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| Erik Darling says:  [SQL Server 2016: Availability Groups, Direct Seeding, and You.](http://brentozar.us2.list-manage.com/track/click?u=9082566fb63d87be35c0662bc&id=2b417416a0&e=b137e91a2b)  **One of my least favorite things about Availability Groups**  [T-SQL Tuesday](http://brentozar.us2.list-manage1.com/track/click?u=9082566fb63d87be35c0662bc&id=8fd7ed2215&e=b137e91a2b)  Well, really, this goes for Mirroring and Log Shipping, too. Don’t think you’re special just because you don’t have a half dozen patches and bug fixes per CU. Hah. Showed you!  Where was I? Oh yeah. I really didn’t like the backup and restore part.  **You find yourself in an awkward position**  When you’re dealing with large databases, you can either take an out of band COPY\_ONLY backup, or wait for a weekly/daily full. But, if you’re dealing with a lot of large databases, chances are that daily fulls are out of the question. By the time a full finishes, you’re looking at a Whole Mess O’ Log Restores, or trying to work a differential into the mix. You may also find yourself having to pause backups during this time, so your restores aren’t worthless when you go to initialize things.  You sorta-kinda got some relief from this with Availability Groups, but not much. You could either take your backups as part of the Wizarding process (like Log Shipping), figure it out yourself (like Mirroring), or defer it. That is, until SQL Server 2016.  **Enter Direct Seeding**  This isn’t in the GUI (yet?), so don’t open it up and expect magic mushrooms and smiley-face pills to pour out at you on a rainbow. If you want to use Direct Seeding, you’ll have to script things. But it’s pretty easy! If I can do it, anyone can.  I’m not going to go through setting up a Domain Controller or Clustering or installing SQL here. I assume you’re already lonely enough to know how to do all that.  The script itself is simple, though. I’m going to create my Availability Group for my three lovingly named test databases, and add a listener. The important part to notice is SEEDING\_MODE = AUTOMATIC. This will create an Availability Group called SQLAG01, with one synchronous, and one asynchronous Replica.  [Critical sensitive data.](http://brentozar.us2.list-manage1.com/track/click?u=9082566fb63d87be35c0662bc&id=d859d8770c&e=b137e91a2b)  Critical sensitive data.  CREATE AVAILABILITY GROUP [SQLAG01]  FOR DATABASE [Crap1], [Crap2], [Crap3]  REPLICA ON  N'SQLVM01\AGNODE1' WITH (ENDPOINT\_URL = N'TCP://SQLVM01.darling.com:5022',  FAILOVER\_MODE = AUTOMATIC,  AVAILABILITY\_MODE = SYNCHRONOUS\_COMMIT,  BACKUP\_PRIORITY = 50,  SECONDARY\_ROLE(ALLOW\_CONNECTIONS = READ\_ONLY),  SEEDING\_MODE = AUTOMATIC),  N'SQLVM02\AGNODE2' WITH (ENDPOINT\_URL = N'TCP://SQLVM02.darling.com:5022',  FAILOVER\_MODE = AUTOMATIC,  AVAILABILITY\_MODE = SYNCHRONOUS\_COMMIT,  BACKUP\_PRIORITY = 50,  SECONDARY\_ROLE(ALLOW\_CONNECTIONS = READ\_ONLY),  SEEDING\_MODE = AUTOMATIC),  N'SQLVM03\AGNODE3' WITH (ENDPOINT\_URL = N'TCP://SQLVM03.darling.com:5022',  FAILOVER\_MODE = MANUAL,  AVAILABILITY\_MODE = ASYNCHRONOUS\_COMMIT,  BACKUP\_PRIORITY = 50,  SECONDARY\_ROLE(ALLOW\_CONNECTIONS = READ\_ONLY),  SEEDING\_MODE = AUTOMATIC);  GO  ALTER AVAILABILITY GROUP [SQLAG01]  ADD LISTENER N'SQLAGLISTEN01' (  WITH IP ((N'123.123.123.13', N'255.255.255.0')), PORT=6000);  GO    [Empty inside.](http://brentozar.us2.list-manage.com/track/click?u=9082566fb63d87be35c0662bc&id=8cf190f60f&e=b137e91a2b)  Empty inside.  The next thing we’ll have to do is join our Replicas to the AG with the GRANT CREATE ANY DATABASE permission. I prefer to do this in SQLCMD mode so I don’t have to change connections manually.  [No more apple strudel!](http://brentozar.us2.list-manage.com/track/click?u=9082566fb63d87be35c0662bc&id=56bc2c9e46&e=b137e91a2b)  No more apple strudel!  :CONNECT SQLVM02\AGNODE2  ALTER AVAILABILITY GROUP [SQLAG01] JOIN  GO  ALTER AVAILABILITY GROUP [SQLAG01] GRANT CREATE ANY DATABASE  GO  :CONNECT SQLVM03\AGNODE3  ALTER AVAILABILITY GROUP [SQLAG01] JOIN  GO  ALTER AVAILABILITY GROUP [SQLAG01] GRANT CREATE ANY DATABASE  GO  [DO MY BIDDING!](http://brentozar.us2.list-manage.com/track/click?u=9082566fb63d87be35c0662bc&id=47b570b7d6&e=b137e91a2b)  DO MY BIDDING!      **Shocked, SHOCKED**  And uh, that was it. I had my AG, and all the databases showed up on my two Replicas. Apart from how cool it is, it’s sort of anti-climactic that it’s so simple. People who set their first AG up using this will take for granted how simple this is.  [BRB waiting for something horrible to happen.](http://brentozar.us2.list-manage.com/track/click?u=9082566fb63d87be35c0662bc&id=ee4b500d28&e=b137e91a2b)  BRB waiting for something horrible to happen.    What’s really nice here is that when you add new databases, all you have to do is add them to the Availability Group, and they’ll start seeding over to the other Replica(s). I need to do some more playing with this feature. I have questions that I’ll get into in another post in the future.  CREATE DATABASE [Crap4]  GO  ALTER AVAILABILITY GROUP SQLAG01  ADD DATABASE [Crap4];  GO    These are empty test databases, so everything is immediate. If you want to find out how long it will take to Direct Seed really big databases, tune in to [DBA Days Part 2](http://brentozar.us2.list-manage.com/track/click?u=9082566fb63d87be35c0662bc&id=2194e77218&e=b137e91a2b). If anyone makes a SQL/Sequel joke in the comments, I will publicly shame you.    [Healthy green colors!](http://brentozar.us2.list-manage.com/track/click?u=9082566fb63d87be35c0662bc&id=050404a1ea&e=b137e91a2b)  Healthy green colors!    Thanks for reading!  **Brent says:** wanna see this capability get added to SSMS for easier replica setup? [Upvote this Connect item.](http://brentozar.us2.list-manage.com/track/click?u=9082566fb63d87be35c0662bc&id=e46ea03d33&e=b137e91a2b)  *Wanna learn from us, but can't travel?* [*Our in-person classes now have online dates, too.*](http://brentozar.us2.list-manage.com/track/click?u=9082566fb63d87be35c0662bc&id=9f98752ef5&e=b137e91a2b)  [Read the comments.](http://brentozar.us2.list-manage.com/track/click?u=9082566fb63d87be35c0662bc&id=84a74451dc&e=b137e91a2b)  Erik Darling says:  [SQL Interview Question: “How do you respond?”](http://brentozar.us2.list-manage.com/track/click?u=9082566fb63d87be35c0662bc&id=94ccb96305&e=b137e91a2b)  **Brent’s in class this week!**  So you get me instead. You can just pretend I’m Brent, or that you’re Brent, or that we’re both Brent, or even that we’re all just infinite recursive Brents within Brents. I don’t care.  **Here’s the setup**  A new developer has been troubleshooting a sometimes-slow stored procedure, and wants you to review their progress so far. Tell me what could go wrong here.  [You are now reading this in Pat Boone's voice.](http://brentozar.us2.list-manage.com/track/click?u=9082566fb63d87be35c0662bc&id=e4d0fb418f&e=b137e91a2b)  You are now reading this in Pat Boone’s voice.  Remember, there are no right answers! Wait…  *Wanna learn from us, but can't travel?* [*Our in-person classes now have online dates, too.*](http://brentozar.us2.list-manage.com/track/click?u=9082566fb63d87be35c0662bc&id=0f2db72966&e=b137e91a2b)  [Read the comments.](http://brentozar.us2.list-manage1.com/track/click?u=9082566fb63d87be35c0662bc&id=8769502734&e=b137e91a2b)  Brent Ozar Unlimited Team says:  [[Video] Office Hours 2016 2016/06/01 (With Transcriptions)](http://brentozar.us2.list-manage1.com/track/click?u=9082566fb63d87be35c0662bc&id=cf47c61117&e=b137e91a2b)  This week, Brent, Angie, Erik, Tara, Jessica, and Richie discuss SSMS issues, security auditing, snapshot replication, SSIS Cache Connection Manager, AlwaysON Availability Groups, deadlocks, and Jessica’s trip to Mexico.  [Here’s the video on YouTube:](http://brentozar.us2.list-manage.com/track/click?u=9082566fb63d87be35c0662bc&id=5843718d74&e=b137e91a2b)   |  | | --- | | [Watch the Video](https://www.youtube.com/watch?v=NoaMCvb6PO8) |   You can [register to attend next week’s Office Hours](http://brentozar.us2.list-manage.com/track/click?u=9082566fb63d87be35c0662bc&id=82761ad251&e=b137e91a2b), or [subscribe to our podcast](http://brentozar.us2.list-manage.com/track/click?u=9082566fb63d87be35c0662bc&id=570dbb31b3&e=b137e91a2b) to listen on the go.  **If you prefer to listen to the audio:**  **Office Hours Webcast – 2016-06-01**  Jessica Connors: All right, I guess we should be talking about SQL Server.  Erik Darling: Nah.  Brent Ozar: Oh no.  Erik Darling: Boring.  Jessica Connors: That one product.  Angie: Meh.  Erik Darling: Snoozefest.  Brent Ozar: Which is out new today. So ladies and gentlemen, if you’re watching this, SQL Server 2016 is out right now. You can go download it on MSDN or the partner site. There’s places where you can go it. Developer Edition is free so you can go download the latest version right now. As we speak, Management Studio is not out yet but will be coming any moment.  Jessica Connors: That was our first question too: Is 2016 out yet?  Brent Ozar: Dun dun dun.  Jessica Connors: Are you hearing any rumblings on problems with it?  [Laughter]  Brent Ozar: We all start laughing. There were a lot of problems with the community previews. For example, SQL Server Management Studio would crash every time I would close it. So I’m really curious. Usually you don’t see stuff quite this buggy as you get close to release. But at the same time, I’m like, well, no one ever goes live with it in production the day it comes out anyway. People are just going to get widespread experience in development, in dev environments, and QA, then they’ll go find bugs hopefully and fix them. Hopefully.  Angie Rudduck: Wait. So I shouldn’t install that in our production servers running everything?  Brent Ozar: Yeah, no. I would take a pass for a week or two. Just let things bake out just a little bit.  Jessica Connors: Let it just wait.    Jessica Connors: Let’s take a question from Dennis, SSMS question. Is there a way to have SSMS format the numbers in the output messages? Not data in the query, like the row count at the bottom?  Tara Kizer: What are you trying to solve here? Because this is a presentation layer issue. Management Studio, it’s just a tool for us to query data, why does the formatting of the output matter? If you have an application you’re developing in .NET, format your data there. The row count at the bottom. No, Management Studio, there isn’t a way to format it. You can change the font and things like that in the tools options but I’m not sure that that’s what you’re asking.  Richie Rump: Is there a way, Brent? Could we format that?  Erik Darling: One thing you can do is if you’re interested in just having commas in is you can cast it as money or convert it to money with a different culture and you can get commas put in. But other than that, I’m not really sure what you’re after so if you’re a little more specific.  Brent Ozar: Well and return it as results. Whatever you’re looking for, return it as results instead of looking at what comes out of SSMS. Then you can format it there as well.  Jessica Connors: Dennis hasn’t replied to us.    Jessica Connors: Let’s go to Ben. He says, “[inaudible 00:02:24 old] to SQL. Hearing rumors about going to the cloud, MS, or Amazon, specifically in terms of security. What are the gotchas and pain points? Security is not our forte.”  Brent Ozar: This is so totally different from on-premises because on-premises you don’t have any security risks at all. No one could possibly access your data. I’m sure it’s locked down tighter than the pope’s poop chute. I mean it is completely secure as all get out. Just me, I’m usually like… Erik says, “Pull my finger.” I would say usually it’s more secure because you don’t go wild and crazy with giving everybody sysadmin. So I just turn it back to people on-premises and go, “So let’s talk about your security. Let’s go take a look at what you got. Everybody is SA. You haven’t changed your password in three years? Yeah, I think you should get out of on-premises. On-premises is probably the worst thing for you.” Nate says, “The pope’s poop chute? Really?” Yes. This is what happens when you work for a small independent company. You can say things like “tighter than the pope’s poop chute.” Probably can’t say that but we’ll find out later.  [Laughter]  Angie Rudduck: You’ve already said it at least three times, we’re going to find out. You’re going to get an official letter from the pope.  Brent Ozar: The Vatican, yep.  Angie Rudduck: Yeah.  Brent Ozar: “The pope does not have a poop chute.”  [Laughter]  Erik Darling: Going for a world record, most references to the pope’s butt in one webcast.  Angie Rudduck: Stop it.  Brent Ozar: Dad always said that to me, so yeah, there we go. Someone else should probably tackle the next question.  Richie Rump: Yeah, somebody else talk now, please.  Jessica Connors: Brent, I’ll just put him on mute.  Erik Darling: Looser than Brent’s…  [Laughter]  Erik Darling: Wallet, wallet, wallet.  Angie Rudduck: Wallet on the company retreat.  Brent Ozar: There we go.  Jessica Connors: I’m glad it’s a short week.    Jessica Connors:  Question from J.H. “Would creating a server trigger and emailing our DBA team if someone makes changes to the server role safe? Hard triggers affect performance, but it’s rare in our case that we have server role changes but want to catch it if a network admin puts himself in the sysadmin role without letting us know.”  Tara Kizer: We had security auditing at my last job. I’m not too sure what was used. Well, I think the other DBA who set this all up, he just set up a job and queried for the information. Then the job would run every few minutes I believe and would send the DBA team an alert if anything changed.  Brent Ozar: Yeah, I like that. My first reaction was Extended Events.  Tara Kizer: We had really strict auditing that we had to put in place due to the credit card information. It was encrypted but we had to be very careful with everything.  [Erik and Brent speaking at same time]  Brent Ozar: Would you say you had tight security? How tight was security? Go ahead, Erik, I dare you.  Erik Darling: Oh, sorry. I was going to say that you can set up the event data. You got me all flustered now. You can set up event data XML. It’s pretty good for modification triggers like that. It’s not like, you know, if you put triggers on tables and you’re doing massive shifts of data or you know before and after stuff. It’s a pretty lightweight way to just log changes as they happen.    Jessica Connors: Let’s see here. Question from Terry. “Is there a way to set up databases in an AG without doing a backup and restore?”  Erik Darling: Not a good one.  Tara Kizer: No.  Brent Ozar: 2016 there is. 2016 we get direct seeding where we can seed directly from the primary, so starting today you can. But unfortunately, not before today.    Jessica Connors: All right, a security question. This is from Nate regarding security auditing. “Any suggestions on getting some basic setup that tracks and alerts for security changes and schema changes?”  Tara Kizer: I don’t know.  Brent Ozar: I don’t know either. Is there like an Extended Event or something you could hook into?  Tara Kizer: Probably. What we had set up for security would have just been queries, just to query for the information. Look at the system tables and views. For schema changes, I don’t know.  Angie Rudduck: I think somebody set up a simple, “Hey, there’s somebody new in this group” for a security group. I think it was PowerShell at my last place just to like all of a sudden somebody is in the DBA sysadmin group. How did you get there? It would fire off of one server in the domain but I don’t know anything about schemas.  Brent Ozar: Yeah, schemas are tricky because you can log DDL changes. The problem is if your trigger fails, then the change to the table can fail and that can be kind of ugly. You can also set up event notifications and dump stuff into a queue with Service Broker, but it is kind of challenging and kind of risky. If you want to learn more about it, search—god, I’ve got to type this woman’s name out—Maria Zakourdaev. So if you search for “event notifications and SQLblog,” that’s what you do: “SQLblog Maria.” SQLblog is all one word. Maria Zakourdaev, and I’m sure I’m butchering her name, from Israel has a post on how you go about setting up event notifications and how they break because they do break under some circumstances.  Erik Darling: Everyone mark it, not only with SQL Server 2016 release today but Brent recommended Service Broker.  [Laughter]  Brent Ozar: It’s a great solution.  Richie Rump: You didn’t see the disdain on my face when he said that? You didn’t see that at all?    Jessica Connors: Let’s talk about snapshot replication from Trish L. “I have…  Tara Kizer: I’ve got to go get my coffee.  Brent Ozar: I know, we’re all like, “I’m out of here.”  Jessica Connors: Maybe we could tackle this. “I have snapshot replication which is scheduled to run one time per day but recently I’ve started to see blocking done by the snapshot replication. Do I need to [Inaudible 00:07:53] the distribution agent as well because it is running automatically now?”  Tara Kizer: I’m not sure about that but the blocking, you’re going to encounter that because it has to lock the schema. That’s one of the last steps it does. So anytime you have to do a snapshot, whether it be snapshot replication or transactional replication, I assume with merge replication too. Anytime you have to do that initial snapshot or reinitialize a snapshot, it does block changes—data changes, schema changes, you’ll see a lot of blocking as it’s going through the last bits of the snapshot creation.  Brent Ozar: What would make you choose snapshot replication? Like what would be a scenario where you’d go—or have there been any scenarios where you go, “Hey, snapshot replication is the right thing for something I encountered.”  Tara Kizer: I’ve never used to it but if users are willing to accept that their data is a day old, let’s say. Any time that I’ve used transactional replication, they’ve wanted near real time data. They wanted zero latency. We couldn’t deliver that in replication. But yeah, snapshot replication, it just depends on what your user wants as far as the data goes.  Richie Rump: I’ve used it for reporting solutions.  [Richie and Erik speaking at the same time]  Jessica Connors: What?  Erik Darling: I was asking Tara if a different isolation level would help with that blocking.  Brent Ozar: Oh.  Tara Kizer: We were actually using RCSI so, yeah, it was definitely a schema lock. We definitely still had blocking.  Brent Ozar: Makes sense. It was probably worse without the schema, or without the snapshot or CSI, probably horrible.  Tara Kizer: It was very rare we had to do the snapshot but sometimes replication would be broken for whatever reason and we couldn’t figure it out and we’d just have to restart replication. Our database was large. It took like five to eight hours to do. Not the snapshot portion, the snapshot took like about 45 minutes I believe but there was a lot of blocking during that time.  Richie Rump: I like snapshot replication for reporting purposes, right? So again, you just dump the data over there and it’s okay that there’s a time delay for the reporting aspect and there’s your data.  Tara Kizer: I just wonder instead of snapshot replication if people should be, not backup and restore because that might take too long on larger databases, but a SAN snapshot, a daily SAN snapshot, because it’s just available right away. You don’t have to wait for anything.  Brent Ozar: No schema locks, it doesn’t matter what the volume of change data is, yeah.    Jessica Connors: While we’re on the hot topic of replication, there’s another one from Paul. “I am replicating a database using merge and had an issue where if the developers changed a procedure on the original database, the change would not be pushed to the replicated database. Replicate schema changes is set to true. Any guidance on the reason why the changes won’t replicate? I did a snapshot before initiating replication.”  Tara Kizer: So replicate schema changes has to do with the table changes, it does not have to do with stored procedure, views, functions, or anything like that. So if you do an alter table, add a column, that will get replicated if you have the replicate schema changes set to true but you would have to also have in a publication either your current publication or a different one to also replicate the stored procedures.  Brent Ozar: I wouldn’t do that in merge either. Like I would—if you’re going to change stored procedures, just keep them in source control and apply them to both servers.  Tara Kizer: Yeah.    Jessica Connors: Let’s move onto a question from Justin, SSIS Cache Connection Manager question. “I want to load several objects into cache, about one to five million records, but can’t figure out how to access that cache’s source of data. It’s quite a bit faster for us to load to a cache versus staging tables. Is this possible? If not, how would you store this?”  Brent Ozar: Have any of us used the caching stuff in SSIS? No, everybody is…  Tara Kizer: No, I’ve used SSIS a lot and have not used that.  Brent Ozar: The one guy I know who does is Andy Leonard. If you search for Andy Leonard SSIS, he’s written and talked about this. I know because it was in his book. I didn’t read the book, I just remember seeing the book. It was on my shelf at one time. It was a great paperweight. Smart guy, really friendly. Just go ask him the question, he’ll be able to give you that right away. Normally we’re all about, “Go put it on stack exchange.” Just go ask Andy. Just go “Andy Leonard SSIS” and he’s super friendly and will give you that answer right away.  Erik Darling: Tell him Brent sent you.  Brent Ozar: Tell him Brent sent you on this.    Jessica Connors: Question from Tim L. He says, “I’ve got an ancient Access expert here at my company. I’m having SA access. He has a lot of ODBC from multiple Access dbs into my 2008 R2 SQL Server. How do I find out what tables he updates? There’s nothing in terms of jobs or stored procedures that references his data pull and updates.”  Tara Kizer: You could do an Extended Event, run a trace, add a trigger.  Brent Ozar: It’s 2008 R2 though. I like the trigger.  Angie Rudduck: I like cutting his access.  Richie Rump: I love that, “ancient.”  Tara Kizer: Yeah, why does he need SA access?  Brent Ozar: Just go ask him. He’s ancient. He’ll be a nice guy. He’s mellow by now. If you run a trace, that’s going to be ugly, performance intensive. The trigger will be intensive.  Erik Darling: Well you can at least filter the trace down to table name.  Brent Ozar: Well but if he wants to know what tables he’s doing, it’s going to be every time…  Erik Darling: Oh, never mind.  Brent Ozar: Yeah.  Tara Kizer: He could filter by his login at least, if that’s what it’s going through at least to connect to SQL Server.  Brent Ozar: And don’t try to log his insert statements or updates deletes. Just put a record in a table the first time he does an update, delete, and then immediately turn off the trigger on that table, or the trace on that. But, yeah. That’s tough. Just go ask the guy. Go talk to the guy. It would be nice.  Erik Darling: Shoot him email.  Brent Ozar: Yeah, shoot him an email. Buy him a bottle of Bourbon.  Erik Darling: Yeah.  Brent Ozar: It’s a human being.  Richie Rump: Yeah, just don’t give away the wine. Right, Brent?  Brent Ozar: If you were going to give somebody wine, you should give them like Robert Mondavi.  [Laughter]  Brent Ozar: He’s Access. He’s not, you know. That’s not true. Cliff Lede, ladies and gentlemen. This webcast is brought to you by Cliff Lede wines. Jessica Connors: Do any of us participate in SQL Cruise?  Brent Ozar: I cofounded that with Tim Ford. Tim and I cofounded it and when we split up the consulting company versus the training and cruise-type business, I wanted to let him go do his own thing there and not be on it because I felt like I would kind of shadow in on it and make the thing murky. It is a wonderful experience. I strongly recommend it to anyone who thinks about going. It’s fantastic for your professional development. It’s limited to just say 20 attendees and like 5 to 10 presenters, so the mix, the ratio of presenters and attendees is fabulous. You get to hang out with them. You get to have dinners, from all of this you get to know them really well. So it can be a rocket ship for your career and it helps you really build networking bonds with not just the presenters but the other attendees who are there. The downside is you get to hang out with the presenters in hot tubs so that may be a pro or a con depending on what your idea of a good time is there. So it’s not for everybody but it is truly fantastic.  Erik Darling: Grant Fritchey in a speedo, ladies and gentlemen.  [Laughter]  Jessica Connors: Do you still go on the cruise then? Are you done?  Brent Ozar: I don’t. I totally stopped doing that. I go off and do my own cruises. My next one is in Alaska in August I think, going on that one with my parents. But I haven’t done a technical cruise since. Most of the time what I like to do now is just go out on a cruise and not talk to anyone. I like to go out and sit and read books.  Erik Darling: You did Alaska before, right?  Brent Ozar: This is my fifth time I think, yeah. Absolutely love it. It’s gorgeous. I never was a snow kind of a guy but you get out there in the majestic snow and mountains and bears and all that, it’s beautiful.  Jessica Connors: Nice.  Angie Rudduck: Minus the jacket.  Brent Ozar: Yes.    Jessica Connors: Let’s talk to Graham Logan, he’s got some problems. He says, “SSMS crashes when expanding database objects in objects explorer. Database is about 1.2 terabytes and has about two million objects.”  Tara Kizer: Oh good lord.  Jessica Connors: But, he says, “[inaudible 00:15:43] design. It’s not mine. How to view all database objects without SSMS crashing.”  Tara Kizer: You just cannot use object explorer. You’re not going to be able to use object explorer. You can’t use the left pane in Management Studio. You’re going to have to write queries to see things. It’s very unfortunate but that’s a heck of a lot of objects in the database.  Brent Ozar: Before you expand the list, you have to right click on the tables thing and click filter. Then you can filter for specific strings but without filtering, it’s useless… I’d go information schema tables, information schema, yeah, all columns, all kinds of stuff.    Jessica Connors: Kyle Johnson has a new one. “We have a 4.2 terabyte database with a single data file. I’m working on a plan to migrate to multiple ones. Shrinking the database to a level with the data between files isn’t really practical with a six-hour window of no users. Have any other suggestions? Reindexing tables and specifying the file groups to move the table to two?” From Kyle Johnson.  Brent Ozar: Not a bunch of good options here.  Erik Darling: Brent is getting ready to tell you about Bob Pusateri.  Brent Ozar: I was. You are psychic. You are phenomenally psychic. Tell us more. I want to subscribe to your newsletter.  Erik Darling: Bob Pusateri, which I feel like this webcast has been obscene enough without me saying that, has a blog post about moving file groups, a lot of the gotchas, and you know, bad things that can happen to you. I will track down the link for it and send it to you but I would not do it justice just explaining what goes on it, because it’s scripts and everything, so.  Brent Ozar: Bob had a 25 terabyte data warehouse with thousands of files in it because the prior DBA thought it was a good idea to create a separate file group for every employee and then later came to regret that decision so he has a great set of scripts on how you go about moving stuff around and keeping them online wherever possible. So it’s really slick. So you do that prepping leading up to the six-hour window so that your six-hour window is only dealing with stuff that you can’t do offline, like moving the LOB data if I remember right.    Jessica Connors: Question from Claudio. “I’m trying to understand the differences between the new AlwaysOn Basic Availability Groups and the synchronous commit mode and the mirroring and high safety mode but they look identical except AlwaysOn seems more complicated to set up and manage. Are there any benefits to either solutions, features, performance, licenses, liability? Which one would you recommend to adopt?  Tara Kizer: Database mirroring is being deprecated so you’re going to want to move over to the AG basic availability groups. Get on it now. It’s the replacement for database mirroring.  Brent Ozar: The drawbacks, so you’ve managed both too. What would you say the strengths of AlwaysOn Availability Groups are over mirroring and vice versa? That’s not a trick question, I promise.  Tara Kizer: Mirroring you’re not failing over groups at a time. You’re failing over a database at a time. So availability groups let you failover in groups which is good when you have an application with multiple databases that it needs.  Brent Ozar: To be clear, so you’re saying the guy is saying Standard too, so you only do one database at a time. You could script those too, just like you would with mirroring. I’m trying to think if there’s anything that would be… have to have a cluster but you don’t have to have a domain with mirroring. But you don’t either with 2016 either. You can do it between standalone boxes.  Tara Kizer: With mirroring, if you want the automatic failovers, you need a witness. With AGs you do need a quorum but it could be a file share on another server, you know, on a file server that you have or a disk on a SAN could be a quorum. Mirroring does require another box, a VM, it can be Express Edition.  Brent Ozar: Yeah, I used to be the biggest fan of mirroring. I’m having a tough time coming up with advantages as 2016 is starting here.  Tara Kizer: I did a lot of failovers with mirroring, log shipping, and then later availability groups and by far I like availability groups best for DR failovers. It was just so much easier. You just run a failover command and you’re done. With mirroring, you’re doing it database by database. Log shipping is, you know, all sorts of restores going on. Mirroring is certainly easy, definitely easy, but I like the slickness of availability groups and readable secondaries and the choice of asynchronous and synchronous.  Brent Ozar: Yeah, that’s where I was going to go too. Because even in Standard, you get choice between synch and asynch now. And you can use one technology that works on your Standard stuff and your Enterprise stuff so you only have to learn one feature instead of learning two. That’s kind of slick too.  Tara Kizer: When we used mirroring, we would use asynchronous mirroring to the DR site then for high availability solution at the primary site we used failover clustering. So availability groups it just solves both solutions in one feature, plus reporting, we got rid of replication. Jessica Connors: All right. Let’s move on to a question from Chris Woods, a regular attendee. He says, “Migrating MDF with LOB data, L-O-B data, I don’t know how you call that, from one drive to another with minimal/no downtime. Can you use log mirroring to mirror it to a new database on the same server that shut down the original during a quick downtime?”  Brent Ozar: You can’t do mirroring to the different database on the same server, can you? You can do log shipping, can you do mirroring to the same instance?  Tara Kizer: No.  Brent Ozar: You can do log shipping to the same instance. That will work. Your downtime will be super fast. Because what your failover process would look like is when it comes time for failover, you do a tail of the log backup up on the main database, then restore that tail-log on the other database. Rename the old primary as like, the old primary database just like “database old.” Then rename the new one as “database new” and then whatever the new database name is or the original database name is. So you could do that in like a 30-second outage. You don’t have to change connection strings because it’s all the same server still. So that’s kind of slick.  Tara Kizer: If this is a SAN drive, even moving from one SAN to the next, we did all this stuff live. I don’t know what the technologies are called but we would move arrays live. The SAN administrators did some magic and it just copied over the data and once the copy was complete, it did a switcheroo between the two pointers, or, I don’t know what the technology was but the SAN can handle this without any down time.    Jessica Connors: Rob is adding a new instance to an existing active active cluster. I think he’s talking me about his process so that we can say if it’s yea or nay. He says, “I would need to failover the existing instances to one node, install the new instance on the node with no instances. Service pack it up and failover the instance to the node I was just on. Then run the install in another node, apply SPS, then rebalance the instances.” Does that sound about right?  Tara Kizer: It does but you know we don’t recommend active active clusters. What happens if you lose a node? I don’t at least. I’ve had four-node clusters where all four nodes were active. It’s just a nightmare. If you lose a node, can your other nodes support all of the instances at the same time until you get that other node fixed?  Brent Ozar: Richie is showing something on his iPad. What I would say is…  Erik Darling: It’s too bright.  Brent Ozar: I still can’t see it. We do recommend active active with a passive node.  Tara Kizer: Yeah, okay. Right.  Brent Ozar: Yeah, multi-instance clusters, just have a passive in there somewhere. Your scenario is exactly why you want a passive node laying around.  Tara Kizer: At least what you wrote out here for the question, yeah, that is the process.  Brent Ozar: Also known as miserable.  Tara Kizer: Yeah. At least since SQL Server 2008 we’ve been able to have where it can install it just on one node. Prior to that, all nodes in the cluster had to be online and have the exact right status in order for the installation. Because the installation occurred across all nodes at the same time. Service packs, the engine, everything. On a four-node cluster, there’d always be one node that was misbehaving. It just says, “I need a reboot.” And you’d reboot it 20 times and it would still say, “I need a reboot.” Then finally that one would be okay and now another node would say, “I need a reboot.” It was just ridiculous. So I’m glad that Microsoft changed the installation process starting with 2008.  Brent Ozar: It’s like taking kids on a road trip. “Everybody ready…?” “No.”  Erik Darling: “I have to pee.”  Richie Rump: I got excited, I thought we had a Node.js question but I guess not.  Erik Darling: Never have, never will.  Richie Rump: Brent has.  Brent Ozar: I have.    Jessica Connors: Let’s take one more question. Let’s see here. “Good morning, Brent and Tara, Erik, Richie, and Angie. Says, “Yesterday we had a problem with the process that normally moves data from table queue and delete it after it’s done. This is a standalone database. We stopped the inflow of data but it didn’t help. We got thousands of deadlock alerts. I notice that the disk queue length on the log drive is higher than usual. Here is a sample of the deadlock.” He provides it. “Is there anywhere I could look for this issue?”  Tara Kizer: If you’re getting deadlocks you should turn on the deadlock trace flag 1222, maybe run an Extended Event to capture the deadlock graph. Having just the deadlock victim isn’t enough to be able to resolve it.  Brent Ozar: It’s a separate technique I think that not a lot of database administrators get good at because it’s one of those things where you’re kind of like, “Hey, you should fix your indexes in your queries.” Then people go off and do their own thing. It’s one of those where when you do want to do it, it takes a day or two to read up and go, “Here’s exactly how the [Inaudible 00:25:00].” There’s also not a lot of good resources on our site for it. We don’t go into details on deadlocks either. Have any of you guys seen resources on deadlocks that you liked?  Erik Darling: I like just hitting Extended Events for it. The system health session has quite a bevy of information on deadlocks and you can view the graphs and everything which is pretty swell.  Tara Kizer: I attended a session at PASS in 2014, Jonathan Kehayias from SQLskills, it was all about deadlocks. It was invaluable information. He went over different scenarios and stuff. He said that he loves deadlocks. It was like, whoa, I don’t know that anyone has ever said that before. But it was really great information. I haven’t looked at—I do read his blogs—but I suspect he’s got a lot of deadlock information on the blog to help you out.  Richie Rump: He also loves XML.  Brent Ozar: He loves XML and Extended Events. If you have a Pluralsight subscription. So Pluralsight has online training. I want to say it’s like $39 a month or something like that. I think Kehayias has a course on deadlocks. I’m not 100 percent sure but if you search for SQL Server deadlocks if Kehayias has a course on there, it would be wonderful.  Erik Darling: Also, if you don’t have Pluralsight but you want to try it, Microsoft has a Dev Essentials site I believe where if you sign up for that, you get a 30-day free trial of Pluralsight and you also get Developer Edition and a copy of Visual Studio that’s free, Visual Studio Community or something for free. So it’s not just the Pluralsight subscription for 30-days but you do get a couple other goodies in there that last you a little bit longer.  Richie Rump: The course is called SQL Server Deadlock Analysis and Prevention.  Angie Rudduck: Someday still has a Pluralsight account.  Jessica Connors: All right guys, that’s all we’ve got for today.  Brent Ozar: But thanks for hanging out with us. Man, time goes so fast now. Gee, holy smokes.  Erik Darling: And they’re sobering up.  Brent Ozar: Well, back to work. The Cliff Lede, ladies and gentlemen. Enjoy the High Fidelity. See you guys next week.    *Wanna learn from us, but can't travel?* [*Our in-person classes now have online dates, too.*](http://brentozar.us2.list-manage2.com/track/click?u=9082566fb63d87be35c0662bc&id=2202dc37b3&e=b137e91a2b)  [Read the comments.](http://brentozar.us2.list-manage1.com/track/click?u=9082566fb63d87be35c0662bc&id=f096174156&e=b137e91a2b)  Brent Ozar Unlimited Team says:  [[Video] Office Hours 2016 2016/06/08 (With Transcriptions)](http://brentozar.us2.list-manage.com/track/click?u=9082566fb63d87be35c0662bc&id=d495646076&e=b137e91a2b)  This week, Angie, Erik, Doug, Jessica, and Richie discuss DB migration, rebuilding large indexes, recommendation for SQL dev ops tools, best practices for disabling SA accounts, compression, and more!  [Here’s the video on YouTube:](http://brentozar.us2.list-manage1.com/track/click?u=9082566fb63d87be35c0662bc&id=5edcd44151&e=b137e91a2b)   |  | | --- | | [Watch the Video](https://www.youtube.com/watch?v=VyTOSLI3DZM) |   You can [register to attend next week’s Office Hours](http://brentozar.us2.list-manage.com/track/click?u=9082566fb63d87be35c0662bc&id=ba3264dc13&e=b137e91a2b), or [subscribe to our podcast](http://brentozar.us2.list-manage.com/track/click?u=9082566fb63d87be35c0662bc&id=ac28e7e998&e=b137e91a2b) to listen on the go.  **If you prefer to listen to the audio:**  **Office Hours Webcast – 2016-06-08**  Jessica Connors: Question from Justin. He always asks us something. Justin says, “Is it advisable to move the public’s role from being able to query sys logins, sys databases, and/or sys configurations in master?”  Erik Darling: Advisable for what? I’ve never done it. I never cared that much. But I’m not like a big security guy. Any other big security guys want to talk about it…?  Doug Lane: Yeah, I’ve never done anything with public’s role and I’ve never seen it be a problem, but again, we’re not security experts.  Erik Darling: Again, we always recommend that when people ask sort of offhand security questions, Denny Cherry’s book *Securing SQL Server* is probably the go-to thing to read to figure out if what you’re doing is good or bad.  Jessica Connors: Yeah, Justin says that they got audited and [Inaudible 00:00:47]..  Erik Darling: What kind of audit was it that brought those up? I’d be curious.    **Two Servers, One Load Test**  Jessica Connors: Let’s move on to a question from Claudio. He says, “I would like to load test a new SQL Server instance with real production data. Is there anything we could put between clients and two SQL Servers that will intercept the queries for them to both SQL Servers and return the response only to one SQL Server?  Erik Darling: Yes, and I also have a magic spell that turns rats into kittens. No. That’s a bit much and a bit specific. You’re going to have to come up with something else. If you want to get really crazy, you’re going to have to look at Distributed Replay and come back in three years when you finish reading the documentation.    **How do I configure multi-subnet AG listeners?**  Jessica Connors: Okay. Let’s see here. This is a long one from Richard. Let’s tackle this one. “I will be adding a remote DR replica, non-readable, to an existing local availability group on a multi-subnet cluster to be able to use the listener at the DR site. I know a remote site IP address will be added to the listener. Is there anything else that has to be configured in the availability group or cluster besides DNS and firewall rules?”  Erik Darling: Brent?  Doug Lane: Yeah.  Jessica Connors: Where are you, Brent?  Erik Darling: I don’t know actually. I would be interested so I want you to try it out and email me if you hit any errors because I would be fascinated.  [Angie Rudduck enters webcast]  Jessica Connors: Oh, hi.  Doug Lane: Oh, we heard Angie before we saw her.  Angie Rudduck: Thought I had my mute on.  Doug Lane: As for the AG mystery, we’re going to leave that one unsolved.  Jessica Connors: Unsolved mysteries.    **How should I configure database maintenance tasks?**  Jessica Connors: Question from David. He says, “For routine tasks, index maintenance, backup, etcetera, is it preferred to use agent jobs or maintenance plans? It seems to be the DBA preference. Any reasons to lean one way or the other?” Erik Darling: [Ola Hallengren](http://brentozar.us2.list-manage2.com/track/click?u=9082566fb63d87be35c0662bc&id=7a2f6d99c7&e=b137e91a2b). Angie, tell us about Ola Hallengren.  Angie Rudduck: Ola Hallengren is amazing. I tell every single client about Ola Hallengren. I used it at my last place and in production across every server. You can do all backups, full disk logs. You can do it separated for your user databases versus your system databases. You get your CHECKDBs in there, user versus system databases. You even get index optimize and even better, Brent, aka Erik, has a [really good blog post about how you can use it to just do update stats](http://brentozar.us2.list-manage1.com/track/click?u=9082566fb63d87be35c0662bc&id=2b075ed5ad&e=b137e91a2b) which is a great follow-up from his post about why don’t do index maintenance anyway, right? Just update stats. I love Ola. I’m working on a minideck to pitch all of his stuff in one instead of just the indexing.  Erik Darling: Nice.  Angie Rudduck: But I’m too busy with clients.  Doug Lane: Plus, he’s a Sagittarius.  Angie Rudduck: Gemini.  Erik Darling: I’ve heard rumors that I’m a Scorpio but I’ve never had that confirmed.  Jessica Connors: Use your Google machine.  Doug Lane: [Imitating Sean Connery] Do you expect me to talk, Scorpio?  [Laughter]    **How do I set the default port for the DAC?**  Jessica Connors: Let’s take one from Ben. He says, “Oh, SQL stuff. Here’s one. In old SQL, we had to set a registry key to set a static remote DAC port. Is there a better way in SQL 2012, 2014, 2016? What’s the registry key?”  Erik Darling: A static remote [direct administrative connection](http://brentozar.us2.list-manage.com/track/click?u=9082566fb63d87be35c0662bc&id=775ff14503&e=b137e91a2b) port?  Jessica Connors: Mm-hmm.  Erik Darling: Weird. No, I don’t know, I’ve never done that.  Doug Lane: Yeah, me neither.  Angie Rudduck: What is old SQL? Like what version is old SQL?  [Laughter]  Angie Rudduck: 2005?  Doug Lane: 2005 he says.  Erik Darling: Hmm, I don’t believe that’s changed much since then.  Richie Rump: Yeah, it sounds like a blog post you need to write, Erik.  Angie Rudduck: We’ve got something on the site about remote DAC because…  Doug Lane: That doesn’t say anything about the port though.  Angie Rudduck: No, but it’s pretty detailed, isn’t it? I don’t know maybe go check that out, Ben, and go from there. I think it’s just go/dac. I don’t know. I’m making up things now.  Erik Darling: [Brentozar.com/go/dac](http://brentozar.us2.list-manage.com/track/click?u=9082566fb63d87be35c0662bc&id=57bdf7e7b4&e=b137e91a2b), D-A-C.  Jessica Connors: What’s the oldest version of SQL you guys have worked on?  Erik Darling: ’05.  Angie Rudduck: 2000.  Doug Lane: In Critical Care, ’05.  Angie Rudduck: Oh, yeah.  Richie Rump: No 6.5 people? No?  Angie Rudduck: Tara is not here.  Jessica Connors: Yeah, she’d probably have a story about the oldest version she’s used. She’s got the best stories.  Erik Darling: “It was on a floppy disk…”  [Laughter]  Doug Lane: I worked on 7 once upon a time. I didn’t actually like do real work on 7, it was just, believe it or not, writing stored procedures in the GUI window.  Angie Rudduck: Query explorer or whatever it is?  Doug Lane: No, it was like the properties of the—it was crazy when I think back on it. There was like no validation of any kind except the little parse button. This was back when Query Analyzer and Enterprise Manager were separate and I was doing it in Enterprise Manager.  Angie Rudduck: We had a 2000 box at my last place and I knew nothing about 2000. I tried logging in there and I was like, “Wait, where is Management Studio?” That was really hard to try to figure it out. The management administrative part is really scary in 2000 and I was on the server directly. It was like already a precarious server about to tip over. So, scary.    **What’s the best way to rebuild a 2-billion-row table?**  Jessica Connors: Question from Joe. He says, “What is the best way to rebuild a very large index without taking outage or filling the log? Rebuilding after two billion record delete.”  Doug Lane: Oh, are you sure you need to delete two billion rows from a table?  Erik Darling: Maybe he was archiving.  Doug Lane: Yeah, I don’t know if you want to flag them as deleted and then move them out some other time or what, but, wow, that’s a lot of log stuff. You can do minimal logging if it’s a table that you really don’t care about it being fully logged on but there are disadvantages to that too.  Erik Darling: What I would probably do, I mean, if you’re on Enterprise you’re kind of out of luck either way, right? There’s no online index operations there. You can help with the log backup stuff if you put it into bulk logged and continue taking log backups, but at that point, if anything else happens that you need to be recoverable after it starts bulk logging something, you’re going to lose all that information too. So bulk log does have its downsides. It’s not a magic bullet. So depending on your situation, you might be in a little bit of a pickle. A better bet is if you’re deleting two billion records and depending on how many records are leftover, you might just want to dump the stuff that you’re not deleting into another table and then do some sp\_rename and switch things around.  Doug Lane: You can actually just drop the index and recreate it. Sometimes that goes a lot faster.    **Are there any problems with SQL role triggers?**  Jessica Connors: Question from J.H. He says, “Anything to be aware of or downsides of setting up SQL role triggers, mainly sysadmin role changes?”  Erik Darling: All these security questions.  Doug Lane: Yeah.  Erik Darling: We bill ourselves as not security people.  Doug Lane: Like the one before, I think we’re going to punt on that.  Jessica Connors: Thomas Cline says, “No security questions.”  Angie Rudduck: Too bad the slides aren’t up.  Jessica Connors: Yeah.  Erik Darling: “For security questions…”  Angie Rudduck: “Please call…”  Erik Darling: Yeah, there we go.  Angie Rudduck: I’ll do them because it usually works for me.  Erik Darling: Attendees… staff… Angie. I’ll just mute you, just kidding. There we go. You are presenting.    **What are the HA and DR options with Azure VMs?**  Jessica Connors: All right, who wants to answer some Azure questions?  Erik Darling: Nope.  [Laughter]  Jessica Connors: Does anybody here know the HA and DR options with SQL 2012 Standard in Azure VMs?  Doug Lane: Oh, no. Not me.  Erik Darling: Using a VM? If you’re just using the VMs, I assume it’s the same as are available with anything else. It’s only if you use the managed databases that you get something else but I think it’s mirroring either way. I know Amazon RDS uses mirroring.  Richie Rump: Yeah, I think they have like three copies and if one goes down it automatically fails over to the other two or something like that. Don’t quote me.  Jessica Connors: Okay, we’re all being quoted. We’re actually all being transcribed. We’re all being recorded. We’re all being watched.  Erik Darling: Really?    **Is there a better solution for replication than linked servers?**  Jessica Connors: Question from Cynthia. She says, “My developers have a product that uses linked servers for parameter table replication. I’ve read that linked servers aren’t the greatest. Is there another way to do this?”  Doug Lane: Okay, that’s actually kind of a two-part question because you’ve heard that linked servers aren’t the greatest. You’re right. So with SQL Server 2012 SP1 and later, you don’t have to blast a huge security hole in order to get statistics back from the remote side in linked servers. It used to be that you had to have outrageous permissions like ddl admin or sysadmin in order to reach across, get a good estimate, when it then builds the query plan on the local side. That’s not the case anymore. The problem that you can still run into though is that where clauses can be evaluated on the local side. Meaning, if you do a where on a remote table what can happen is SQL Server will bring the entire contents of that remote table over and then evaluate the where clause locally. So you’re talking about a huge amount of network traffic potentially. That’s what can go wrong with them. The other question, “Is there a better way?” That kind of depends on what flexibility the app gives you because you say that this is a product. So I don’t know if this is something that you have the ability to change or not but if you’re talking about replicating from one side to the other, there’s any number of ways to move data from A to B.  Jessica Connors: And why do linked servers suck so bad?  Doug Lane: I just explained that.  Jessica Connors: Oh, did you? I didn’t hear you say why they suck so bad, sorry.  Doug Lane: Because you can end up with really bad plans either because permissions don’t allow good statistics or you end up pulling everything across the network just to filter it down once you’ve got it on the other side.    **Are there any good devops tools for SQL Server?**  Jessica Connors: Question from Joshua. This might be one for Richie. “Do you have any recommendations for Microsoft SQL dev ops tools?”  Richie Rump: There’s not a ton. I guess [Opserver](http://brentozar.us2.list-manage.com/track/click?u=9082566fb63d87be35c0662bc&id=1e6f9f0595&e=b137e91a2b). I guess from Stack Overflow would be one of them but not that I know of that there’s like out-of-the-box ways to do that kind of stuff. I know when I was consulting with one firm, they had built their own dev ops tools. I think they had Splunk and then they just threw stuff out from SQL Server logs and then did a whole bunch of other querying to put dashboards up so they could do monitoring amongst the team and do all that other stuff. I think Opserver does a lot of that stuff for you but it’s a lot of configuration to get it up and running. I’d say test it out, try it out, and see if that works for you but I’m not aware of any kind of things you could buy and it’s kind of ops-y things. I don’t know, what do you think guys?  Erik Darling: I agree with you.  Doug Lane: I don’t live in the dev ops world.  Jessica Connors: I agree with you, Richie.  Angie Rudduck: Yeah, whatever the developer says.  Jessica Connors: What he said.    **Should we disable the SA account and set the DB owner to something else?**  Jessica Connors: Question from Curtis. He says, “I’m looking for a clarification on SA usage. sp\_Blitz [inaudible 00:12:03] to having DB owner set to SA, not a user account. But what about the best practice of disabling SA? Should DB owner be set to a surrogate SA account?  Erik Darling: Nope. It’s not really catastrophic because it’s something that you should be aware of because usually what happens on a server is someone will come in and restore it. Someone will come in and restore a database, usually from an older server to the new one. They’ll be logged in with their user account so they’ll be the owner of that database. The owner of the database has elevated privileges on the database equal to SA, which you may not want always and forever. That’s why SA should be the owner, even if it’s disabled and the user account shouldn’t be. Even if the user is a sysadmin, you kind of just don’t want them to also be the owner of a database.    **How do I migrate databases in simple recovery?**  Jessica Connors: Question from Monica M. “We are migrating and upgrading from SQL 2008 R2 to 2014. We use simple recovery as our reporting/analysis rather than OLTP. Our IT department said after I copy/restore the databases to the new server it will take them two weeks to go live. By this time, our DBs will obviously be out of sync. What simple method would be best to perform this move?”  Angie Rudduck: Every time I moved, we did some server upgrades where we just created a new VM and ended up renaming it to the old server name eventually but what we did was we took a full backup like the day before, hopefully, but if you have to do two-weeks, we took the full backup when we knew and then we took a differential right when we’re ready to make the cut over. So let’s say at 6:00 p.m. the maintenance window is open and I’m allowed to take the database offline. I put it in single-user mode. I took a differential and then applied that to the new server. Then took it out of single-user mode on the new server. Then we did all of our extra work. So it’s not perfect for two weeks of data change, so if you could keep applying the fulls until like the night before, that would give you a little bit better change over.    Jessica Connors: Trying to find some questions here. You guys are real chatty today.  Erik Darling: Everyone is all blah, blah, blah, problems, blah, blah, blah.  Jessica Connors: “Here is my error…” They copy and paste it. I’m never reading those.  Erik Darling: “Here’s the memory dump I had.”  Angie Rudduck: Jessica likes to be able to read the questions and she doesn’t read SQL, so nobody reads computer. Nobody really reads computer, including us.  Erik Darling: “Yeah, I found this weird XML…”  Jessica Connors: Richie reads computer.  Angie Rudduck: That’s true, Richie reads computer.  Richie Rump: I was reading XML before I got on.  Angie Rudduck: That’s disturbing.  Erik Darling: Naughty boy.    **How do I shrink a 1.2TB database?**  Jessica Connors: Here’s a question from Ben. He says, “I have a large 1.2 terabyte [inaudible 00:14:51] queuing database. Added a new drive and a new file device. DBCC SHRINKFILE does not seem to be working on the original file. Seems that the queuing application reuses space before it can be reclaimed. Any suggestions?”  Angie Rudduck: Don’t shrink.  Erik Darling: I don’t know what you’re trying to do. Are you trying to move the file to the new drive or what are you up to? I don’t think you’re being totally honest with us here.  Angie Rudduck: Yeah.  Jessica Connors: But you shouldn’t shrink, huh?  Doug Lane: Spread usage across drives, okay.  Angie Rudduck: Maybe put it on one drive, I don’t know? I guess that’s hard to do with such a large file size.  Jessica Connors: 1.2 terabytes.  Erik Darling: So you have your database and you bought a new drive. Did you put like files or file groups on the new drive? Did you do any of that stuff yet?  Angie Rudduck: He says he has to shrink because the original drive is maxed and he needs workspace. I think it’s just not creating—maybe he has to do what you’re saying, Erik, about creating an additional file group to be on the other drive.  Erik Darling: Right, so what you have to do is actually move stuff over to that other file. So if you haven’t done it already, you have to pick some indexes or nonclustered or clustered indexes and start doing rebuild on the other file group.  Angie Rudduck: Then you’ll be able to clear out space to shrink your file.  Erik Darling: Hopefully.  Angie Rudduck: Maybe, yeah. Let us know next Wednesday.    **Has anybody played with SQL Server 2016 yet?**  Jessica Connors: Have we played with SQL 2016 yet?  Erik Darling: Oh, yeah.  Doug Lane: Yep.  Jessica Connors: No? Some of you?  Erik Darling: Yes.  Jessica Connors: Have you played around with the 2016 cardinality estimator and do you know if it works better than SQL 2014?  Erik Darling: It’s the same one as 2014.  Jessica Connors:         Is it?  Doug Lane: So there’s the new and the old. Old is 2012 and previous and the new is 2014 plus. There’s all kinds of other new stuff in 2016 but the cardinality estimator actually hasn’t been upgraded a second time.  Erik Darling: Yeah, Microsoft is actually approaching things a little bit differently where post 2014 with a new cardinality estimator, they’ll add optimizer fixes and improvements for a version but you won’t automatically be forced into using those. You’ll have to use trace flag 4199 to apply some of those. So even if you pop right into 2016, you may not see things immediately. You may have to trace flag your way into greatness and glory.    **Are high IO waits on TempDB a problem?**  Jessica Connors: Here’s a good question from Mandy. She says, “I’ve been on a SQL 2014 standard cluster with tempdb stored on SSDs for several months. The last few days we’ve been seeing a lot of alerts and spotlights saying that we have high IO waits on those tempdb files. The IO waits are as high as 500 to 800 milliseconds. Is this a high value? I’m new to using SSDs with SQL Server and I admit that I just don’t know what high is in this case. Any thoughts?”  Doug Lane: It’s high but how frequent is it? Because if you’re getting an alert that like once a day that you’re hitting that threshold, it may not be something you need to worry about too much depending on what it is that’s hitting it. So what you want to do is look at your wait stats and look at those as a ratio of exactly how much wait has been accumulated versus hours of up time. If you’re seeing a lot of accumulated wait versus hours of up time, not only will you know there’s a problem but you’ll also be able to see what that particular wait type is and get more information about what’s causing it. Then you can put that together with what might be happening in tempdb and possibly come up with an explanation for what’s going on.  Erik Darling: Yeah. I’d also be curious if something changed that started using tempdb a whole lot more or if maybe you might be seeing some hardware degradation just after some time of use.    **What should I do when my audit stops working?**  Jessica Connors: Question from James. He says, “I’ve installed a SQL Server audit and noticed it stopped working. Is there anyway to be alerted when a SQL Server audit stops or fails?”  Angie Rudduck: Is that the Redgate tool? Because I feel like Redgate had some auditing tool or encrypting tool that went out of support. When I was at my last place and we had to change over so I’m not sure what that is.  Doug Lane: If it throws a certain severity error then you can have SQL Server notify you of those kinds of things. But as far as like audit as a product, I’m not sure.    **Will backup compression compress compressed indexes?**  Jessica Connors: Then we’ll move on to J.H. Says, “When compressing all tables page option in a database does compressing its backup gain more compression?”  Erik Darling: Yes.  Angie Rudduck: Compression squared.  Erik Darling: Compression times compression. Are you really compressing all your tables to get smaller backups?  Jessica Connors: Is that really bad?  Erik Darling: No. It’s just kind of a funny way to approach it.  Doug Lane: I don’t know if that’s the purpose but…  Angie Rudduck: I think he has no drive space, tiny, tiny, tiny SAN.  Erik Darling: Buy a new thumb drive.  Doug Lane: Talk to Ben because he apparently has the budget to have new large drives.    **Are there performance issues with SSMS 2016?**  Jessica Connors: We have somebody in here that’s playing with SQL 2016. He says, this is from Michael, “SQL Server Management Studio 2016 sometimes goes into not responding status when using the object explorer window such as expanding the list of database tables. These freezes last around 20 seconds. Is there any known performance issues with SSMS 2016?”  Doug Lane: I found one. I was trying to do a demo on parameter sniffing where I return ten million rows of a single int-type column and maybe about half the time SSMS would stop working and it would crash and force the restart. So I think SSMS 2016, at least related to the RTM release, is a little bit flakey.  Jessica Connors: For now.  Erik Darling: Yeah, it might depend on just how many tables you’re trying to expand too. I’ve been using it for a bit and I haven’t run into that particular problem with just expanding object explore stuff. So how many tables are you trying to bring back would be my question.  Angie Rudduck: I was just about to say, we had that question last week or the week before about SSMS crashing when they tried to…  Erik Darling: Oh, that’s right.  Angie Rudduck: Remember? They were trying to expand their two million objects.  Erik Darling: Yeah, that’s not going to work out well.  Angie Rudduck: So maybe this is the same person, different question.  Doug Lane: I was going to say I think it might just be a little…  Angie Rudduck: Yeah. It’s brand new, what do you expect? It’s a week old. It’s going to be flakey.  Richie Rump: Something to work when you release it?  Angie Rudduck: No, come on.  Richie Rump: I’m just saying, it’s a crazy idea, I know. I have all these crazy ideas but…  Angie Rudduck: Unrealistic expectations, Richie.  Erik Darling: That would require testing.  Jessica Connors: Richie has never released anything with bugs.  Angie Rudduck: Who needs to test things? I did have a client recently ask me what test meant when I was talking about test environment.  Jessica Connors: I know, what?  Richie Rump: What’s this test you speak of?  Erik Darling: Just for the record, Richie wipes cooties on everything he releases.  Angie Rudduck: Kiddie cooties.  Doug Lane: All right, looks like we’ve got two minutes left. Lightening round, huh?  [Group speaking at the same time]    **What’s the best SQL Server hardware you’ve ever worked on? And the worst?**  Jessica Connors: Question from Dennis. He wants to know, “Tell me the best SQL hardware environment that you have ever worked on.”  Doug Lane: I would say when we went down to Round Rock last year. I got to play with I think it was a 56-core server, that was pretty fun.  Erik Darling: Yeah, I think my best was 64 cores and 1.5 terabytes of RAM.  Richie Rump: Yeah, I had 32 cores and 2 terabytes of RAM.  Erik Darling: Nice.  Jessica Connors: What about the worst you’ve seen with clients?  Erik Darling: Ugh. Probably an availability group with 16 gigs of RAM across them. That was pretty bad. And it had like one dual core processor. It was pretty, yeah. It was Richie’s laptop.  Angie Rudduck: Worse than Richie’s laptop.  Doug Lane: That sounds about like the worst I’ve seen is like dual core, 10 or 12 gigs of RAM.  Angie Rudduck: 500 gigs of data.  Erik Darling: I’ve had faster diaries than that.  Jessica Connors: All right, well, we’re out of time.  All: Bye.  *Wanna learn from us, but can't travel?* [*Our in-person classes now have online dates, too.*](http://brentozar.us2.list-manage.com/track/click?u=9082566fb63d87be35c0662bc&id=f815eff904&e=b137e91a2b)  [Read the comments.](http://brentozar.us2.list-manage.com/track/click?u=9082566fb63d87be35c0662bc&id=c42a6bd9fb&e=b137e91a2b)  Erik Darling says:  [Getting Started With Oracle Week: Creating Indexes and Statistics](http://brentozar.us2.list-manage.com/track/click?u=9082566fb63d87be35c0662bc&id=b05051c5e3&e=b137e91a2b)  **This is not a deep dive**  If you’re looking for lots of internals and explanations of what happens behind the scenes, don’t read past here. I almost made a READPAST joke. It’s that kind of day. This is just a basic overview of creating some indexes and gathering statistics. Why? Because someone just paid about $47.5k for every 0.75 cores of Oracle Enterprise licensing and they probably expect some performance out of it. This isn’t MySQL. We don’t have all day to get query results.  If you remember last time, we created a couple tables of random data, HR.T1 and HR.T2. They are currently sitting in TABLESPACE, where no one can hear you scream.  The first thing you want to do is forget about clustered indexes. Oracle has Cluster Indexes, which allow frequently joined rows from separate tables to sit on the same block of data, to reduce I/O when joining tables. Oracle has Index Organized Tables, which can be defined by a Primary Key.  But that’s more than I want to bite off!  **Index Gang**  Creating a Primary Key ain’t too far off from SQL Server. But there are some weird points, too. For instance, when you create a Primary Key, you can let it create an associated index, specify an index to associate with, or let Oracle pick the first index it finds to associate with the Primary Key. Full disclosure: it may not be the index you’d pick, it may be the first index that has the PK column as a leading column.  Here are some examples!  ALTER TABLE HR.T1 ADD CONSTRAINT pk\_t1\_id PRIMARY KEY (ID);  --I created this one a little out of order to show the USING syntax  ALTER TABLE HR.T2 ADD CONSTRAINT pk\_t2\_id PRIMARY KEY (ID) USING INDEX IX\_T2\_ID\_OID\_CID;  If, at some point, you realize you chose the wrong Primary Key, you can drop it without dropping the index.  ALTER TABLE HR.T2 DROP CONSTRAINT pk\_t2\_id KEEP INDEX;  **Can’t cluster this**  You can also create some pretty familiar looking index structures. There’s even an online option, if you paid through the nose. You can, of course, define your index as UNIQUE for free (for now, anyway)!  CREATE INDEX IX\_T1\_ID\_OID\_CID ON HR.T1 (ID, ORDER\_ID, CUSTOMER\_ID);  CREATE INDEX IX\_T2\_ID\_OID\_CID ON HR.T2 (ID, ORDER\_ID, CUSTOMER\_ID);  CREATE INDEX IX\_T1\_ID\_OID\_CID ON HR.T1 (ID, ORDER\_ID, CUSTOMER\_ID) ONLINE;  CREATE INDEX IX\_T2\_ID\_OID\_CID ON HR.T2 (ID, ORDER\_ID, CUSTOMER\_ID) ONLINE;  CREATE UNIQUE INDEX IX\_T1\_ID\_OID\_CID ON HR.T1 (ID, ORDER\_ID, CUSTOMER\_ID) ONLINE;  CREATE UNIQUE INDEX IX\_T2\_ID\_OID\_CID ON HR.T2 (ID, ORDER\_ID, CUSTOMER\_ID) ONLINE;  But man oh man, the best part of this to me brings in a little something from when we created the tables and test data! Creating indexes with no logging! Creating indexes online with no logging is like perf tuning God mode. Oracle for the IDDQD!  ALTER TABLE HR.T1 ADD CONSTRAINT pk\_t1\_id PRIMARY KEY (ID) NOLOGGING;  CREATE UNIQUE INDEX IX\_T1\_CID\_PHN\_NL ON HR.T1 (CUSTOMER\_ID, CUST\_PHONE) ONLINE NOLOGGING;  **Other options**  Oracle doesn’t exactly have filtered indexes. They have function based indexes, but to my SQL Server soaked brain, they seem more like a computed column with an index on it than a filtered index.  CREATE UNIQUE INDEX IX\_T2\_OD\_PD\_SD ON HR.T2 (UPPER(FIRST\_NAME)) ONLINE;  You can also create bitmap indexes, which are good for low density columns. That’s fancy talk for ‘not very unique’. Our bit column would fall into that category. Other entrants would be stuff like gender, marital status, or Favorite Rebecca Black Song would also probably qualify.  CREATE BITMAP INDEX IX\_T1\_BM\_ISS ON HR.T1 (IS\_SOMETHING);  **Ain’t no STATMAN here**  To create, update, or otherwise manage statistics you use the [DBMS\_STATS](http://brentozar.us2.list-manage1.com/track/click?u=9082566fb63d87be35c0662bc&id=2041104d98&e=b137e91a2b) package. It has subprograms for so many things, it’s hard to list them all. Oracle treats statistics much more importantly than SQL Server does, and with good reason: THEY ARE!  I also like the advice that the Oracle crowd has had on index fragmentation, [since around 2002](http://brentozar.us2.list-manage1.com/track/click?u=9082566fb63d87be35c0662bc&id=6534a26960&e=b137e91a2b):  My opinion — 99.9% of all reorgs, rebuilds, etc are a total and utter waste of time and energy. We spend way way way too much time losing sleep over this non-event. If you are going to spend time on this exercise — make sure you come up with a way to MEASURE what you’ve just done in some quanitative fashion you can report to your mgmt (eg: these rebuilds I spend X hours a week doing save us from doing X IO’s every day, or let us do Y more transactions then otherwise possible, or …..) No one, but no one, seems to do that (keep metrics). They just feel “it must be better”. Who knows — you may actually be DECREASING performance!! (you’ll never know until you measure)  If we wanted to gather statistics on all columns in our T1 and T2 tables, we could run commands like this:  BEGIN  DBMS\_STATS.GATHER\_TABLE\_STATS(  'HR',  'T1',  METHOD\_OPT => 'FOR ALL COLUMNS SIZE AUTO'  );  END  BEGIN  DBMS\_STATS.GATHER\_TABLE\_STATS(  'HR',  'T2',  METHOD\_OPT => 'FOR ALL COLUMNS SIZE AUTO'  );  END;  You can check on Oracle statistics in the GUI, and see that they provide pretty commensurate information to SQL Server’s statistics.  That's a thick milkshake.  That’s a thick milkshake.  **I’ll revisit this down the line**  But there’s a lot I want to explore here, first. Hopefully you learned a few things along the way. I know I did writing this!  Thanks for reading!  *Wanna learn from us, but can't travel?* [*Our in-person classes now have online dates, too.*](http://brentozar.us2.list-manage1.com/track/click?u=9082566fb63d87be35c0662bc&id=c5b775b05e&e=b137e91a2b)  [Read the comments.](http://brentozar.us2.list-manage.com/track/click?u=9082566fb63d87be35c0662bc&id=955e57ec87&e=b137e91a2b) |