generated SQL statements
• SELECT clause
• WHERE clause
SQL


https://events1.social27.com/msdyn365bclaunchevent2021w1/agenda/player/95482
Partial records on UI pages (preview)
In SaaS 18.0 enabled on
• Vendor Lookup
• Customer Lookup
• Item Lookup
On-premises: wait until we are 110% certain that it is stable
strike


https://events1.social27.com/msdyn365bclaunchevent2021w1/agenda/player/95482
Reporting
strike





Report performance: 3x-6x faster on 17.0

Two types of analysis of report execution in 16 vs 17. For two Fridays one month apart (October 23 and November 20), I looked at report execution data.

In the first analysis, I just did a summarize avg and median by major version on the two dates

In the second analysis, I looked at tenants that were on 16 in October and were on 17 in November. For each tenant, I recorded MS reports that was executed on both days. Then I summed up all execution time and execution count across the population and compared averages.

Result of analysis 1:

October data

major	count	median_exe_time	avg_exe_time
16	141503	43,2	2501,51
17	12772	15,2	1249,88

November data

major	count	median_exe_time	avg_exe_time
16	72026	29,95	3251,01
17	403263	6,90	792,86

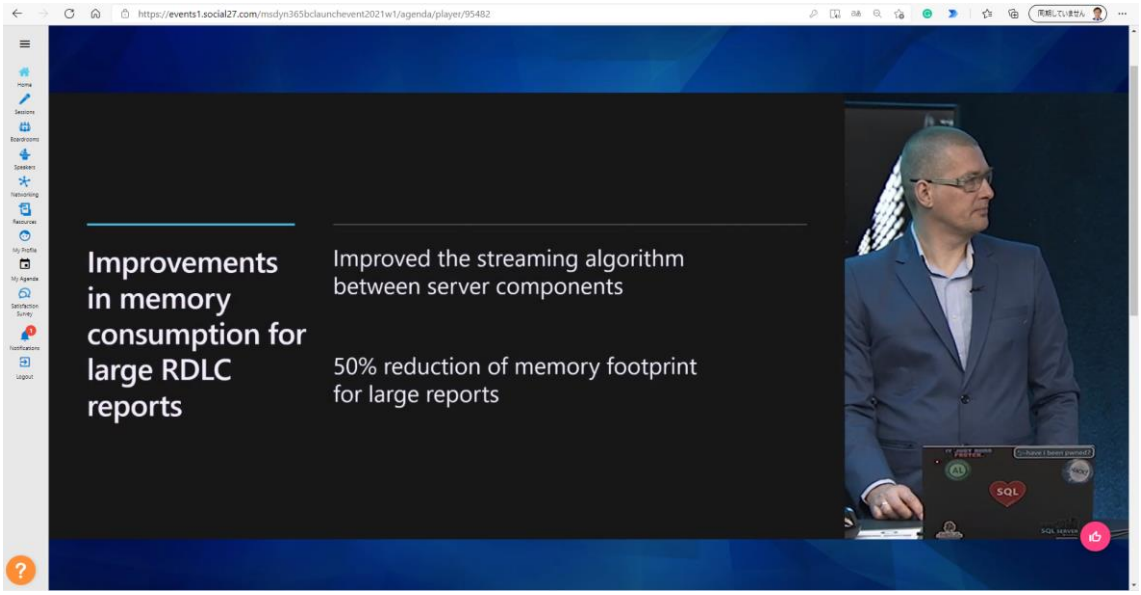
Improvement 16 vs 17

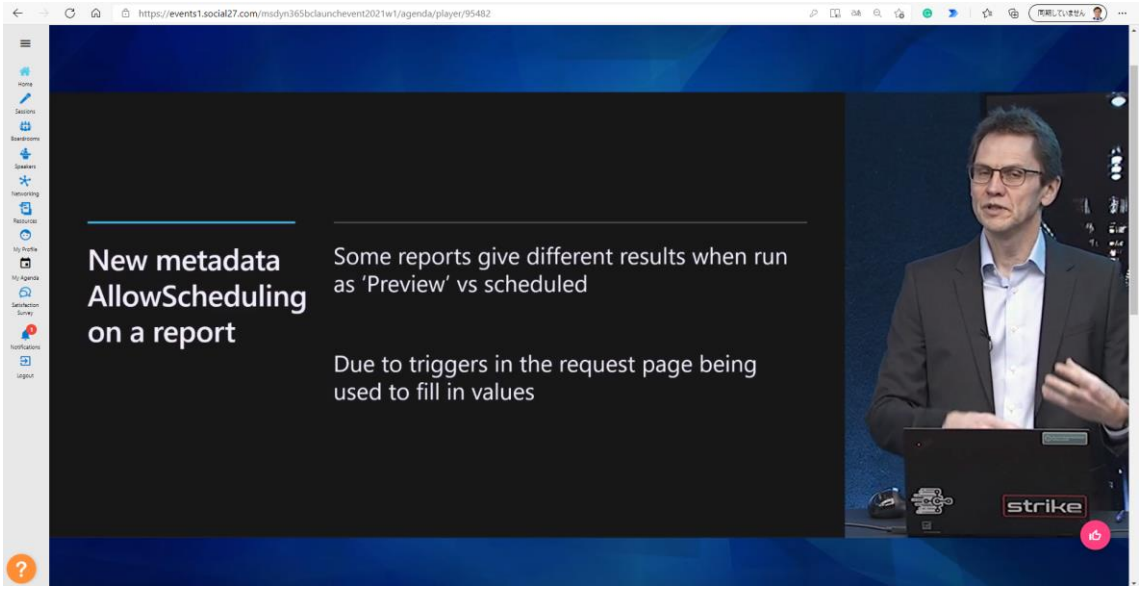
median: 43,2/6,90 = 6x

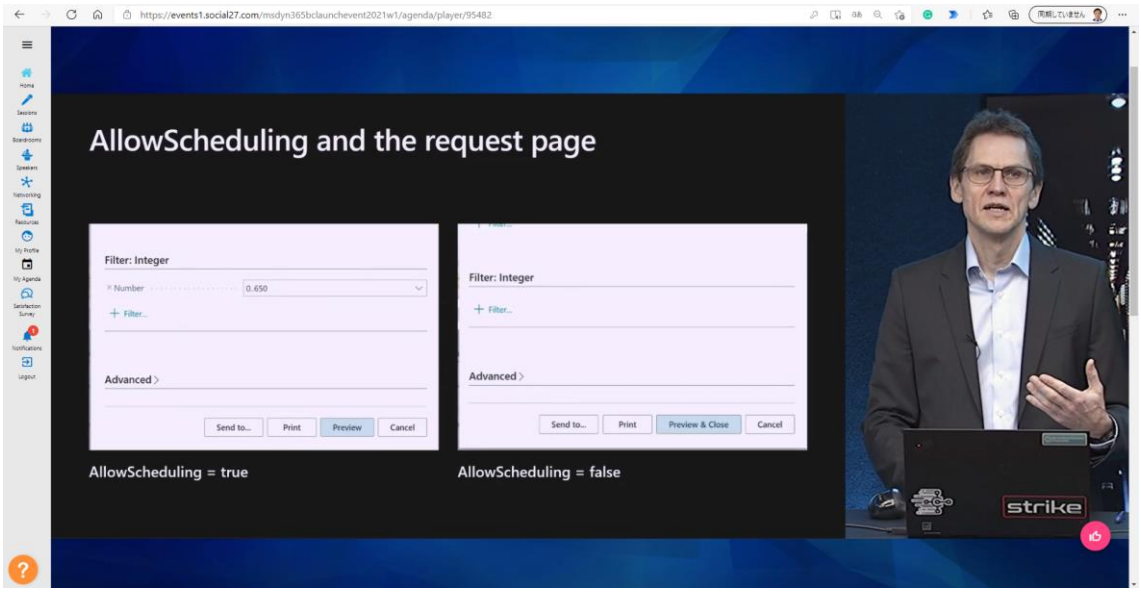
avg: 2501,51/792,86 = 3x

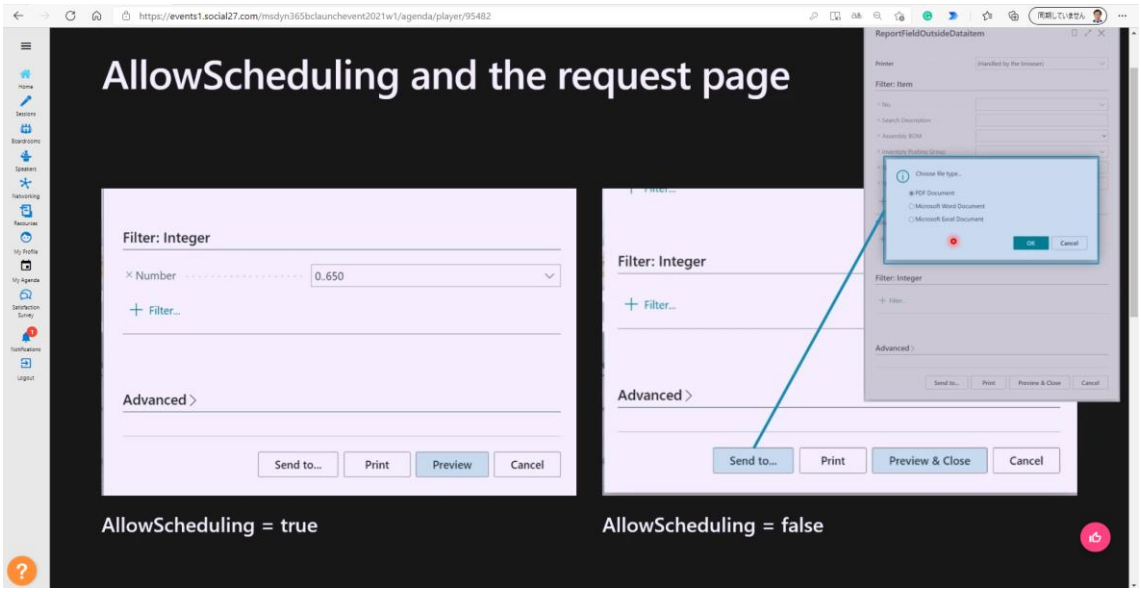
Result of analysis 2:

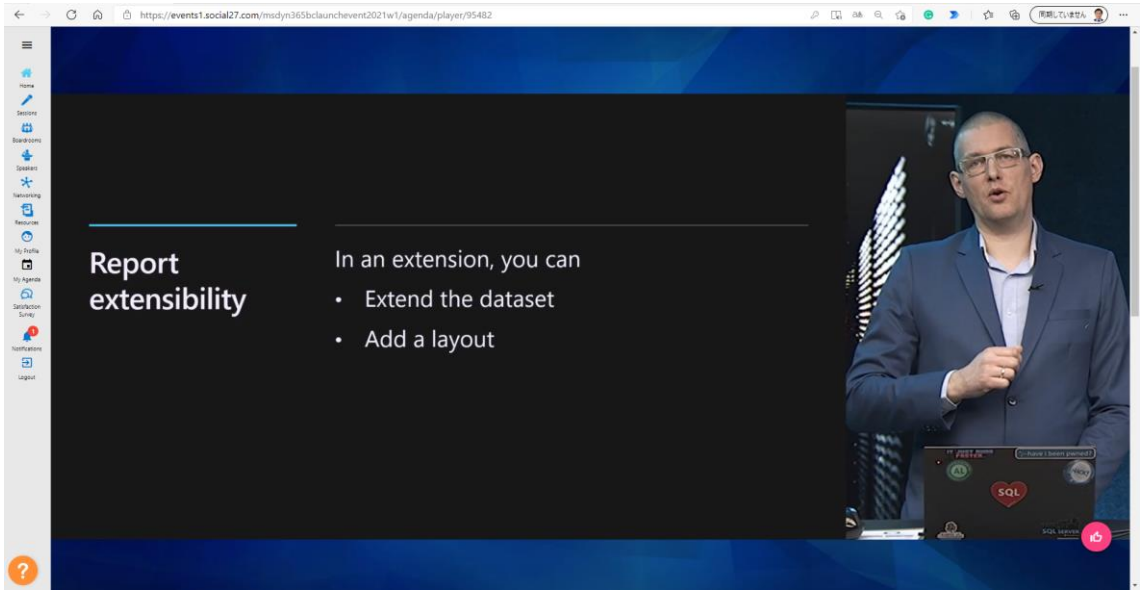
report_time_in_sec_16	report_time_in_sec_17	num_reports_16	num_reports_17	avg_sec_16	avg_sec_17	improvement
94917,62	77809,72	76598	307923	1,24	0,25	5x

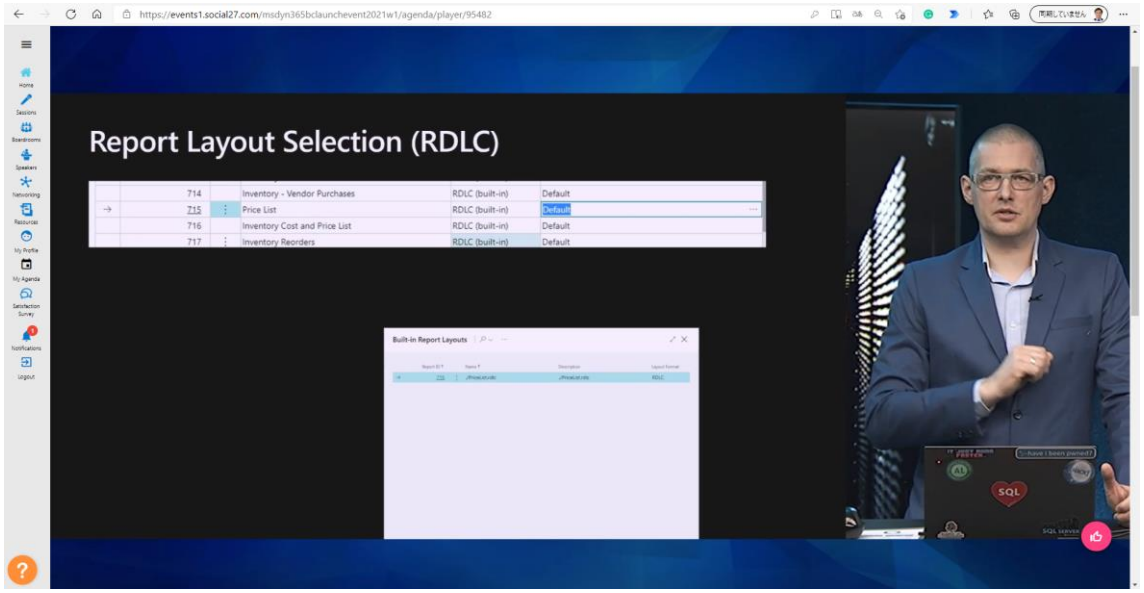

https://events1.social27.com/msdyn365bclaunchevent2021w1/agenda/player/95482
Improvements in memory consumption for large RDLC reports
Improved the streaming algorithm between server components
50% reduction of memory footprint for large reports
SQL

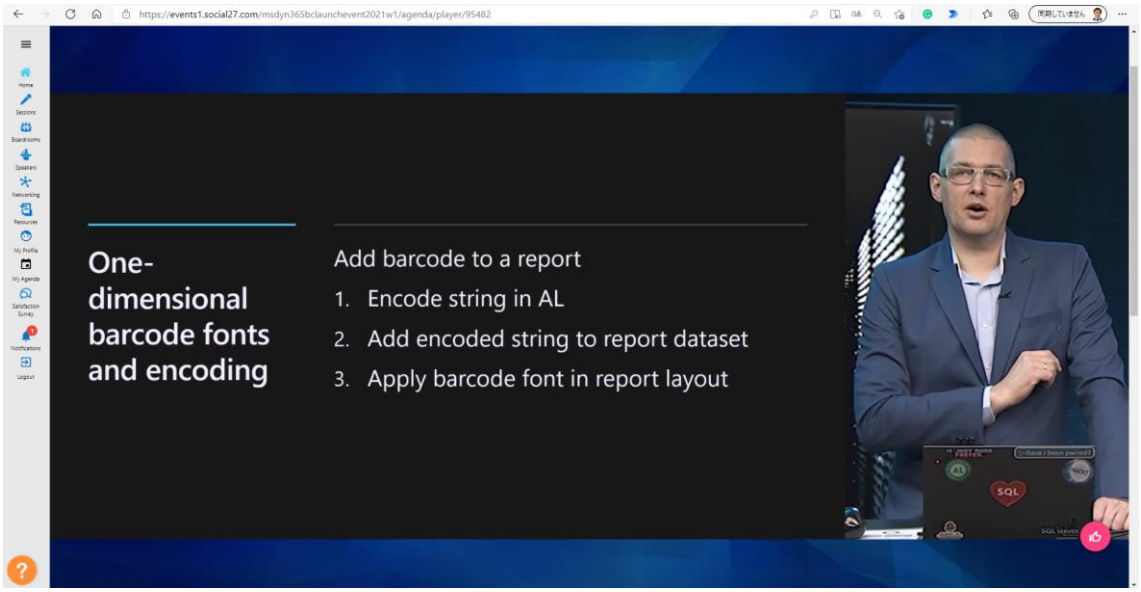

https://events1.social27.com/msdyn365bclaunchevent2021w1/agenda/player/95482
New metadata AllowScheduling on a report
Some reports give different results when run as 'Preview' vs scheduled
Due to triggers in the request page being used to fill in values
strike

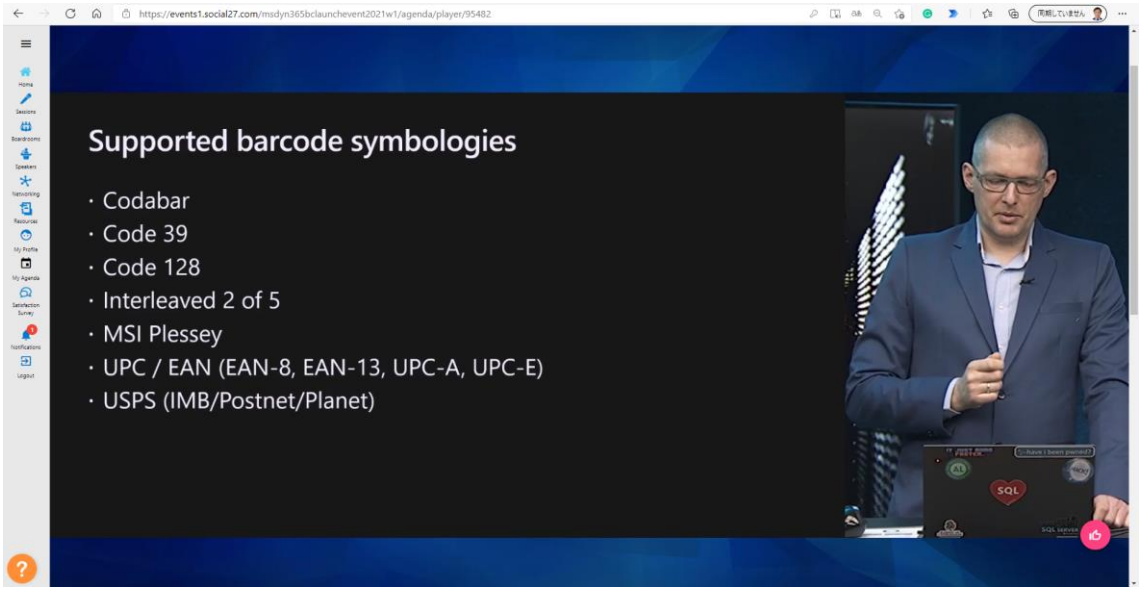

https://events1.social27.com/msdyn365bclaunchevent2021w1/agenda/player/95482
AllowScheduling and the request page
Filter: Integer
Number
0..650
Filter...
Advanced
Send to...
Print
Preview
Cancel
AllowScheduling = true
Filter: Integer
Filter...
Advanced
Send to...
Print
Preview & Close
Cancel
AllowScheduling = false
strike

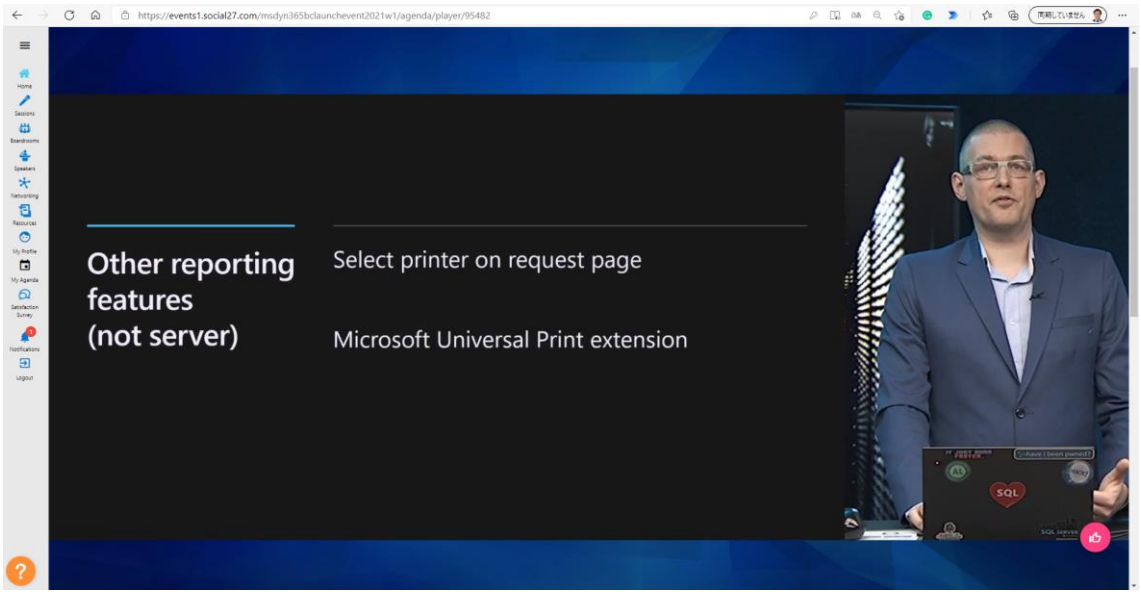

https://events1.social27.com/msdyn365bclaunchevent2021w1/agenda/player/95482
AllowScheduling and the request page
Filter: Integer
Number
0..650
Filter...
Advanced
Send to...
Print
Preview
Cancel
AllowScheduling = true
Filter: Integer
Filter...
Advanced
Send to...
Print
Preview & Close
Cancel
AllowScheduling = false

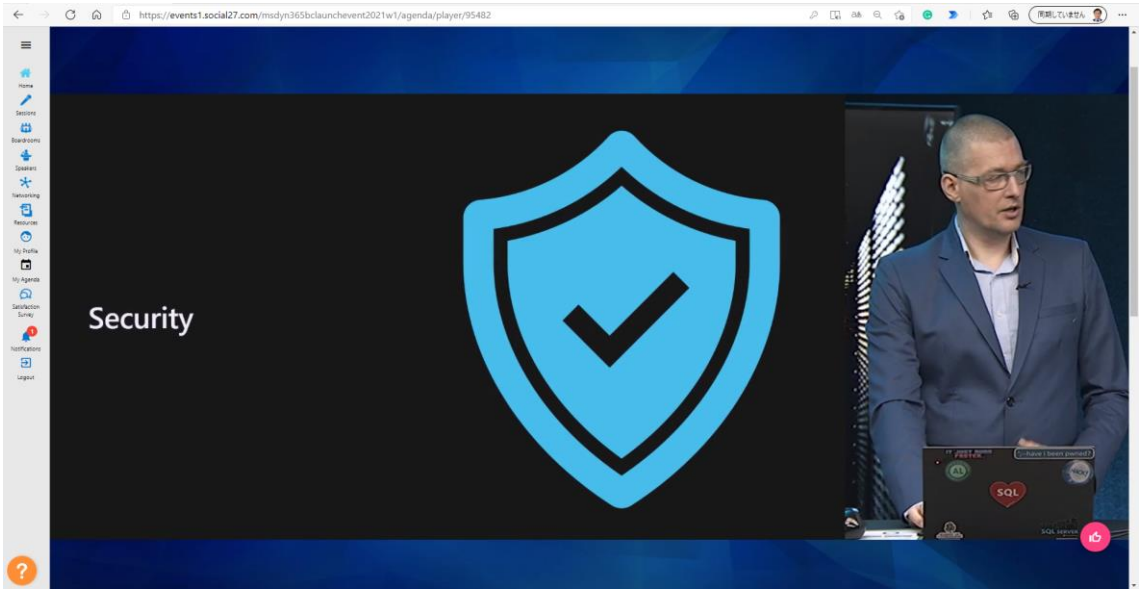

https://events1.social27.com/msdyn365bclaunchevent2021w1/agenda/player/95482
Report extensibility
In an extension, you can
• Extend the dataset
• Add a layout

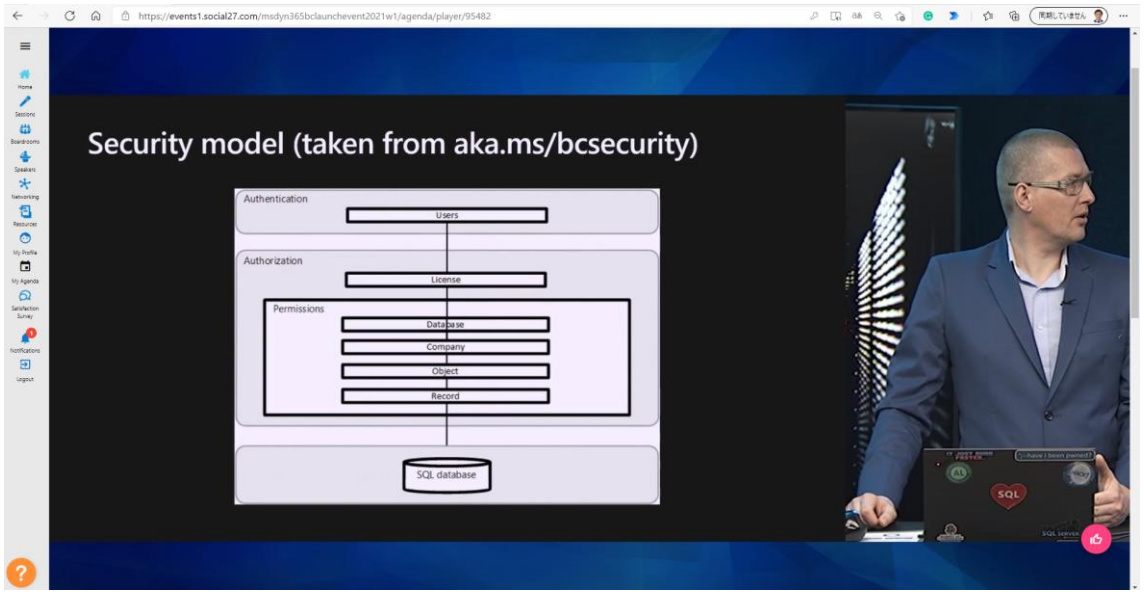

https://events1.social27.com/msdyn365bclaunchevent2021w1/agenda/player/95482
Report Layout Selection (RDLC)
714 Inventory - Vendor Purchases RDLC (built-in) Default
715 Price List RDLC (built-in) Default
716 Inventory Cost and Price List RDLC (built-in) Default
717 Inventory Reorders RDLC (built-in) Default
Built-in Report Layouts

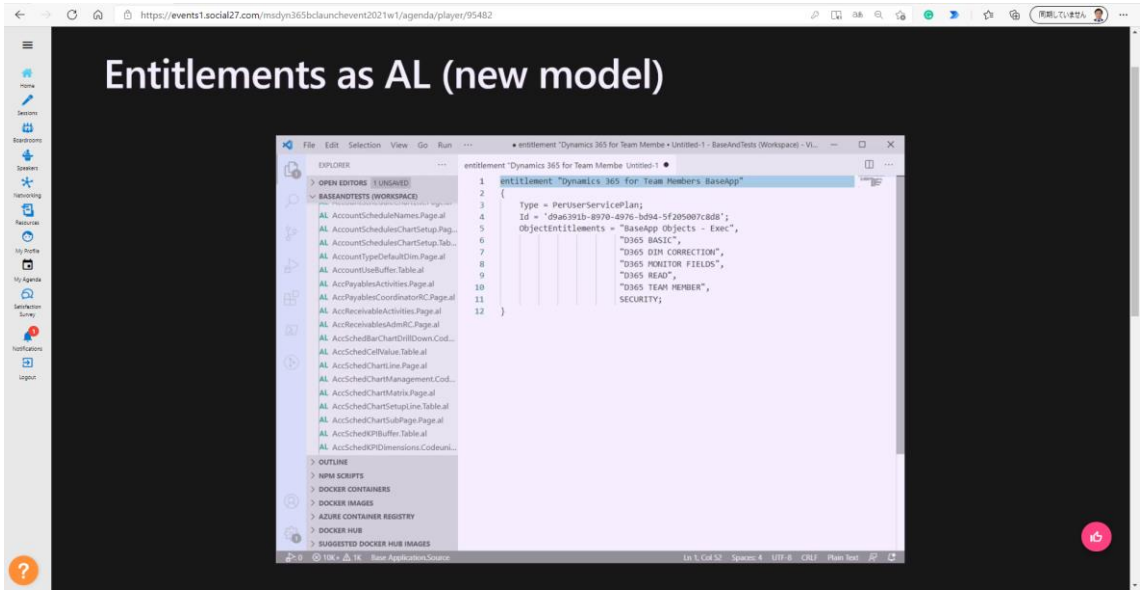

https://events1.social27.com/msdyn365bclaunchevent2021w1/agenda/player/95482
One-dimensional barcode fonts and encoding
Add barcode to a report
1. Encode string in AL
2. Add encoded string to report dataset
3. Apply barcode font in report layout

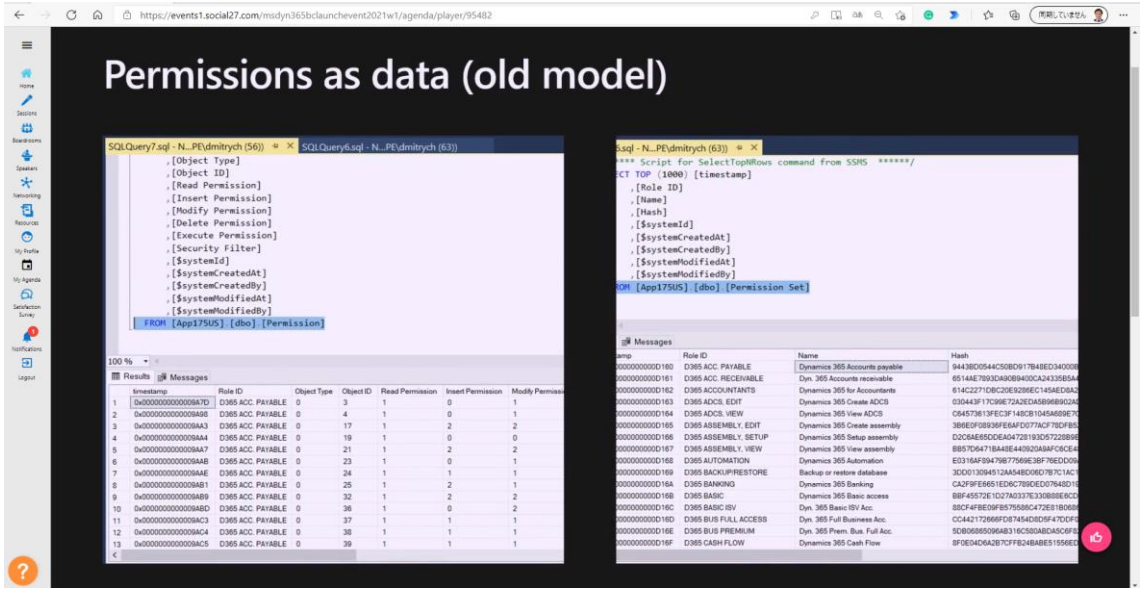

https://events1.social27.com/msdyn365bclaunchevent2021w1/agenda/player/95482
Supported barcode symbologies
· Codabar
· Code 39
· Code 128
· Interleaved 2 of 5
· MSI Plessey
· UPC / EAN (EAN-8, EAN-13, UPC-A, UPC-E)
· USPS (IMB/Postnet/Planet)

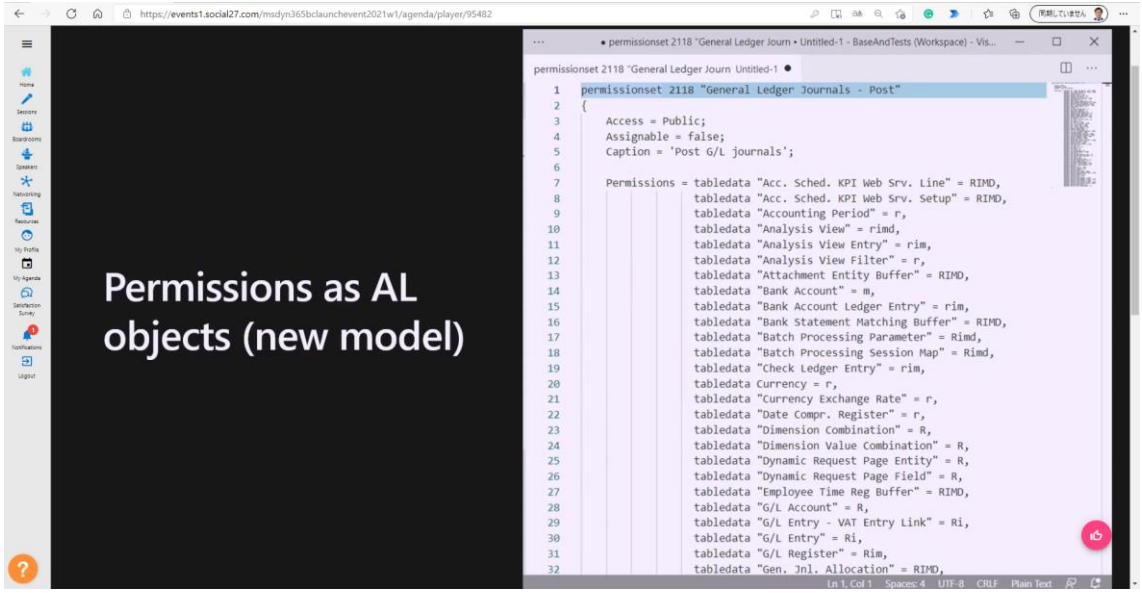

https://events1.social27.com/msdyn365bclaunchevent2021w1/agenda/player/95482
Other reporting features (not server)
Select printer on request page
Microsoft Universal Print extension

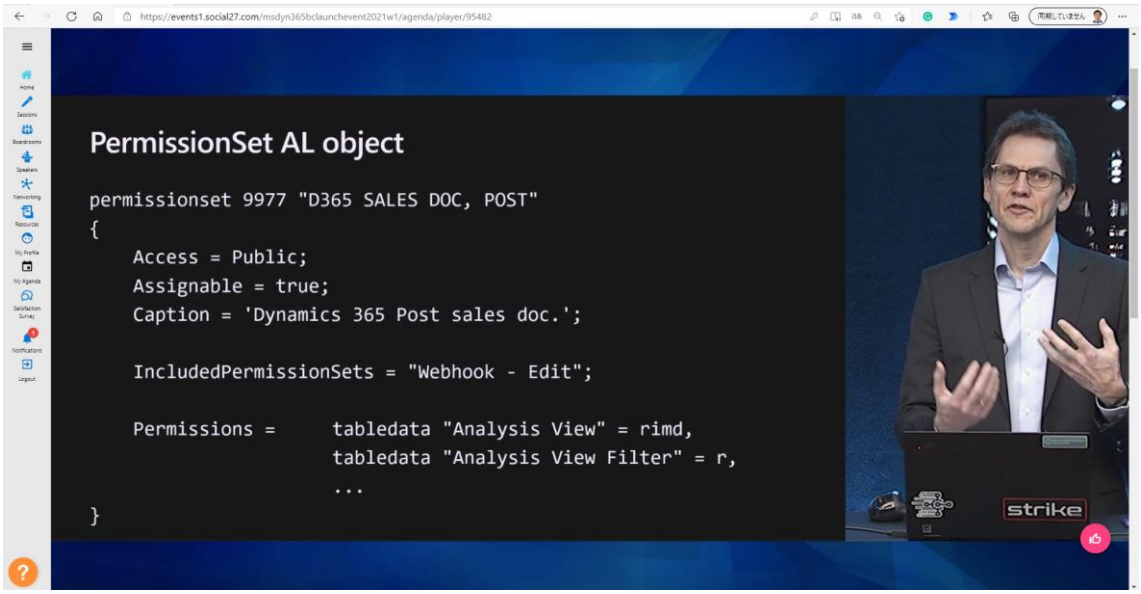

https://events1.social27.com/msdyn365bclaunchevent2021w1/agenda/player/95482
Security

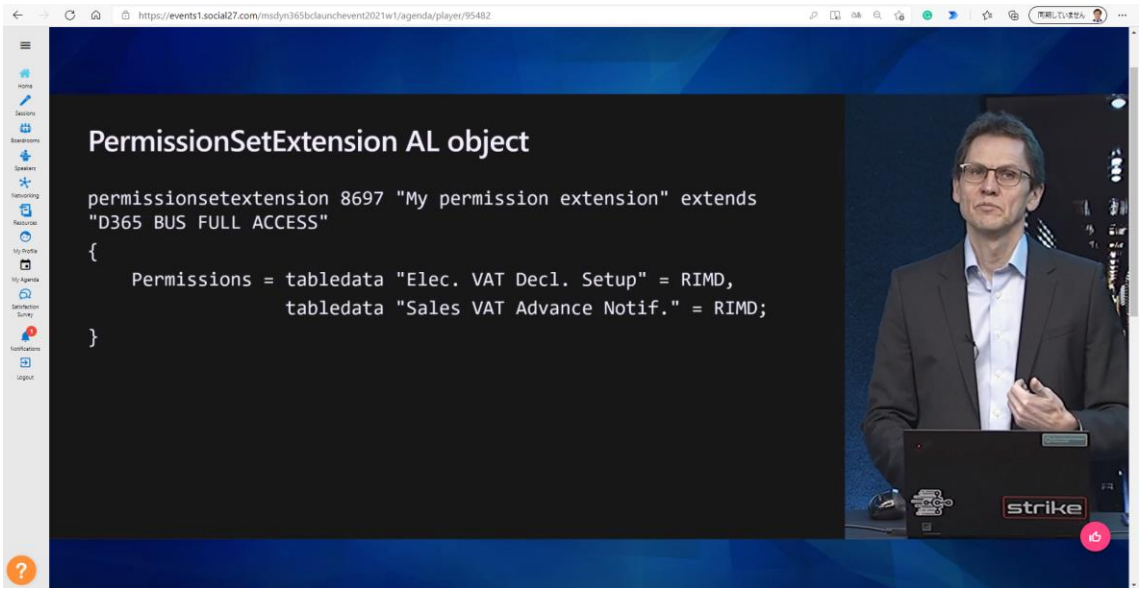

https://events1.social27.com/msdyn365bclaunchevent2021w1/agenda/player/95482
Security model (taken from aka.ms/bcsecurity)
Authentication
Users
Authorization
License
Permissions
Database
Company
Object
Record
SQL database

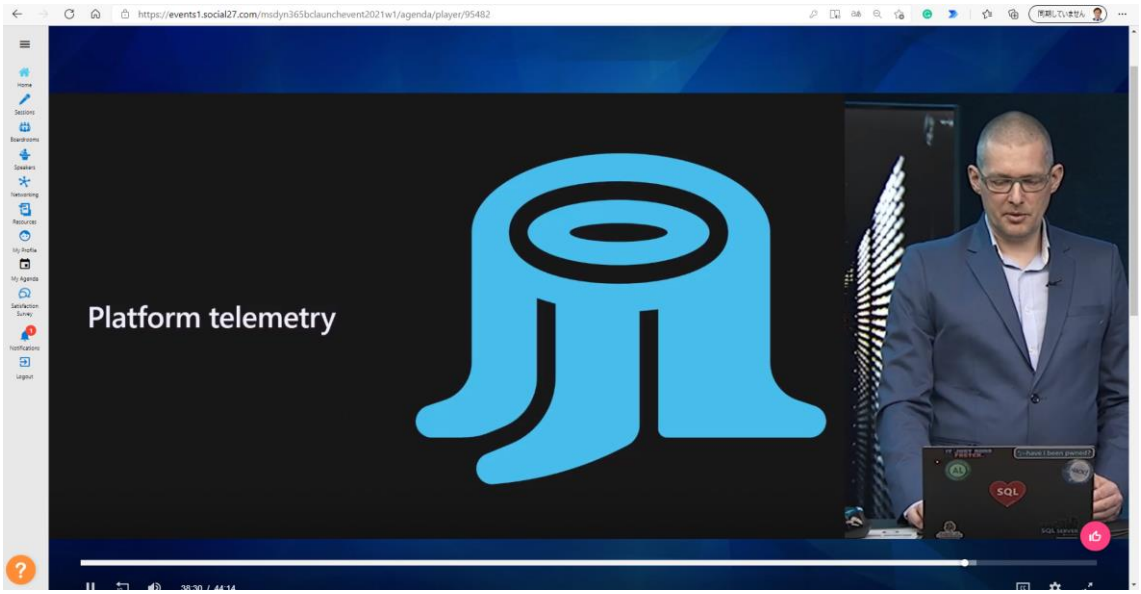

https://events1.social27.com/msdyn365bclaunchevent2021w1/agenda/player/95482
Entitlements as AL (new model)
entitlement "Dynamics 365 for Team Members BaseApp"
{
Type = PerUserServicePlan;
Id = 'd9a6391b-8970-4976-bd94-5f205007c8d8';
ObjectEntitlements = "BaseApp Objects - Exec",
"D365 BASIC",
"D365 DIM CORRECTION",
"D365 MONITOR FIELDS",
"D365 READ",
"D365 TEAM MEMBER",
SECURITY;
}

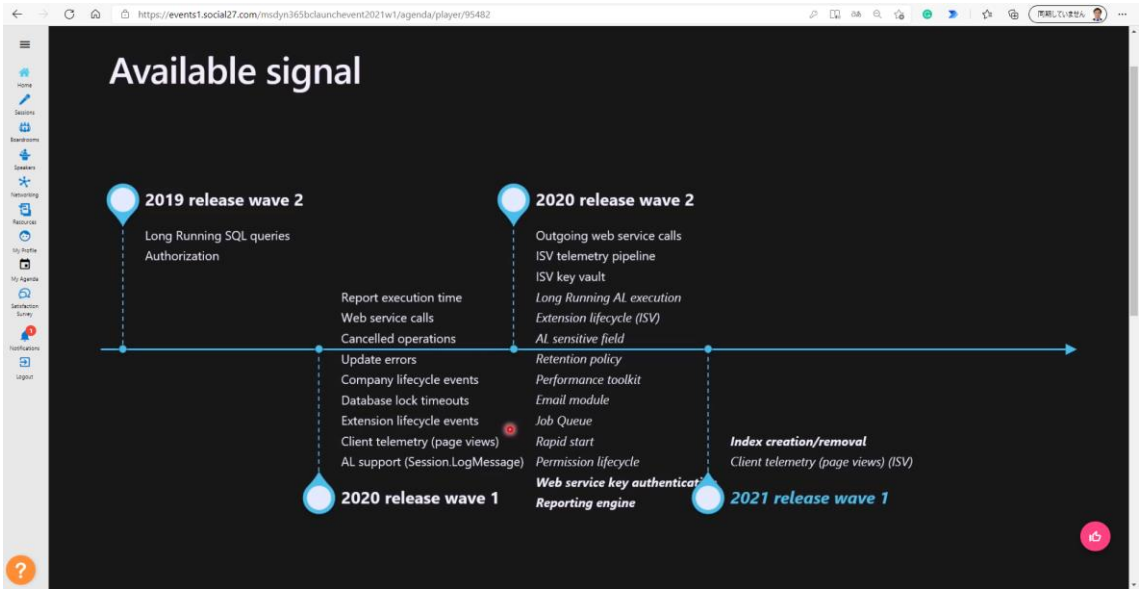

Permissions as data (old model)
SQLQuery7.sql - N...PE\dmitrych (56))
SQLQuery6.sql - N...PE\dmitrych (63))
,[Object Type]
,[Object ID]
,[Read Permission]
,[Insert Permission]
,[Modify Permission]
,[Delete Permission]
,[Execute Permission]
,[Security Filter]
,[$systemId]
,[$systemCreatedAt]
,[$systemCreatedBy]
,[$systemModifiedAt]
,[$systemModifiedBy]
FROM [App175US].[dbo].[Permission]
Results
Messages
timestamp
Role ID
Object Type
Object ID
Read Permission
Insert Permission
Modify Permiss
1 0x00000000000047D D365 ACC. PAYABLE 0 3 1 0 1
2 0x00000000000049A8 D365 ACC. PAYABLE 0 4 1 0 1
3 0x00000000000049A3 D365 ACC. PAYABLE 0 17 1 2 2
4 0x00000000000049A4 D365 ACC. PAYABLE 0 19 1 0 0
5 0x00000000000049A7 D365 ACC. PAYABLE 0 21 1 2 2
6 0x00000000000049AB D365 ACC. PAYABLE 0 23 1 0 1
7 0x00000000000049AE D365 ACC. PAYABLE 0 24 1 1 1
8 0x00000000000049B1 D365 ACC. PAYABLE 0 25 1 2 1
9 0x00000000000049B9 D365 ACC. PAYABLE 0 32 1 2 2
10 0x00000000000049BD D365 ACC. PAYABLE 0 36 1 0 2
11 0x00000000000049C3 D365 ACC. PAYABLE 0 37 1 1 1
12 0x00000000000049C4 D365 ACC. PAYABLE 0 38 1 1 1
13 0x00000000000049C5 D365 ACC. PAYABLE 0 39 1 1 1
**** Script for SelectTopNRows command from SSMS ******/
CT TOP (1000) [timestamp]
,[Role ID]
,[Name]
,[Hash]
,[$systemId]
,[$systemCreatedAt]
,[$systemCreatedBy]
,[$systemModifiedAt]
,[$systemModifiedBy]
OM [App175US].[dbo].[Permission Set]
Messages
Role ID
Name
Hash
D365 ACC. PAYABLE
Dynamics 365 Accounts payable
D365 ACC. RECEIVABLE
Dyn. 365 Accounts receivable
D365 ACCOUNTANTS
Dynamics 365 for Accountants
D365 ADCS, EDIT
Dynamics 365 Create ADCS
D365 ADCS, VIEW
Dynamics 365 View ADCS
D365 ASSEMBLY, EDIT
Dynamics 365 Create assembly
D365 ASSEMBLY, SETUP
Dynamics 365 Setup assembly
D365 ASSEMBLY, VIEW
Dynamics 365 View assembly
D365 AUTOMATION
Dynamics 365 Automation
D365 BACKUPRESTORE
Backup or restore database
D365 BANKING
Dynamics 365 Banking
D365 BASIC
Dynamics 365 Basic access
D365 BASIC ISV
Dyn. 365 Basic ISV Acc.
D365 BUS FULL ACCESS
Dyn. 365 Full Business Acc.
D365 BUS PREMIUM
Dyn. 365 Prem. Bus. Full Acc.
D365 CASH FLOW
Dynamics 365 Cash Flow

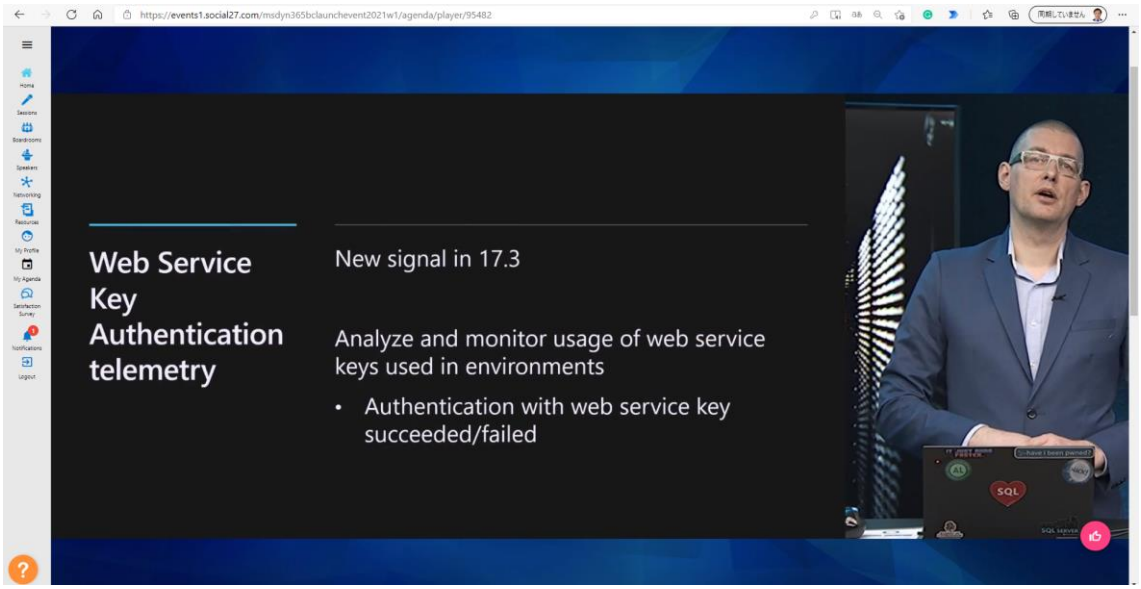

Permissions as AL objects (new model)
permissionset 2118 "General Ledger Journ • Untitled-1 - BaseAndTests (Workspace) - Vis...
permissionset 2118 "General Ledger Journ Untitled-1
permissionset 2118 "General Ledger Journals - Post"
{
Access = Public;
Assignable = false;
Caption = 'Post G/L journals';
Permissions = tabledata "Acc. Sched. KPI Web Srv. Line" = RIMD,
tabledata "Acc. Sched. KPI Web Srv. Setup" = RIMD,
tabledata "Accounting Period" = r,
tabledata "Analysis View" = rimd,
tabledata "Analysis View Entry" = rim,
tabledata "Analysis View Filter" = r,
tabledata "Attachment Entity Buffer" = RIMD,
tabledata "Bank Account" = m,
tabledata "Bank Account Ledger Entry" = rim,
tabledata "Bank Statement Matching Buffer" = RIMD,
tabledata "Batch Processing Parameter" = Rimd,
tabledata "Batch Processing Session Map" = Rimd,
tabledata "Check Ledger Entry" = rim,
tabledata Currency = r,
tabledata "Currency Exchange Rate" = r,
tabledata "Date Compr. Register" = r,
tabledata "Dimension Combination" = R,
tabledata "Dimension Value Combination" = R,
tabledata "Dynamic Request Page Entity" = R,
tabledata "Dynamic Request Page Field" = R,
tabledata "Employee Time Reg Buffer" = RIMD,
tabledata "G/L Account" = R,
tabledata "G/L Entry - VAT Entry Link" = Ri,
tabledata "G/L Entry" = Ri,
tabledata "G/L Register" = Rim,
tabledata "Gen. Jnl. Allocation" = RIMD,
Ln 1, Col 1
Spaces: 4
UTF-8
CRLF
Plain Text

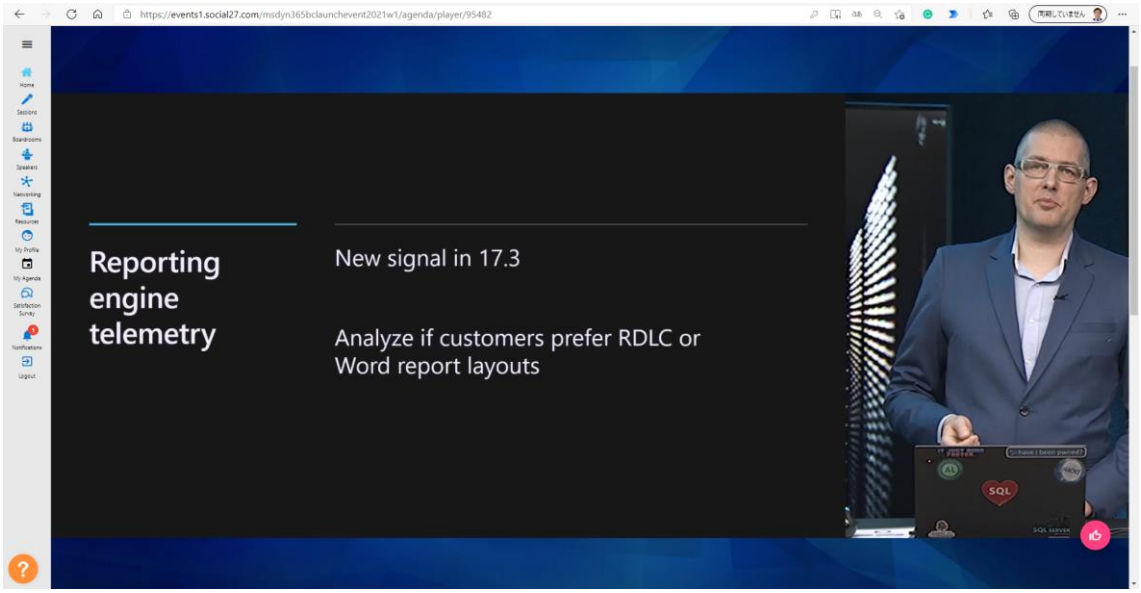

https://events1.social27.com/msdyn365bclaunchevent2021w1/agenda/player/95482
PermissionSet AL object
permissionset 9977 "D365 SALES DOC, POST"
{
Access = Public;
Assignable = true;
Caption = 'Dynamics 365 Post sales doc.';
IncludedPermissionSets = "Webhook - Edit";
Permissions = tabledata "Analysis View" = rimd,
tabledata "Analysis View Filter" = r,
...
}
strike

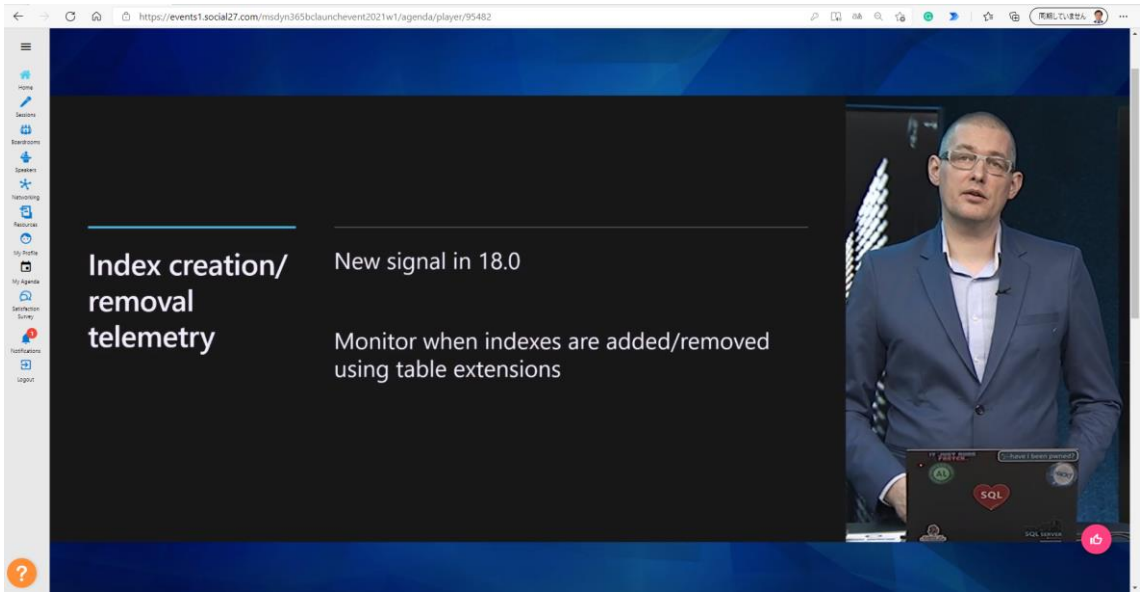

https://events1.social27.com/msdyn365bclaunchevent2021w1/agenda/player/95482
PermissionSetExtension AL object
permissionsetextension 8697 "My permission extension" extends
"D365 BUS FULL ACCESS"
{
Permissions = tabledata "Elec. VAT Decl. Setup" = RIMD,
tabledata "Sales VAT Advance Notif." = RIMD;
}
strike

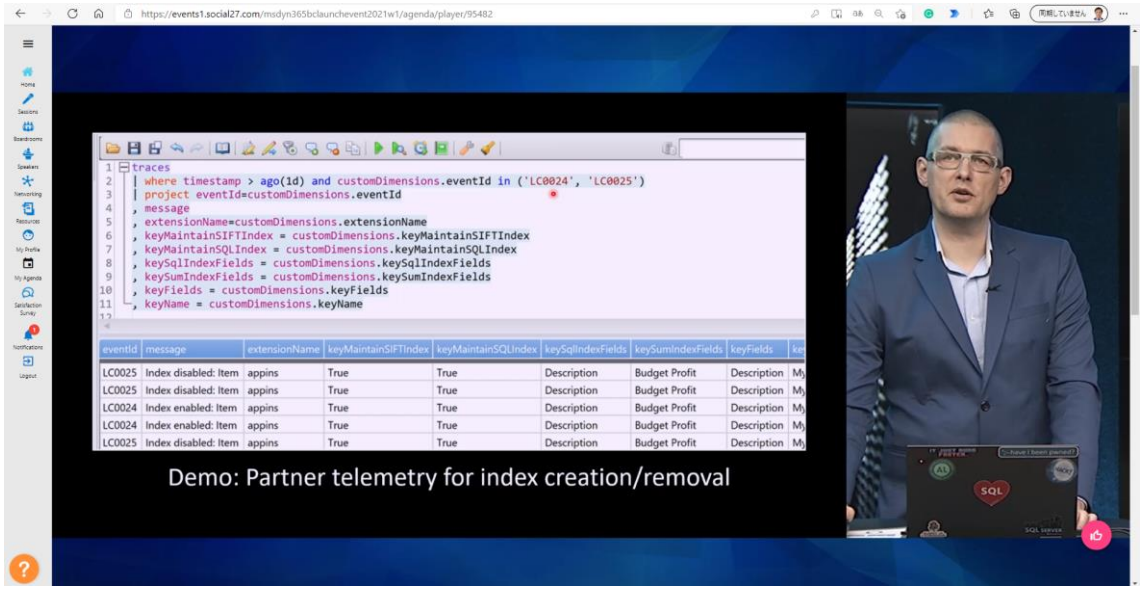

Platform telemetry

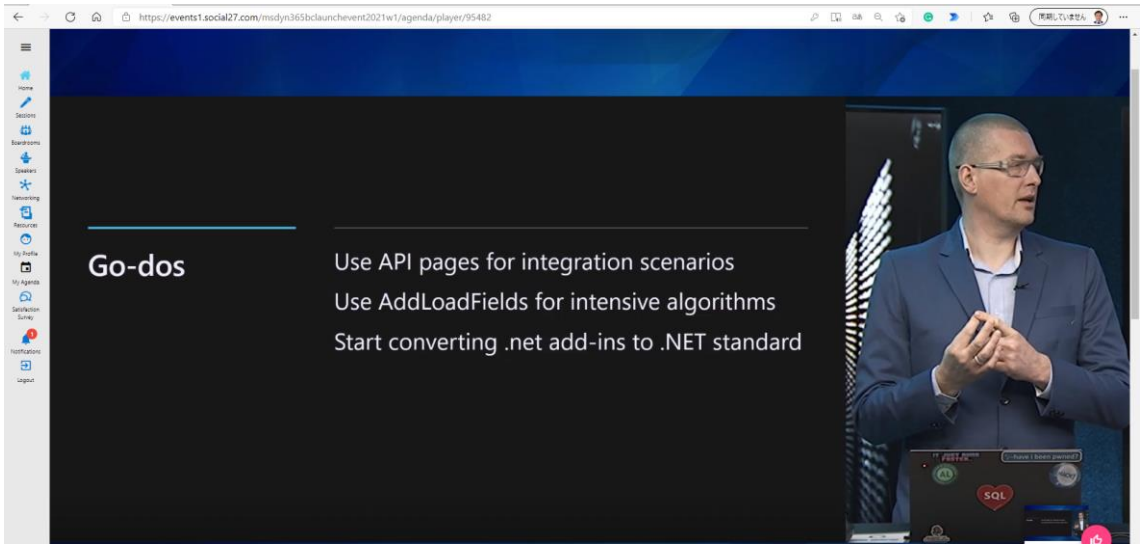

Available signal
2019 release wave 2
Long Running SQL queries
Authorization
2020 release wave 1
Report execution time
Web service calls
Cancelled operations
Update errors
Company lifecycle events
Database lock timeouts
Extension lifecycle events
Client telemetry (page views)
AL support (Session.LogMessage)
2020 release wave 2
Outgoing web service calls
ISV telemetry pipeline
ISV key vault
Long Running AL execution
Extension lifecycle (ISV)
AL sensitive field
Retention policy
Performance toolkit
Email module
Job Queue
Rapid start
Permission lifecycle
Web service key authentication
Reporting engine
2021 release wave 1
Index creation/removal
Client telemetry (page views) (ISV)

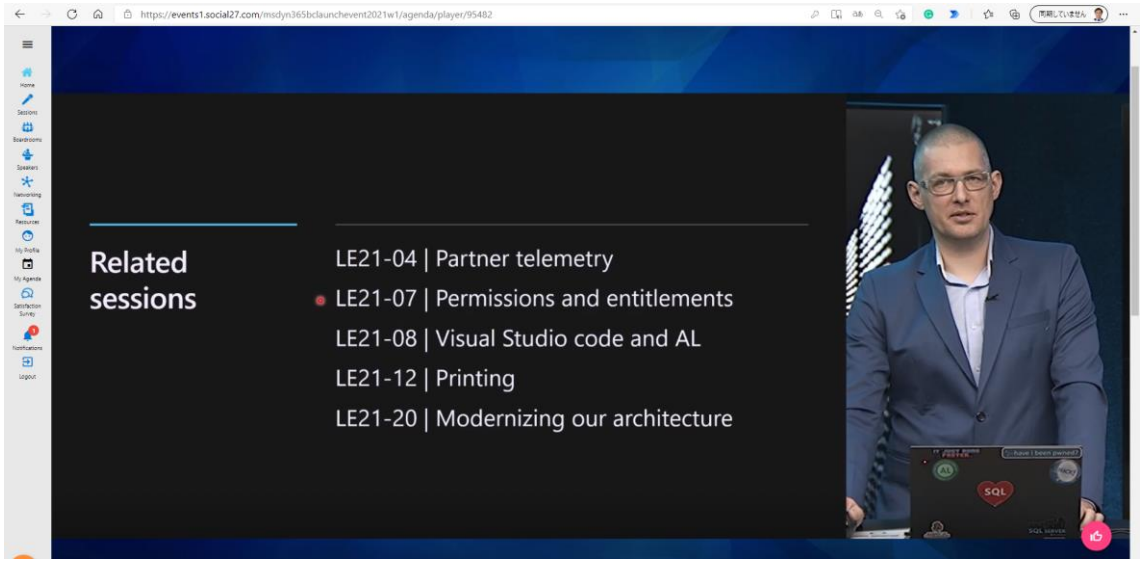

Web Service Key Authentication telemetry
New signal in 17.3
Analyze and monitor usage of web service keys used in environments
• Authentication with web service key succeeded/failed


Reporting engine telemetry
New signal in 17.3
Analyze if customers prefer RDLC or Word report layouts


Index creation/ removal telemetry
New signal in 18.0
Monitor when indexes are added/removed using table extensions


traces
| where timestamp > ago(1d) and customDimensions.eventId in ('LC0024', 'LC0025')
| project eventId=customDimensions.eventId
, message
, extensionName=customDimensions.extensionName
, keyMaintainSIFTIndex = customDimensions.keyMaintainSIFTIndex
, keyMaintainSQLIndex = customDimensions.keyMaintainSQLIndex
, keySqlIndexFields = customDimensions.keySqlIndexFields
, keySumIndexFields = customDimensions.keySumIndexFields
, keyFields = customDimensions.keyFields
, keyName = customDimensions.keyName
eventId message extensionName keyMaintainSIFTIndex keyMaintainSQLIndex keySqlIndexFields keySumIndexFields keyFields
LC0025 Index disabled: Item appins True True Description Budget Profit Description
LC0025 Index disabled: Item appins True True Description Budget Profit Description
LC0024 Index enabled: Item appins True True Description Budget Profit Description
LC0024 Index enabled: Item appins True True Description Budget Profit Description
LC0025 Index disabled: Item appins True True Description Budget Profit Description
Demo: Partner telemetry for index creation/removal


https://events1.social27.com/msdyn365bclaunchevent2021w1/agenda/player/95482
Home
Sessions
Boardrooms
Speakers
Networking
Resources
My Profile
My Agenda
Satisfaction Survey
Notifications
Logout
Go-dos
Use API pages for integration scenarios
Use AddLoadFields for intensive algorithms
Start converting .net add-ins to .NET standard


https://events1.social27.com/msdyn365bclaunchevent2021w1/agenda/player/95482
Home
Sessions
Boardrooms
Speakers
Networking
Resources
My Profile
My Agenda
Satisfaction Survey
Notifications
Logout
Related sessions
LE21-04 | Partner telemetry
LE21-07 | Permissions and entitlements
LE21-08 | Visual Studio code and AL
LE21-12 | Printing
LE21-20 | Modernizing our architecture