**Part 6 (2023-08-14)**

August 14, 2023, 3:33PM

36m 46s

 **Mohit Gupta** 0:04  
Uh.

 **Dinesh Vijayakumar** started transcription

 **Mohit Gupta** 0:07  
Yeah, I think you're recording now.  
So what do you Richard?

 **Richard Jimenez** 0:13  
So the generally the has to give a overall look of the infrastructure, correct?  
I know we didn't really have a chance to speak on kind of.

 **Mohit Gupta** 0:28  
Yeah.

 **Richard Jimenez** 0:28  
Coordinated this over the weekend.

 **Mohit Gupta** 0:28  
Yeah. The I.  
Yep, Yep.  
The idea is what is the media publishing infra as of today both in PME and Ms tenant and then we'll go over the threat model and the architecture.

 **Richard Jimenez** 0:44  
Sounds good.  
OK.  
One second I'll share screens.  
All right.  
So here's the overall overall view top level view of our infrastructure.  
So we can start with how?  
How was in Microsoft to how it is now in in PME?  
So the general flow with our infrastructure, umm as before, everything was inside of our Microsoft tenant.  
So I'll Azure resources and where our services were located as well.  
So we have I publish service that gets requests generally from AWE service.  
These get put into a queue which our logic app.  
One of our logic app orchestrations, dequeue these messages and process as as needed for whatever request it is.

 **Leslie Trowbridge** joined the meeting

 **Richard Jimenez** 2:06  
So logic apps generally call our services which are hosted inside of a service fabric cluster, which before we were using a special kind of virtual network called A express route, which is an internal implementation for.  
It's an internal offering to be able to connect to Corpnet Resources, which was one of our required scenarios.  
So we connected through using API management.  
There's actually another layer here between the API management and the cluster.  
It was a internal it was a load balancer which we no longer use, but there's that detail there.  
In addition, we also had two clusters that we used with UM in Microsoft.  
Uh, the idea was that this proxy cluster would be the main one to talk to corpnet, but in fact they were both in the same vnet, so both clusters had the same capacity, but we had initially separated out the logic for for a lot of the umm, what we called proxy calls to that cluster.  
So besides that, we also employed all of our Azure resources Cosmos DB BLOB storage service bus up app, insides keyvault et cetera.  
And finally, we talked to external resources using the OR from the service fabric cluster.  
Umm due to the vnet, the so one element of these express route vnets, so they're highly secure.  
So all traffic between maybe any other resource, any outside location would be blocked by default.  
So anything, any new resource that we need to add, we had to always go through and ACL process.  
So this was quite lengthy, could be two to four weeks or more just to be able to open up traffic between different resources.

 **Kruti Kallola Mohanta** joined the meeting

 **Richard Jimenez** 4:17  
Ohh, they required very stringent.  
Explanations AND so that was that was one thing that would also be something that we have to consider when we were moving to PME.  
So when the PME requirement came along, we learned that Express route was not supported in PME and so this put a big roadblock in our designs.

 **Eduardo Toraya** joined the meeting

 **Richard Jimenez** 4:46  
So we had to figure out a way to be able to, uh, not only migrate to this new infrastructure, but also be able to do it in a way where we could always roll back and make incremental changes and move piece by piece.  
Umm.  
In into the new tenant.  
With the piece, feel free to raise your hand or stop me anytime during this if you have any questions.  
So moving on to the hybrid design, initially we the goal was to create the the new infrastructure in PME.  
So we created the PME cluster and this actually works on a public VNET which we have.  
Configured using a what's called a network security group, and so the network Security group is a resource that sets rules between the traffic of the vnet and so it essentially works as a way for us to be able to, umm have a firewall for traffic because the reason or the so we are we are we are monitored with our production traffic and so one of the requirements is that obviously that we have the most secure traffic we can.  
So with the network security rule that actually it actually works for that.  
So if what we have seen is that if we don't activate some network security rules and we have set up the cluster to be monitored for production, then we will actually get S 360 rules to fix those those things.  
So this is kind of how we have a new way to manage the the the traffic as you know before it was just automatically all deny.  
So the new that's how the new infrastructure was working with the with the vnet.  
So we started simple.  
Just create a cluster the vnet the network security rules and the API management which still routes which will still be using to route all traffic from that public facing URL to the internal URLs from the from the service fabric cluster.  
So there were a couple limitations between tenants and some traffic was not allowed.  
So we were able to call from logic apps since it's not in the Express route logic apps is in public Azure, we were able to call services in PME from Microsoft Logic apps.  
So we decided to leave those in Microsoft until the end and to begin to move services into the new cluster and and reverse the we were we are able we were able to call into Microsoft services from PME services.  
The opposite was not true, but this did work, and so we were able to use that to be able to route traffic back to make this hybrid workflow work for us.

 **Tavishi Gupta** joined the meeting

 **Richard Jimenez** 7:53  
So we slowly started moving services into the new cluster and the goal was to move the Azure resources at the last step.  
The reason why it was because we were still working on well, the main reason was because we're still working on removing express route dependencies to be able to talk to corpnet.  
So all teams had some major dependencies are here, so we were working to both migrate and to also either find a solution or UM permanently move to to a cloud solution.

 **Achal Shah** 8:32  
Hey, Richard, quick question.

 **Richard Jimenez** 8:32  
Right.  
Yes, Sir.

 **Achal Shah** 8:35  
So I seen when we're in Microsoft tenant, the cluster does not call API management, but from the new tenant it does is there.

 **Richard Jimenez** 8:50  
The sorry.

 **Achal Shah** 8:51  
So this is yeah, the top here.  
The new cluster right and that calls into API management.

 **Richard Jimenez** 8:55  
Yeah.  
Yeah.  
So it was just logic apps calling him too into the new service and it does route through the API API management. Umm.

 **Achal Shah** 9:08  
OK, but that green arrow?  
Is that something that happens or is that you're just showing it for?

 **Richard Jimenez** 9:14  
So that is something that was happening during the hybrid.  
So calling into PME was mainly done with logic apps because service to service was not open from Microsoft but from PME to Microsoft.

 **Achal Shah** 9:18  
OK.  
Yeah.

 **Richard Jimenez** 9:28  
We we were able to call in inbound and so that's what that error means is in some cases due to for example some services here needed to call me to corpnet enabled services.  
So for the hybrid flow, we would still have those services call back into Microsoft for those corpnet services, corpnet scenarios.  
And for that, it would go through API management.  
Right, so this is what our infra looked like for some time during their the migration we began with this might be older.  
But diagram as well, but the main idea is there.  
We initially moved.  
I publish umm the exact uh order of things is not correct in the diagram but.  
Umm sorry, this was actually one of the proposed.  
Never ever diagrams so.

 **Kruti Kallola Mohanta (WSD)** joined the meeting

 **Richard Jimenez** 10:41  
So I'll just give you a breakdown through through here, but after you moved all services and we began to move the resources and so we some resources were needed to needed to be recreated, for example the cluster, the API management vnet ohm and some resources we went ahead and did what's called the directory transfer.  
And So what that does is allows us to move completely, move the resource and outs data to to a completely different tenant.  
And so we basically, umm, lift lift and shifted most of these resources that you see when the Azure.  
And so I've been successfully recreated many app registrations.  
We also recreated some of them still remain at Microsoft as the app registrations were not or requirement for the migration.  
They are likely on no cost resource so so we move the resources next.  
Sorry, doing this and live, but we move the resources next, then we move the logic apps and essentially oops.  
Excuse me, Kitty, and essentially, once we we had everything here, then we started to sibling things in Microsoft, so we know we're longer needed.  
The express route we no longer needed.  
At least all the things that were left there and service bus was actually part of this move here.  
And so we get to this next phase.  
UM, the final phase here, which was everything in PME.  
And so you can see I publish service bus is on via me.  
Logic apps were also deployed to PME as a resources were moved or we created Umm and the new infrastructure is here talking to external resources.  
So for media we had one way to be able to overcome the.  
The express route because of for us, we actually had one or two partners that were not able to migrate to PME in time.  
So there was no other solution for us than to keep the Corp net connection.  
So ohh that there was the diagram here for that.  
Give me a second.  
Well, it's not here, but the highlighted here in this text, but essentially what we did is any any call that needed corpnet Jacob set up a pipeline.  
Uh, so an agent pool pipeline that still had the Vnet Express route VNET connection and uh, this pipeline still does all the IO for us, so.  
That was the main requirement for us is to be able to upload and download pretty large files from corpnet and so the pipeline still takes care of that for us and we just call it through HTTP.  
And so we were able to not have to keep the service fabric cluster in Microsoft and just uh, just keep the express route VNET and the agent pool.  
So let's reduction of resources and Leah, we are under way to finally remove this dependency as well for media.  
So essentially that is how we got to this final infrastructure and see count the pipeline as part of it then that's that is the whole E that was a whole view of the of the infrastructure.  
And so I believe you wanted me to review the threat model as well.  
So here's the top level view of the thread model.  
We can go ahead, Mohit.

 **Mohit Gupta** 15:04  
Sorry, can you go back to the Visio please once?

 **Richard Jimenez** 15:07  
Sure.

 **Mohit Gupta** 15:09  
So did we also evaluate the putting a service bus between the logic apps and the services?  
Yeah.

 **Richard Jimenez** 15:20  
Did we evaluate?  
Between the logic apps and services, no, that was not something that was evaluated.

 **Mohit Gupta** 15:26  
He.  
And.

 **Richard Jimenez** 15:30  
The reason for.

 **Mohit Gupta** 15:33  
No, it was just thinking this is service bus between I publish and logic apps and that I think makes sense because that gives us a more availability if something is down.  
This was for one incident where if the services are getting deployed then logic app start failing because it's not available right?

 **Richard Jimenez** 15:51  
Right. OK.

 **Mohit Gupta** 15:53  
So I I was just wondering if you put us a service bus between the logic apps and the services, maybe it will be more available.

 **Richard Jimenez** 16:02  
OK.

 **Mohit Gupta** 16:02  
Of course it needs some code changes, but.

 **Richard Jimenez** 16:04  
Right.  
Yeah, that's definitely something we can add to to our list of improvements.  
So for the migration there were a number of things that we could have taken advantage on.  
UM and so.  
So there was a redesign requirement as far as the virtual network, but everything else we the goal was to keep it as as the same as much as possible and only focus on the migration so.  
Redesigns were not really part of this migration.  
It was more.  
It was only the focus was to migrate, so we did do a bit of thank you for for that.  
Actually, that reminds me.  
We did.  
We did still corporate a some number of improvements with this migration.  
So one of those being that mpme alright, this mess and PM me, we actually are able to deploy all of this infrastructure it using scripts and so we actually have a repo with which contains the uh the deployment scripts to be able to deploy both the cluster the vnet, NSG, API management, the key vault even.  
And so actually in PME, we have generally we have three key vaults, we're still working on setting up the BCDR, but you may see in PME that we have one called manual.  
And that is the one like source of truth, essentially.  
And what our infra scripts do is they copy the the secrets from the manual keyvault into what we call a regional keyvault and so the main regional keyvault would be our you know, our W US two or whatever.  
I mean cluster is and the second regional keyvault would be what we call the BCDR keyvault which is for when W US two goes down we recover to to that secondary.  
Umm.  
But as I said, we still working on setting that up.  
Yes, I think.

 **Vaithi Krishnasamy** 18:16  
Sorry, just to answer Mohit's question right.  
So, uh, putting your service bus between the logic apps and the the actual service fabric services would not work in most of our architectures.  
The reason being is you know logic app is used here as a workflow tool right?  
So we want the logic app for each depth trip to complete.  
You know, to make a service call, get a response back, go to the next one and stuff.  
So if Logic app puts that on a service bus, wait for example the initial step for the first service call, then you would just lose control of the workflow.  
Yeah, it would just make the architecture more complex.  
So we thought about it long time back with this was designed, but we didn't proceed with that.

 **Richard Jimenez** 19:03  
Yeah.  
Thank you.

 **Vaithi Krishnasamy** 19:04  
So you this is a common one across like almost all of the UPS architect, it's not getting media specific, it's a UUP do the same.

 **Richard Jimenez** 19:04  
I do.

 **Vaithi Krishnasamy** 19:13  
I think movie Six also does the same thing.

 **Richard Jimenez** 19:16  
Correct.  
I think of it as the service bus still being, uh, in between the calls.  
Logic apps are just the orchestrators to be able to dequeue the the messages and route them to to the correct service.  
Go ahead Mohit.

 **Mohit Gupta** 19:32  
Yeah.  
Thanks.  
Thanks, sweetie.  
Uh, I think the way it W works is slightly different, right?  
And I'm not sure if there are AWE X perts here today, but but the adapter design in AWE is slightly different and I think they have decoupled the logic apps or the workflow and the services.  
Anyone has any comments on that?

 **Achal Shah** 20:13  
Umm, yeah.  
So it's basically the same principle.  
Avoid that the workflows cannot do the orchestration and they invoke the services.  
It's the same concept as as the logic app.

 **Tavishi Gupta** left the meeting

 **Achal Shah** 20:29  
It's just that we don't AWE doesn't use the logic app.

 **Mohit Gupta** 20:35  
Right.  
But is the communication between the workflow and services still synchronous in AWE?

 **Achal Shah** 20:42  
No, no, it's asynchronous.

 **Tavishi Gupta** joined the meeting

 **Mohit Gupta** 20:46  
And what technology are you using for making it days interest?  
Is IT service bus or something else?

 **Achal Shah** 20:52  
No, Leslie, you want to answer that?  
It looks like yeah, basically.

 **Mohit Gupta** 21:06  
Secondly, face the question.  
Listen, if you want.

 **Achal Shah** 21:08  
Yeah.  
Yeah, it is.  
Basically, the workflow is, uh implemented as as actors, right?  
And they will make a call into what you know is an activity and then the activity made directed calls to an adapter, right?  
And that whole pot finishes and then the workflow is just waiting right?  
And then if the adapts adapter finishes, for example, they'll call back into your activity, which will then finished the actor, right?  
And then it moves on to the next step.  
So that is, there's no service bus or anything in between, right?  
It's just a calls.

 **Mohit Gupta** 21:49  
And see.

 **Achal Shah** 21:51  
Yeah.  
Calls between services.

 **Mohit Gupta** 21:52  
Yeah.

 **Vaithi Krishnasamy** 21:54  
So for Heather, so here the logic app caused to the service side.  
It's not a synchronous call.  
Still, asynchronous cards, logic apps internally do supporting asynchronous count.  
So what happens is what exactly as you described, we do the same thing where you know logic app calls the service and then forgets about it, and then once the service is done, there's a call back back to the exact project step and then it proceeds further.

 **Mohit Gupta** 22:25  
You can't.

 **Achal Shah** 22:27  
Good Dina.  
Dina as arena.

 **Vaithi Krishnasamy** 22:28  
I.

 **Mohit Gupta** 22:29  
You know, has it handled? Yeah.

 **Dina Helal** 22:31  
Yeah, just wanted to add, I think Mohit, you mentioned that your concern is during the services deployment that the logic apps fail.  
That's why you you're thinking of service bus in between.  
So the way we do it now, as Vaithi mentioned, so, so we do have a the the requests are in the service bus and our entry point to the logic apps, we have our first logic app which is the service bus reader.  
So during the deployment we disabled this logic app, which means the messages will stay in the service bus and will not be processed or picked up until the service is deployment is done.  
This is a manual stuff, but we do it during deployments to make sure we're not processing anything by the logic apps.  
While the services are getting deployed.

 **Richard Jimenez** 23:17  
Yes, correct.  
Thank you, Dina.  
On that.  
So we actually did do that during the migration to PME for logic apps.  
We were going to have logic apps and so one of the issues was having that DQ logic app on in both environments, both tenants.  
So we did actually disable it during deployment, but the other thing actually is for us and maybe Jacob, if you like, you can talk more about this, but we have upgrade rollbacks or upgrade deployments on our cluster for our services.  
So what that means is the deployment will we'll have the deployment goes in different stages and it checks the health at every stage and once it completes all stages, if there was any issues during any of the stages, it would roll back that pending deployment and from the callers perspective, the service never went down.  
It was the servers always stays up and it doesn't actually get upgraded until that deployment gets confirmed.  
And so we've tested this before in production and we've seen that services don't get affected during our during our deployments for that reason.  
Go ahead as well.

 **Achal Shah** 24:37  
Yeah.  
Another question I had is there any relationship between I publish and API management or are they is I publish kind of independent of API management?

 **Richard Jimenez** 24:52  
So I don't know the full low level details of I publish.  
I believe they might have their own API management.

 **Achal Shah** 25:00  
OK.

 **Richard Jimenez** 25:00  
Set up for the yeah for itself. Umm.

 **Achal Shah** 25:03  
OK, So what this API management you showing here is is strictly to get to the cluster, right?

 **Richard Jimenez** 25:10  
Correct. Yes.

 **Achal Shah** 25:11  
Yeah. OK.

 **Richard Jimenez** 25:15  
Yeah, I believe I published my Bo Web app service.  
Somebody correct me.

 **Vaithi Krishnasamy** 25:24  
I I don't.  
OK management.

 **Richard Jimenez** 25:27  
Could you repeat that by?

 **Vaithi Krishnasamy** 25:29  
No.  
I publish apps and I don't like that.

 **Achal Shah** 25:32  
Are you putting out right? Yeah.

 **Vaithi Krishnasamy** 25:36  
Hello, can you hear me now?

 **Richard Jimenez** 25:39  
It's a little choppy, but you can try again.

 **Vaithi Krishnasamy** 25:42  
Uh, I I was saying I probably she doesn't have anything.  
So with that.

 **Richard Jimenez** 25:50  
It's OK here, you but uh, believe you're saying that?  
Yeah, it's wet.  
It's a app service, so it should have its own, Umm API management writing through it.

 **Vaithi Krishnasamy** left the meeting

 **Richard Jimenez** 26:01  
OK.  
Any more questions on this?  
I can move on to the threat model.

 **Vaithi Krishnasamy** joined the meeting

 **Richard Jimenez** 26:12  
Right.  
So just run through the flow through here.  
I publish in queue the message into service bus.  
Service bus? Uh.  
Service bus reader it's constantly polling and checking for messages and when a message is found, it accuses it into the logic app to be able to read it and process.  
So depending on the message it will request this logic.

 **Achal Shah** left the meeting

 **Richard Jimenez** 26:42  
App usually always calls another out logic app directly.  
Uh.  
And so it'll call the logic app, which usually will be a publish scan, approve, go live, etcetera.  
And that logic I will then call the service so calls in with AAD API management routes to the cluster.  
And.  
Obsessed with hypernet my bed, so I routes to the cluster and then the cluster.  
That's what it needs to do.  
The service and calls whatever external services we need, et cetera.  
So one of the challenges as well and there's something didn't cover with the other diagrams, is at least for media, I can speak on and I know for UUP this was also a scenario challenge is we have this service DCAT service that we talked to and before we had to employ the the Express route to be able to talk to to it.  
And so we worked with Sumana's team and they were able to migrate this DCAT diagnostic service for us to into PME and with the help of the app folks who were also working on their own solution for DCAT and what we what we selected was using what is called the HYPERNET Virtual Network which works to be able to enable this traffic into the decap service.

 **Vaithi Krishnasamy** left the meeting

 **Richard Jimenez** 28:24  
Service and so for one of our scenarios for ESDS specifically, we do talk to that service inside this other cluster that was created inside of this hypernet cluster.  
So as you can see, all of the external partners we most of them are listed here, media seeker, user P all of our publishing partners, et cetera would be there.  
In addition, the cluster and logic apps to connect to the key vault Azure storage in Cosmos DB.

 **Fatuma Omer** joined the meeting

 **Richard Jimenez** 29:01  
And so all these are.  
So we're Cosmos and Azure.  
We are using UMI believe connection strings and for the KEYVAULT we're using certificates.  
So that's one more detail as well for the preparation to PM me for me pub at least I had to move away from us using thumbprint authentication to using subject name authentication for certificates because this allowed us to hold our certificates in one cert which is, you know, the Microsoft and TERNAL provider for for a certificates.  
And so one cert works.  
Our sorry I scripts when we deploy the cluster, they actually go ahead and grab all the certs, we just list them in the scripts by our name and provider.  
It goes ahead and grabs all the newest certs from one cert and installs or.  
Yeah, installs them into the hitbox into the keyvaults, the regional ones, so you won't see the certs in the manual keyvault.  
Keep that in mind.  
You will always only see them in the regional keyvault.  
Alright.  
And this is the implementation with the pipeline.  
That we are using to be still be able to talk to build chairs.  
We use a PAT token to talk to this uh pipeline agent, which then does the processing for us and I believe this is only for a couple scenarios now, AP and PF I believe, but Jacob will know more about that.  
If there's any questions on that.  
Alright, so that's the base.  
That's the top level for our infra and our flow.  
Any any further questions or concerns here?  
I know Mohit had to drop.  
But he did want me to show the threat model so.

 **Mohit Gupta** 31:15  
Getting next meeting is in 5 minutes.

 **Richard Jimenez** 31:17  
Oh, you still here?  
Sorry, I thought your message that you drop.

 **Mohit Gupta** 31:18  
Yeah.  
Hey, just starting 5 minutes after so.

 **Richard Jimenez** 31:27  
OK.

 **Mohit Gupta** 31:27  
Yep.

 **Richard Jimenez** 31:31  
Cool.  
So like I said, it was pretty free flow, didn't have really anything like a presentation presentation.  
Umm created but hopefully this gives you a good overview of the info and I'm free to take any questions, concerns etcetera.  
We also have, umm, most other folks that are involved with our infra here in this call, so it's a good time too to ask any questions.  
Otherwise, I'll hand it back to you, Mohit, or whoever's presenting or if we don't have more topics, umm, you can afford us.

 **Mohit Gupta** 32:11  
Yep, I think people will need to digest this and maybe come up with questions and maybe poke some holes in either the threat model or the architecture.  
So what I'll do is I'll evangelize this recording across across the meeting, and people who did not join and that encourage them to ask questions or suggest any changes as as part of the improvement.

 **Richard Jimenez** 32:40  
Ohh, I'd actually sorry.  
One more thing I could add is some of the improvements that we are considering.

 **Mohit Gupta** 32:47  
Sure.

 **Richard Jimenez** 32:49  
So one of the challenges was the fact that we have a shared infrastructure with the UP folks, which has always been a blessing since we don't have to set up a lot of the things ourselves, but that also created extra challenges as we have some pretty specialized scenarios now and we would like to be able to control all these elements on our own.

 **Mohit Gupta** left the meeting

 **Richard Jimenez** 33:12  
So one of those improvements was for us to move to our own infrastructure.  
So this is a shared info.  
Umm.  
So what that would entail is for us to actually have all the resources here not shared.  
So the cluster with its own network etcetera, we would ideally have our own cluster for me pub.  
Same with our own key vaults.  
We actually already use our own storages and that was one of the improvements into PME is that we consolidated.  
So we had about four or five different subscriptions before that.  
We had just different items in, so now we were able to consolidate all into a single subscription to all of our storage solutions are the same.  
So script subscription and BME and the shared ones are still in the shared subscription as multiple teams use them, but same also with uh, Azure or their cosmos DB is we currently share it though we do have our own collections inside of the account.  
So essentially this might be even easier to do.  
We just have to really put the research in and cost it out, but that's one of the improvement areas for us.  
Also, the deprecation of the pipeline as as awesome of a solution as it is, it's still just supposed to be, you know, a temporary solution.  
And just to be able to allow this, but we're working on actually Jacob, could you give us the latest status on what is happening here or what we're waiting for or what the the goal is?

 **Jacob Kissel** 34:56  
Yeah, with the express route pipelines, we only need to wait now for past native to excuse me, move off of meeting Red Dog coupling, but for APPF we're almost done and able to merge the code for Stratus which which removes APPF from meeting express route.  
Umm, we're still gonna have pipeline agents because pipelines are very useful for doing other certain types of operations, but they don't live inside of the Express route.  
They're just kind of their own thing.  
Umm.  
And those are the ones that do that are already in PME, but the ones that are in Microsoft that are in Express route are just for past native at this point in time.

 **Richard Jimenez** 35:46  
OK, excellent.  
Thank you.  
So Yep, that's that's the scope of it all.  
Umm.  
So yeah, please go ahead and digest this as Mohit said, and feel free to bring any questions to the next meeting next week and we can cover anything on that.  
So I know Mohit dropped.  
I don't think we had anything else on the agenda today.  
Unless anybody has something speak now.

 **Kruti Kallola Mohanta (WSD)** 36:22  
You.

 **Richard Jimenez** 36:30  
Yeah.  
If not, I believe, then we can drop and then this bit early.

 **Sam Son** left the meeting

 **Richard Jimenez** 36:38  
Uh, so yeah.  
Thank you all for listening and tuning in.  
Always open for any questions.

 **Dina Helal** 36:44  
Thanks a lot.  
Good trick.

 **Dinesh Vijayakumar** stopped transcription