

Enhance Sage X3 performance and scalability

Clustered index presetting for SQL Server

*Sage X3 V12
Release 2021 R2*

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This purpose of this document is to detail the clustered index presetting that is been delivered in version 2021 R2.

Your feedback and questions are important

Your feedback is valuable. If you have questions not covered in this document, please contact Sage Customer Support.

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Default clustered index setting

Description of the feature

SQL server allows to create a clustered index per table. When a clustered index is used, the data is stored physically in the order of this index. This has the following advantages:

- Reduce read operations:
Indeed, instead of reading the index and then the associated data, SQL Server engine will read the index + data with one read operation.
- Reduce sort operations:
Since X3 sorts all queries using the default index as order by, and clustered index being already sorted, using them will no longer require to use tempdb to sort data.
- Enhance lock granularity:
It is difficult, and sometimes even impossible to acquire a row lock on tables that are dense (data types with small lengths, few fields) as thousands of records can be stored on a single page. It means that some tables like AVALNUM will almost always acquire a page lock instead of a row lock, or even acquire several pages locks to get data spread across 2 pages. This creates contentions. If the correct index is clustered, data is organized so contention will be reduced to allow a row lock and less pages locked.

A well-chosen clustered index can enhance greatly performance and scalability of a system. It might make your system behaving less well if inaccurately chosen. Choosing the right index depends on customer data: how the data is distributed, what are the most frequent queries. Using database statistics usually helps to define the right policy. In X3 table dictionary, you can set-up a default clustered index that will remain even if the table is updated through a standard upgrade. But it is also possible to define a default standard clustered index that will be created if no local set-up has set-up another one.

Until release 2020 R4, Sage policy was to let the customers optimizing locally the SQL server database by setting their own clustered indexes.

But there are cases where we can accurately determine which cluster index will be efficient, regardless of the customer data. The dictionary and supervisor tables, on which we know the type of queries and updates that are done, can benefit from standard clustered indexes. Doing so will increase the performance of some standard time-consuming processes such as:

- patching and upgrading (which updates massively some dictionary tables)
- document number assignments (where counters tables are updated concurrently)
- parameter values access.

The Center of Excellence has over the time acquired feedbacks of big customers facing performance issues and lock escalations solved by clustered indexes, and we decided to deliver some default clustered indexes where there is no doubt about their efficiency.

As delivering clustered indexes revalidates the table, there is an initial cost during the patch application. But afterwards, there are huge benefits in some consuming operations (such as the patching or a folder revalidation).



If you have a big number of sites and / or users, the AFCTFCY can have a big number of records, and its validation can therefore need a significant time.

The release 2021 R2 introduces a second list of default clustered indexes, presented below:

Clustered indexes delivered in 2021 R2

Table code	Table title	Index code	Index descriptor
AFCTFCY	Site profile function	AFF0	FCY+PRFCOD+FNC
AABREV	Abbreviation	AAB0	ABREV
ABIDATMRT	Datamart	ABM0	COD
ABIDATWRH	Data warehouse	ABW0	COD
ABIDIM	Dimensions	ABIO	CODDIM
ABIDIMFLD	Dimensions (fields)	ABJO	CODDIM+NUMDIM+FLDDIM
ABIHIERA	Hierarchies	AHH0	COD
ABIPRFUSR	BI user profile	AIU0	PRF
ABIREGDES	Synchronization rules (dest)	ABY0	CODREG+NUMDES
ABIREGORG	Synchronisation rules	ABV0	CODREG
ABIREPORT	Business objects reports	ABO0	COD
ABIREPORTD	Business objects reports	ABQ0	COD+LIG
ABIREPORTID	Business objects reports	ABOID0	COD+DATAW+LAN
ABITABAGG	Fact table (aggregates)	ABE0	CODABF+NUMAGG+CODAGG
ABITABDAT	Fact tables	ABF0	CODABF
ABITABFLD	Fact table (fields)	ABZ0	CODABF+NUMFLD+CODFLD
ABITABIND	Fact table (index)	ABX0	CODABF+NUMIND
ABITABLNK	Fact table (links)	ABK0	CODABF+NUMLNK
ABITRAUNV	Report translation	ATV0	ABM+RAPORT+LANTRA+TEXTE
ABLBSYS	Graphic components	ASB0	CAT+CODFIC
ACALCUL	Calculator history	AKL0	USR+NUM
ACHANGE	Key change set up	ACG0	COD+LIG
ACLBSYS	Graphic components	ASA0	CAT+CODFIC
ACODIF	Section coding	ACO0	ABB
ACONSULT	Inquiries	ACN0	COD
ACTCODPAR	Action parameters	CODPAR	CODPAR
ACTION	Action dictionary	ACTION	ACTION
ACTL	Control tables	ACLO	CTL
ACTLDEV	Reserved brackets	ACD0	COD
ACTPAR	Action parameters	NOPAR	ACTION+NOPAR
ADELETE	Deletion	ADL0	NUM
ADELIVER	Deliverable	ADLV0	COD
ADELIVERB	Deliverable	ADLB0	COD+CODFNC+CODBDG
ADELIVERD	Deliverable	ADLD0	COD+CODACT
ADELIVERL	Deliverable	ADLL0	COD+FNCLIM

Table code	Table title	Index code	Index descriptor
ADELIVERO	Deliverable	ADLO0	COD+TABCOD+TABKEY
ADELIVERP	Deliverable	ADLP0	COD+PARAM+CLEPARAM
ADELIVERR	Deliverable	ADLR0	COD+CODASW+COBBDG
ADELIVERT	Deliverable	ADLT0	COD+CODSES+CODDVC
ADIMENSION	Sizing elements	ADM0	COD
ADOCBLB	Documentation (linked files)	ADB0	LAN+TYP+COD+LEV+SUBLEV+LIG
ADOCCLB	Documentation (texts)	ADH0	LAN+TYP+COD+LEV+SUBLEV
ADOCFLD	Field documentation	ADZ0	LAN+MOTCLE
ADOCFNC	Documentation links	ADF0	TYP+COD+NUM
ADOCUMENT	Documentation	ADO0	LAN+TYP+COD+LEV+SUBLEV
AELT	Web elements dictionary	ELT0	ELTTYP+ELT+ELTLAN
AELTLINK	Web element links	ELK0	ELTTYP+ELT+ELTTYPLK+ELTLK
AENCHAIN	Import/export sequence	CODE	CODE+NUMLIG
AENTREE	Entry points	APE0	TRTSTD+OBJ+TRTSPE
AEXPV3	Table setup/import	AEV0	CODE
AEXPV3D	Table setup/import	AED0	CODE+LIG
AFCTPRF	Functional authorization	AFPO	PRFCOD+FNC+FCYGRU
AFORDIM	Sizing formulas	AFO0	CODFIC
AGDPRMAI	Sizing formulas	AGMAI0	NUMREQ
AGDPRPHONE	Sizing formulas	AGPHO0	NUMREQ
AGDPRSETTING	GDPR setting	AGS0	CODE
AGDPRVCR	GDPR search	AGVCR0	UID+CODATY+CODFIC+CODE+VCRKEY
AGRPCPY	Company groupings	AGC0	GRP+CPY
AGRPFCY	Site groupings	AGF0	GRP
AHISTO	History/purge	AHIO	COD
AHISTOD	History/purge	AHD0	COD+LIG
AINDEX	Specific index	ANX0	LIG
AITRLNK	Interactive components	AIT0	CODLNK
ALINK	Link explorer	ALI0	USRCOD+SRCOBJ+SRCKEY+DSTOBJ+DSTKEY
ALISTEC	Graphical query tool	ALC0	COD
ALISTED	Query tool	ALD0	COD+LIG
ALISTEH	Query tool	ALH0	COD