Good morning good afternoon or good evening depending on where you are in the world and welcome to today's data
0:11
center knowledge webinar AI ready data centers uncovering the essential infrastructure upgrades sponsored by Legrand
0:18
and broadcast by informa I'm Brandon Taylor with data center knowledge and I'll be your moderator
0:23
today we have just a few announcements before we begin this webinar is designed to be in
0:30
active The Dock of widgets at the bottom of your screen will allow you to learn about today's speakers download
0:36
resources share this webinar via social media outlets and participate in the Q&A
0:41
session that takes place at the end of our presentation the slides will advance automatically throughout the event you
0:47
may also download a copy of the slides via the resources widget toward the end of our webinar we will uh ask you all to
0:54
provide feedback via the survey widget found at the bottom of your screen please take a minute to fill this out
1:00
before leaving us today as your feedback will provide us with valuable information on how we can improve future
1:06
events lastly if you are experiencing any technical problems please click the help widget found at the bottom of your
1:12
screen or type your issue into the Q&A area and we will be glad to offer one-on-one
1:19
assistance now on to the presentation a ready data centers uncovering the
1:24
essential infrastructure upgrade discussing today's topic is saman brookham senior product manager for LR
1:33
again saman is the senior product manager under lr's data center power and control division focused on cabinets and
1:39
containment he's worked in the cabinet and containment industry for nearly a decade holding roles in both sales

1:44
engineering and product management demonstrating his expertise in both pre and post customer support as product
1:52
manager he focuses on developing his portfolio in both categories which has led to the gr's leadership position in
1:58
the space San has received his certified data center design and Six Sigma Green Belt
2:06
and just like a data center soman believes that the only way forward is through continuous Improvement joining
2:12
San today is Claus dafinger pooling Marketing Manager for L Grand or for L
2:18
Grand excuse me uh K CLA brings 17 years of expertise in the data center industry with a background in planning project
2:23
management and installations for clients ranging from small businesses to hyperscale operators currently he drives
2:30
strategic marketing initiatives at LR shaping innovative solutions for the data center
2:36
Market if you want to ask our speakers any questions today again please use the Q&A area that is on that is found on the
2:43
right side of your screen samon over to you thanks Brandon appreciate
2:51
it you're welcome all right so AI ready data centers uncovering the essential infrastructure upgrades uh Brandon if
2:57
you have uh any questions from the audience uh that is pertinent to the slide that we're on before we before we move on to
3:04
the next one feel free to jump in and and ask okay we want to keep this kind of open with the audience definitely all
3:13
right so let's start at the the cabinet level uh one of the major trends that
3:19
we're seeing in today's market is the need for higher static Dynamic and
3:24
transportation ready cabinets uh so first we'll start with the static look this is a test that
3:31
almost everyone who deals with data center cabinets is aware of UL 2416 uh we have uh a 5,000 pound weight

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load capacity as part of our tnt6 platforms this is a direct result of the
3:45
increased density of the equipment that's going into the rack as well as all of the additional pdus uh sensors
3:54
cabling copper fiber that's going to be loaded within and we thought it best uh
3:59
you know suit the market today if we increase those weight load capacities um
4:05
you know accordingly UL 2416 is a test that me uh that basically certifies the
4:12
structural Integrity of the cabinet ensuring that it's a safe to use uh
4:17
product within the data center including when the uh equipment is [Music] loaded uh the second testing that we
4:25
accomplish on our cabinets is a functional or rolling test this is not not an industry standard test uh like UL
4:32
2416 this is a homegrown test that we've developed uh over many years and
4:38
basically the function of this is when the equipment comes off of the pallet um
4:43
goes into the data center floor we understand that there could be a significant uh distance between the dock
4:51
and the ultimate location of uh the cabinet and when this happens you go
4:56
over things like uh ramps inclines impact some obstacle somebody left uh
5:02
their badge on the floor and the casters get hung up and we want to make sure that while the cabinets being
5:08
transported within the data center that it could it could handle all of these different scenarios while still being a
5:15
safe to deploy a piece of equipment uh the last item is the
5:22
transportation load and this is something that is uh fairly common nowadays with AI applications is you
5:29
take your cabinet you send it to an integrator the integrator populates the cabinet with their ID equipment cables

5:37
it burns it in if necessary and then ships it to the end user that uh new
5:43
method of shipping to the integrator and the integrator going to the End customer site has seen a pretty big boom over the
5:50
last several years uh and we've really standardized on the testing protocol that you see above uh this does a
5:58
variety of different you know there's a different uh set of protocols than the other two tests these will go on shock
6:05
pallets be packaged with uh exterior packaging uh typically made out of
6:11
cardboard uh and the sequences are typically rotational drops a Vib a 4H
6:17
hour vibration test uh and and a whole host more ensuring that when the
6:22
equipment is loaded into the cabinet and ultimately transported via truck or air
6:27
to the end user that the not only does the cabinet survive but the equipment also survives and we've seen a a really
6:35
good result uh from our our testing making sure that it's very
6:40
comprehensive um you know for uh for these types of applications so all of these tests are
6:48
basically accomplished on you know the smallest and the largest sizes within our range so from our range we have uh
6:55
600 mm and 36 in deep all the way through 800 millimet and 54 in deep uh
7:02
every size within that footprint uh and up to 52 Ru is uh you know passes all
7:09
all of these tests uh and we're really we're really proud of this
7:15
accomplishment and uh and San this is not an uncommon approach to um AI
7:21
deployment so what is LR doing differently from a packaging uh standpoint that allows for the customer
7:26
to do this safely is the entire Packaging reusable Brandon thanks for that yeah so
7:33

from the packaging standpoint what we're seeing is that many of uh our competitors are using a foam approach to
7:40
protecting the equipment within and what this does is it it basically puts a lot
7:46
of pressure on dumping all of that excess material once the packaging is used so we we know that the pallet
7:53
itself or where the cabinet sits on has some sort of foam uh to uh protect
7:59
against the vibration and the damage caused within uh the the trucks if that
8:05
uh is um how you know how it's being shipped but the uh the packaging itself
8:12
on the outside is really you know the functionality is just to hold the cabinet against the truck walls or the
8:18
you know the method of transportation so what we've done from an exterior packaging perspective is twofold the
8:24
first method is the cardboard method the cardboard method instead of the foam
8:30
internal fill we've used uh a cardboard internal fill as well as metal strap
8:35
packaging around the exterior this gives the crush protection uh that is
8:40
necessary to protect the equipment within the cabinet as seen from the the test results and it gives uh the customer a
8:49
lot less waste uh when it gets to the to the end site so you know no you know no
8:55
bringing of 10,000 dumpsters to to take and and discard some of this material is
9:01
really just a knockdown uh approach that can be recycled you know even nearby so uh the second approach is our
9:09
created solution this is a uh reusable exterior packaging so we uh you know we'
9:15
like to see integrators who uh take the packaging that we provide to them use it
9:21
as you know for the first round and then have some sort of uh Reflow program
9:26
where they're bringing the the trucks back or they're uh taking this exterior packaging and and saving it for the next

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deployment of uh our cabinets into the data center that way uh we we do a
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little bit more uh sustainability projects that way um and kind of help all
9:46
around the next method uh that we would like to talk about is the sensors that
9:51
go uh within the cabinets we're seeing a lot of deployments nowadays take into
9:56
account the ashray standard which is the American Society of heating refrigeration and energy uh and we uh
10:05
basically see that we with the higher uh load requirements higher um you know
10:12
electrical load higher heat load within the cabinets that now sensors are becoming more prevalent because the data
10:19
analytics behind uh these deployments is a lot more important so uh back in the
10:26
day when you had 5 to 10 kilowatts per cabinet you know know it really uh you
10:31
know you really didn't see that much of hot spots or or things of that nature
10:36
but now with all of the new equipment that's being installed you're really starting to see uh some of these uh you
10:43
know concerns within the data center and people need to understand how to properly accommodate for these new types
10:49
of environments so we really recommend having a a host of sensors within your
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aisles that way you can make decisions about how you deploy your next generation of equipment or or in the
11:01
future when you're looking to deploy let's just say another site how you would restructure those those equipment
11:07
and it devices to more you know to more uh evenly distribute uh all of this load
11:14
across the environment so I really like uh cabinets that have at least temperature and
11:21
humidity included uh Within These but uh our division has a whole host of sensors
11:27
that could be plugged in directly into the pdus uh and if you export this data

11:34
into your um your uh building Control Systems you can definitely take a look
11:39
at aggregate data uh across you know a cabinet a row an aisle you know Etc uh
11:46
and really give yourself a clear understanding of what is happening uh within
11:52
each I totally agree on what you said San and I I just want to to point out
11:58
the the importancy of of of Those sensors um because I mean changes and
12:05
and adding equipment in cabinets that's not new at all but as you said so when the load was like 5 to 10 kilowatt per
12:11
cabinet and you added a server it was just a slight difference but with the the the the change in the servers and
12:19
the energy consumption the impact on on single systems is totally different so
12:24
sensors in in your systems just to monitor the changes and everything to to to have a few on potential hotspots as
12:32
early as possible is an absolute key so sensors very very crucial and so uh
12:39
Claus and San we uh we have a question from the audience um and they're wanting to know are the sensors uh Standalone or
12:46
do they need to be plugged into the pdus how do you use the data from these sensors yeah really good question so
12:53
there's uh two methods that you can go with our sensors if you buy servertech or ritin pdus these are plug in uh Plug
13:00
and Play into those units and you can daisy chain up to 32 of them off of a
13:05
single pdu uh the other method if you're not using rtin or servotech is to buy a
13:12
um a sensor module so we have these Standalone units that can uh be deployed
13:17
within an entire row and hold up to 200 sensors off that single unit that way
13:23
everything is aggregated into one location and you have one uh basically uh con connection to your uh building
13:31

Control Systems uh bms's I think uh building monitoring systems and that system would
13:37
basically allow you to to generate graphs and reports and and provide warnings when these sensors are you know
13:44
above a certain threshold for example and that could be all set from from the backend UI of either of those
13:57
methods okay okay uh lastly I'll talk about uh
14:04
different containment systems so we have um three primary uh objectives or
14:11
methods of of doing containment within a data center environment and in general you know containment and the segregation
14:18
of hot air and cold air has been a widely adopted um method for you know
14:24
current data center deployments but even more so this containment is your first
14:29
step into uh you know airflow management within your data center environment uh
14:35
we don't see it as a uh replacement we see it as a stepping stone to getting
14:40
more and more efficient within your data center environment so in general you
14:45
have three methods for uh containment you have your ready to install where uh
14:51
you know the equipment is either known or already laid out within the data center environment we use either drawing
14:59
or take measurements on site to determine what the distances are of the row the height where you want the
15:06
containment to land on the tops of the cabinets uh and we create pre-fabricated
15:11
panels that basically install and hook up to the sealing the cabinet one or
15:16
both uh and have different insert materials depending on the different scenarios within the
15:23
environment uh the second scenario is what I call the DIY method or the the
15:28
two by4 and sheetrock method this is a uh solution that we've developed where

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containment applications are not always so clearcut as to what uh needs to
15:40
happen or where things need to be located so we developed a product that has a bunch of standard components uh
15:48
about you know 10 or 12 of them that are can be used in various combinations to basically design the containment around
15:55
the existing infrastructure within the data center uh and this has really helped in a lot of different situations
16:01
where you know construction plans are not always uh accurate and the time that
16:07
it takes to make modifications or to come back to the vendor uh and and ask
16:12
for new items is not really part of the the schedule I guess I'll call it and if
16:19
we are looking to deploy faster and and better we need to have a product that really aligns with that that methodology
16:26
as well um the last uh solution is what
16:31
we've seen more and more hyperscale customers do is what I call a building
16:37
within a building uh this structure is essentially taking all of the requirements that would typically be
16:43
placed on the building core and shell and putting it down closer to where it belongs at the cabinet and conveyance
16:51
level so this structure essentially takes um all of the requirements for uh
16:57
support for your uh your overhead busway youra your copper your fiber the docking
17:02
of your cabinets and your containment system and bundles it all into one solution and then that solution is
17:09
deployed on concrete typically and the core and shell of The Bu of the building
17:15
no longer sees those those requirements so this could be you know really a quick
17:21
deployment um for your building because you're not you know you're not putting so much emphasis on what that Corin

17:26
shell can do but more what the structure you know that that's holding all this
17:32
equipment can do closer to to where it
17:37
belongs thanks Zan and we have a couple of couple of submitted audience questions um and so the first one I'll
17:44
ask you uh what do you see as the most common solution uh for containment yeah
17:50
so I guess I'll um I think that that question has two different uh paths that it can take so uh hot Isle definitely
17:57
more you know in in the US at least the hot aisle is definitely more prevalent than the cold aisle systems are and the
18:04
second one is what material choice is the most common within the data center so on the left uh image you'll see a
18:12
clear polycarbonate insert and on the middle image you'll see the twin wall polycarbonate insert twin wall is
18:18
definitely more common but for applications that uh where security or
18:24
visibility is is of Mo utmost importance uh we see a lot of clients go with the
18:30
clear polycarbon insert so hot Isle uh for sure twin wall you know definitely
18:36
used more often than not and this clear polycarbon it serves a kind of segment
18:41
of the market where it's not you know always clear where the security cameras are in relation to the aisles and if
18:47
that security is of concern you know that that that's the method that they would
18:52
use so what are some uh what are some considerations that you've seen customers make to decide between these
18:59
uh containment Solutions yeah so from a prefabricated
19:04
standpoint those customers are typically uh very knowledgeable about what's already existing in their space uh they
19:12
have most of their Dimensions or can get them uh or um you know or have a

19:19
basically faster than normal deployment requirement uh and they don't want to take the the effort uh when the when the
19:27
material shows up on site to make changes like you would with a DIY method so that's where we see more of the ready
19:34
to install products going into uh on the second uh on the second the DIY method
19:41
those customers are typically uh contractors in construction uh I've seen new data centers where with uh you know
19:49
unique cooling strategies have to have different methods of containment and it
19:54
wasn't always clear where that containment needs to land or if things were to print uh so in that in that image that I'm
20:01
showing you this is an actual construction site where the Ducks are attached to the wall and there's a fan
20:08
that's uh blowing that's taking in all of the hot air that's being exhausted by the cabinets and that uh was a kind of
20:17
unique thing that generally a prefabricated installation
20:22
would not you know adhere to that way they needed something that they can modify and retrofit on site to kind of
20:28
accommodate for for this unique cooling solution uh and on the last one you know
20:34
it's really about speed speed to deployment I know a lot of the hyperscale clients are using this type
20:39
of uh material uh you know the building core and shell going up very fast you
20:44
know even as fast as six months uh and basically you have your your data center
20:50
environment at the Pod level rather than a a whole uh building kind of surrounding and supporting
20:57
that uh and then General these Solutions are within the up to 15 kilowatt range
21:03
uh for for densities higher than 15 kilowatts there are a lot of cooling solutions that can be deployed and for

21:09
that I'll pass that over to to klous to to speak to absolutely absolutely perfect thanks
21:17
saman so uh we talked a lot about sensors and uh housing and optimization
21:23
of cooling um but the AI and HPC so the the trend that we are moving is it it
21:32
accelerated enormously compared to to the last year so meaning the increase
21:38
and the demand of of power and everything in data center is is everything but new but again the steps
21:45
that we are now taking are on a on a different level um so optimization is
21:50
absolutely key um the loads and potential loads in the future and the
21:55
near future we're talking about is is a total different level than it was in in in previous years or in the past so and
22:03
this adds a lot of options and complexity when we when we look at the cooling um that you uh that you have or
22:11
potentially available in in your data center so looking from the options that we have like the the crack and inro
22:18
cooling inro most often used in in on premise uh Craig very very popular um
22:25
the same is for fan balls um we we also have R hit exchanger as an option or uh
22:32
potentially also immersion cooling um on top of this on top of the the choice
22:38
that a customer might need to make um we have also a lot of new things that are
22:45
needs to be considered um like for example the of course the increase in power density so what is it that we're
22:51
looking for What will What is the average load per cabinet look like in
22:56
the future in the near future so so we evolving very very fast on this one um
23:02
the same is for the efficiency on which my systems are running on so a lot of
23:08
the the the total um energy consumption of the data center is needed for for
23:15

cooling um so this is something that is not uh only important for your money
23:21
meaning the more uh the less power you need to cool your systems the more you
23:26
can spend on on actually powering those systems and um from an collocation point
23:32
of view the more energy you have to serve your customers in the end um the
23:37
next thing is also space and design so you want to have it uh on an Optimum
23:44
level and not wasting a lot of space for those new uh for those HPC and and AI
23:52
applications uh like for example an in row cooling so you are relatively
23:57
Limited in the space that you can plan meaning every in row unit that you need to add um adds like 30 cm or consumes 30
24:05
cm of your row um and that's also something that you that you need to
24:11
consider um thermal hotspots and reliability so we are back at the sensors and the importancy of those um
24:18
so it is most likely not the case
24:23
for uh like lethal humans so they will meaning there will not be uh the impact
24:30
in a data center uh that from one day to another you will change 100% of your
24:35
systems and you have like only Ai and HPC so there will be a transition in those so in your existing data center
24:43
you will have new systems that have a higher power demand so therefore it is it is very very important and I said
24:50
this during the sensors and I will say it again now so that you monitor your systems that you monitor your your
24:57
airflow your temperature to to uh uh to have the information and that you see
25:02
potential risk and uh thermal hotspots within your system that you can act accordingly so that you know you might
25:10
have a you might run into trouble there so you you have an idea what to do and
25:15

also to know the limitations of your of your system of your cooling system depending on what technology you're
25:21
using um you might also be aware of where to place my uh my high power
25:27
equipment um in row cooling For example you might want to place it next to an in row
25:33
cooler of course because there is the the the cold air on um uh the
25:38
concentrated cold air from from the cooler uh if we look on a fan wall then
25:44
you might want to place the systems or you have to place the systems that uh um consumes more power more cooling power
25:51
closer to the fan W then uh uh instead of the the furthest the the furthest
25:57
point away from the fan wall just it makes just logically sense but you need to monitor those the same is if uh if
26:05
you look at a fan wall for example it is also hard um
26:12
to uh be efficient in cool specifically
26:17
HPC Rex um just think about it if you have a row with 10 cabinets or 20
26:24
cabinets and within the row you have like two cabinets that needs 30 or 40
26:29
kilowatt of cooling power or they have a 30 or 40 wat kilowatt of load and the
26:35
other 18 r or eight or whatever it is they have like the standard equipment with five 10 or 12 kilowatts the fanv
26:43
needs to deliver this cooling power to cool the 30 or 40 kilowatt so we have
26:49
potentially a total overkill on the other cabinet so efficiency is also hard to to handle um with uh depend depending
26:58
on the cooling technology they that they're using uh also very important one is the
27:05
the Regulatory and environmental factors so a lot of companies especially big
27:11
ones and a lot of governments and everything they have their own rules um and the the their own set point of the
27:19

impact on the environment they want to have so this is also something that is very important and the cooling of a data
27:25
center can have a very high impact on this one so talking about just the the poe or the Energy Efficiency um water
27:34
effective uh water usage Effectiveness and stuff like this so very very important this is also something that is
27:40
now way more important than it was like the was like years before um and the
27:46
last one and this is where where it gets also complicated or it might be complicated so is the evolution in
27:52
cooling technology so uh 5 years 5 years ago you had like
27:58
the crack uh the fanv in row cooling some of the big ones um um had even uh
28:05
other cooling solutions already but the the change in the market um on on all levels is different
28:13
so that every customer if he wants to be ready for whatever is coming in the near
28:19
future needs to think of different uh different solutions of cooling so it
28:25
might be worth uh to look at also so the re heat exchanger uh it might be immersion
28:32
cooling or whatever it is um it is uh so the complexity is is on a
28:40
on a total different level if we look on those and the the points that you have to consider is not only uh like yeah the
28:48
the five or 10 kilowatt that you had in the past it's it's different now it's different and it can be even different
28:54
from cabinet to Cabinet depending on the architecture um and also on the uh the equipment that
29:01
they using so this is a very uh we we
29:06
see a really huge impact on Cooling in in the times that we are now in the the
29:13
change and the movement of the AI and the HPC that we're in right
29:19

now great stuff Claus and and I read somewhere that the data center industry uh consumes as much power as the airline
29:26
industry so what's type of regulations are are being placed globally uh to support reducing energy
29:33
consumption yeah so I will I will talk about the European part and maybe someone you can add some for uh for us
29:42
um so in in Europe this is uh a very
29:47
very important point where you are you have you are forced to reduce your
29:53
energy consumption of those so um
29:58
it it different it is even different from country to Country so some countries um they ask you to achieve a
30:06
certain level of of Poe within your data center to not waste any energy um other
30:12
countries they force you which is a good thing so don't get me wrong they force you to reuse the heat of the data center
30:19
and this is also easier to do on with different cooling solutions Le so the regulations
30:26
is totally different and on top of this it's also on on as I said on a company
30:31
level it is very different so um you have uh Rules by by the government in
30:39
terms of water usage Effectiveness uh power usage Effectiveness that you have to do um it differs from country to
30:46
Country at least in in in Europe um you're also uh restricted in some countries by um what cooling liquid
30:55
you're using meaning is it waterbased cool is it a Dix so a cooling gas or
31:01
whatever so even their limitations they not allowed to use um like gas in the
31:06
future and stuff like this so a lot of complexity given there key and bottom line of all of those is the lower the
31:14
power consumption needed for cooling the better it is obviously yeah than class and from a US

31:22
perspective uh you know I can see the the basically the range of different
31:27
regulations I guess I'll call it regulations that that we've adopted you know at at a city level or a region
31:34
level there's a little bit of a constraint uh you know that we're seeing now with the Advent of electric cars
31:41
placing energy cons you know energy consumption on the grid uh very high we've seen uh you know different states
31:48
adopt different um internal regulations on how power is consumed in general but
31:54
we're really seeing it from the energy utility companies becoming more prevalent uh adopting a a method of
32:01
providing credits to to people who adopt uh energy you know responsible energy
32:06
practices uh I've seen that in uh Chicago Virginia know California
32:12
definitely being the hot spot of uh you know uh regulation in terms of uh energy
32:18
consumption so we're really seeing a lot of uh cities and states kind of provide
32:23
this type of Regulation where the federal government has not yet stepped in or not at the country level has
32:28
stepped in uh to provide that type of Regulation I do suspect that we are on
32:33
you know in on the track of of having some of those uh you know like you said
32:39
Brandon the the data center energy uh the data center industry is consuming all this power uh and and we're really
32:47
um we really got to do our part to to reduce energy consumption wherever possible
32:54
Right absolutely absolutely so I will move one slide on so we talked lot about
33:00
different cooling solutions and densities and stuff like this I just want to want to display the make it uh
33:08
uh use use a little bit of color just to to give it a little bit of of of of
33:13

details and to make it a little bit easier um so when we just look at an an
33:19
at at one example which is like very very often and very common in use um
33:25
like a Craig unit so you have uh your your crack or craw unit that provides
33:32
the cold air and you hopefully use a kind of a containment so to optimize
33:37
this which saves you a lot of a lot of headache so with the containment in in
33:43
in easy words to keep the air where you want to keep it to not mix the cold and
33:48
the hot air which is something that you totally want to avoid so um you can use
33:54
both you can use hot ale or cold ale containment um it doesn't really uh it doesn't really matter what
34:02
you prefer to use um key is to not mix it um on a day
34:09
one installation um where the the theoretical load of every cabinet is
34:16
even or is in between 3 to 10 kilowatt per cabinet or whatever it is very easy
34:21
to go uh very easy to do straightforward you can do basically whatever is needed
34:26
so this is what we had when we when when we started this whole thing and when we talked about sensors so very very easy
34:33
if the density in the cabinet increases then this is where you need to think of
34:39
what to do with it and where to place those for example when we look at the the red highlighted cabinets so those
34:46
are uh uh displaying the the the cabinets with the highest load highest
34:51
load in in this scenario so um the yellow ones are like mid uh uh mid power
35:00
consuming cabinets so this is something that you need to be aware of when we talk about placement so meaning if you
35:06
have like a third cabinet that needs a higher demand obviously you have to check if your cooling system is able to
35:13
provide the the cooling power um and secondly uh you have to look at your

35:22
your sensors that you hopefully are using to where to place this cabinet in the worst scenario you would place like
35:28
two red or two high L cabinets within uh next to each other which might cause a
35:35
problem uh because they will consume a lot of the air distributed into the the
35:41
a containment and there will be not much left for the others or one cabinet just
35:46
gets rid of uh gets um consumes that much of the coal there that there is not
35:52
enough for the cabinet next to it which is also High loaded cabinet so you might run into trouble into problem so um
36:00
sensors is very important and then the funny thing is so you know that you
36:06
might face a problem so what to do with it I mean it's not as easy as uh like there is no switch that
36:14
you can can can run and say so I need 25% more power or 50% or whatever um and
36:21
even if you have this switch then your efficiency is like
36:27
totally um um um meaning if you have to run your cooling system on the cabinet
36:35
with the highest load you might have really an overkill on all the others so efficiency is uh Poe is like forget
36:43
about it this off the charts so the interesting thing is if you know you might face problems or whatever so what
36:49
to do with it and this is why it might be wise to look at other cooling
36:54
solutions um to be very efficient and to be very precise in cooling um so you are
37:01
down to like uh you should cons consider like a a wreck level cooling for this um
37:10
and there are different meth methods to do so so on a Rec level cooling you end
37:15
up very quickly either in the choice of an reader hit exchanger uh on chip
37:20
cooling or immersion cooling so the thing is immersion cooling I will
37:28

I will give it a few words later on because that's very very specific this topic um read heat exchanger and on chip
37:35
cooling so onchip cooling is something that you can't decide at any stage just
37:41
on your own or just because of the will of it because you need specific systems meaning the servers need to be able to
37:47
to deal with liquid cooling um so specific systems that you need and then
37:53
you need also uh the Water in your cabinet which is by the way a good way
38:00
this is the topic of uh of this webinar so um this is something that is way more
38:08
important than the the actual cooling solutions that you do you need to provide the way to cool your cabinets
38:16
meaning um you should think about Distributing or providing the pipe work
38:21
within your data center for the future needs so we are back to to this scenario
38:28
we have more cabinets that needs to be cooled wherever it is uh uh than for
38:33
example an onchip cooling because you change the systems in one or two or three of your cabinets or you have just
38:39
the high load with uh with normal servers and then you can use uh the Water distributed within your data
38:46
center and you can attach for example a read heat exchanger a read heat exchanger is cooling whatever load you
38:54
have based on your cabinet the this solution is an air assisted
39:01
liquid cooling meaning the heat exchanger is is liquid uh um is based on
39:06
on liquid cooling uh in best case it is a water uh in best case it's water so it
39:13
doesn't matter what load that you have in your cabinet um the the reader hit
39:20
exchanger can deal with it within its limitations obviously depending on the water flow and uh the temperature but to
39:29
deal with Hotspots for example is a great way to do and you can add this in

39:34
any scenario that you have so if you use fan wall if you use a crack and a craw or whatever it is uh it doesn't really
39:42
matter also if you use cold L containment or hot L containment the configuration there is no change needed
39:49
you can add a reader to solve a hotsp spot in any scenario the good thing about is the reader hit exchanger takes
39:57
out your high load cabinet out of the the the equation and in the same time
40:03
supports your cooling system that is already running um because the only hot
40:09
air you have is the distance from the end of your servers to the front of the coil of the reheat exchanger and that's
40:15
it the air that leaves the cabinet on the backside outside of the rhead exchanger is cool air again which can be
40:22
directly used consumed from every system next to it or in in in the whole room um
40:29
so this is uh the the complexity of the topic you
40:37
you can help yourself if you think the step further and have your your
40:43
infrastructure ready to deal with what will be there in the future meaning plan
40:51
ahead plan the pipe work you need the liquid in your cabinet one way or
40:57
another so this is something that there there will be no way around if it is then uh
41:03
on chip cooling or it is like a reader heat exchanger by the way onchip cooling
41:08
so onchip cooling is a very very good solution but please don't forget if you
41:15
use onchip cooling you need a second source of cooling because all of your systems uh and your servers if they use
41:23
onchip cooling everything within this server that is not a CPU or GPU is not
41:28
equipped with onchip Cooling and needs to be air cooled so you need a second source of cooling for your systems as
41:34

well also the transition I I doubt that any
41:40
customer will will have the cut from Monday to Tuesday and say so we have all
41:46
our systems we throw them in the bin and tomorrow we have the big boom and we just go and onchip cooling this will
41:52
also not happen so it is the transition and as I said if you use onchip cooling you need air cooling for those systems
42:00
as well um depending on the system you use between 10 and 40% of those servers
42:05
is not cooled with the onchip cooling so if we look just uh um use use uh plane
42:13
numbers if we have a cabinet with 100 kilowatt load which is it it sounds very
42:19
high but it is not that big of a challenge with those systems so if we talk about 100 kilowatt cabinet between
42:26
10 and 40 so 10 or 40 10 up to 40 kilow needs to be cooled by air in addition to
42:33
on chip cooling so if we are down to 10 kilowatt you might be lucky and you have
42:39
your crack unit you use uh uh containment so um airflow management to
42:44
optimize this you might be able to run this um if we're looking about more to 40 kilowatts then you look more for a
42:52
combination of an non chip Cooling and a reader hit exchanger for example to get rid of the heat so those are very very
42:59
important things and the best thing to be safe is um plan ahead and plan with
43:07
the infrastructure you have um there is uh there is no way around
43:14
liquid uh uh liquid cooling or air assisted liquid cooling that you will
43:19
have to deal in the future to get rid of the the the heat um and the load that
43:24
your cabinets might have yeah C really really well said uh I think to your
43:31
point on planning for the future I think it really all starts from the cabinet level I mean I I talk to Data Center uh
43:38

managers all the time and if you think that the it refreshes that occur every three to five years you know that's not
43:46
the same as what is done on on the cabinet level right so on the cabinet level you're you're you're putting this
43:51
piece of equipment uh you know it's almost going to die with your data center I I've seen data centers torn
43:58
down with with cabinets inside um so you know making sure that you're not only
44:04
your cooling but your you know everything starts at the cabinet your your cabinet level cooling is important
44:11
your load is important whether it's applicable into seismic environments or could be a future seismic envir
44:18
environment you know these are all things that you have to think about when you're planning because you don't know
44:24
what you're going to get tomorrow and those things are going to be with you for very long time oh yeah and thanks
44:30
that you that you brought in the topic of cabinets because it is absolutely true that you should you have to think
44:36
about this as well because the there is just think about the size of a cabinet
44:41
so think about the future and for example a 600 white cabinet with the the
44:47
higher demand in power impossible it is impossible to fit in because you need you need the space for the pdus um and
44:55
if we if if you think about about or if you potentially think about like uh on chip cooling you need to place the
45:01
manifold somewhere to distribute the the water within the cabinet so you even
45:06
have to uh to think about the the the easy thing like the dimensions of your cabinet to be safe um what this is so to
45:15
to plan the the Step Ahead absolutely yeah right now with now with manifolds you know being added to the back of the
45:21

cabinet especially I see things going deeper deeper already and for these types of of uh you know power loads
45:28
we're seeing up to eight pdus being installed in the cabinet depending on the type of environment uh and and power
45:35
sources you have uh within the data center so
45:40
definitely and before we uh leave the topic as well as the slide uh gentlemen
45:46
how how do you decide on which cooling solution uh you want to deploy in a data
45:52
center yeah yep that's that's that's an a very good question um
46:00
and to be to be very very open about this if anyone on the market at this
46:08
time at this period of time tells you so you have to do this because it will look like this in one one year from now or in
46:15
two he will totally lie into your face reality is at the moment no one can tell
46:21
you exactly what the future of cooling will look like what I can tell you is
46:27
that you be on the best step towards the future meaning what is the best things
46:33
that you can do to be ready for the future so we
46:39
have uh crack uh crack and inro I will I will not talk about those because
46:44
they're just from from a load point of view and everything this is just it it it will not be the one for the future
46:52
fan wall used very often yes but on its own also very limited and also hard to
46:59
be precise in Cooling and to be efficient if you have like a huge Variety in R densities so what is true
47:07
and what is reality so there will be no way around of uh liquid cooling uh and
47:13
uh also not on the rec level so uh uh back to the thing
47:18
again um we are down to uh the infrastructure and distribute whatever
47:25

is needed like the pipe work and everything to to solve your cabinets and then secondly there also um the way of
47:35
being ready for the future is also something so you want to have a very
47:40
high range that can be cooled um within one cabinet so meaning um from from the
47:48
the the the new St start point of like 10 kilow per cabinet and above you want
47:55
to have something that can Co pool very effective on a rack Bas level independent of the of the power of the
48:01
load of the cabinet um and therefore is uh the read hit exchanger is is a very
48:08
good way to do this because the read hit exchanger it it is it doesn't matter if
48:14
it is the cabinet is loaded with 10 kilow and two weeks after it is 20 kilow
48:19
and then it's 35 or 40 or 50 there is no change needed in in the system itself so
48:25
the read hit exchanger um can run this and can run this on a very very efficient level and also based on the
48:32
cabinet itself so there is no no need to run anything on 100% if it's just one
48:38
cabinet needed so this is something that you can cool down very precise and the
48:44
second good thing about if you if you look towards this kind of a solution um
48:49
by the same time you also have the water already in the cabinet so even if you then think about the next step which
48:57
might be the transition from your systems to on chip cooling systems you already have the water in your cabinet
49:04
so even there you can start the transition so in in in in a
49:10
nutshell there is nobody then can can can say right now in two years in three
49:16
years next year this is the cooling solution and this is what you need to do this is absolutely not true but to show
49:25
a way where you can be safe for anything that is uh uh that that might appear or
49:30

that might cross your way this is something that we can absolutely do and this is as said so um the the PIP workor
49:39
and everything that you need to do and then uh the trend will go like a combination of uh read he exchanger and
49:47
on chip cooling this is what it's most likely will be on the other hand and
49:53
this is where we'll jump so this this question fits in there perfectly so on
49:59
the other hand we have also um the immersion cooling so I said I will I will give it one or two words later um
50:06
because this is something that is totally different from uh from other cooling methods that
50:14
we see so if I I I don't believe it but if anyone in here is hasn't crossed
50:21
immersion cooling um so this is like what would be a good good way to
50:27
visualize it um it's it's a bathtub where you reverse deep fry your server
50:34
so this is how you can maybe imagine it so it is a bathtub where you dunk in all
50:40
your servers depending on the liquid you're using and if it's one phase or
50:45
two-phase so it is uh oil or it is uh like an a synthetic uh
50:54
uh liquid um it has a very huge potential the
51:01
immersion cooling uh dep depending on how you use it and what liquid you use it might have
51:09
an an a bad impact on the environment um it is also not very easy
51:15
to handle so you need the systems uh uh to handle those so um it's easy set you
51:22
can dunk into any system but as soon as you as you ask then yeah how about the
51:28
warranty and stuff like this so then everybody falls short so it it is it has
51:33
an an a a huge potential and also reusing the heat for example with immersion cooling is one of the easiest
51:40

that you can have um what no one talks about for example in immersion is it has
51:48
also some downsides so um meaning you need the staff trained on the immersion
51:54
cooling so it's it's not as easy as as the other things
51:59
um if you uh you have to test the liquid and
52:05
uh depending on on what liquid it is um you have to dispose it and renew it every two to three years so if you're
52:13
using the systems just for yourself may be easy if you host systems
52:19
and you have like 100 clients on those systems um good luck finding a date
52:25
where all 100 clients of you agree to like okay we have a shutdown of the
52:31
server because you have to renew the the liquid and stuff like so it has a great potential but there are also some some
52:37
downsides on it so um it it might be the big thing but it will be limited to some
52:45
customers this is where immersion will will most likely position itself and the
52:50
other things is like what I what I explained earlier I just made this chart to make it to to to give it a a bit more
52:58
uh visibility so I used the the snowflakes where is the the potential of those um just to have to to to give it
53:06
an an idea what to use and as said the trend will most likely be a combination
53:12
of onchip cooling and a re heat exchange this is what we see in the
53:18
market I hope that this yeah gives an idea on what cooling solution to
53:25
use yes thanks Claus and and the the audience has also been seeing immersion
53:30
as a type of cooling that is up and coming um and they wanted to know does that follow the same type of approach as
53:36
the air and liquid cooling solutions that you discussed earlier yeah so that's that's what I
53:42
said so the the the approach so it is it is a total different style of solution

53:49
so that's why I try to to make it to to visualize it with the you deep frying your servers so um this is what it is um
53:58
it has a the the a huge potential it has also the biggest impact on your whole
54:05
infrastructure and therefore on all of it and finally immersion cooling is also
54:12
something so what we see right now so some customers and by some I mean you can count them on one hand are using
54:18
immersion Cooling in the data centers which is on on static systems or whatever absolutely um
54:26
on most customers it is like the proof of concept phase that those systems are
54:33
they they just are at the proof of concept but then no next step or whatever um reality is also um this is
54:41
something that you you might think of so is it really the solution that I need um
54:47
because immersion cooling is like something so the the the cost I mean you
54:53
at one point you have to consider the cost and this is the most expensive uh
54:58
Solution on on day one that you can have so it has the potential to have the the
55:04
lowest uh uh Poe but the initial costs are by far the highest for immersion
55:10
cooling um and secondly it is also something um like do you need it in
55:19
terms of the load so for one tank of immersion cooling we talk about a capacity of up to 400 kilowatt in in in
55:26
one of those tanks or maybe more um so
55:32
um as said it has a potential but there are so many new questions with this
55:37
topic um so this is a total new chapter but for majority of the
55:44
customers I don't uh the market sees no
55:49
wider Depon in the next coming years on on immersion cooling it has its its
55:54

potential but it's not it's not the solution for for every DC
55:59
let's say like this it's an all or nothing is what it sounds like you know you're either all
56:05
in on immersion or you're not so there's no there's no in between definitely thanks CL and thanks as well San did you
56:13
have any final comments before we close here today uh yeah I think uh I see a
56:19
question in the chat regarding seismic um on the containment products
56:24
that uh we offered the building within a building structure has the ability to be a a seismic rated solution that way if
56:32
uh if you're in one of those environments and this uh this solution is holding up your infrastructure it
56:37
will be rated as well as our our cabinets for the same the last comment that I
56:44
had okay awesome thanks San um and we would like to thank you both uh for your
56:50
expertise today um and before we begin with today's Q&A instructions please direct your attention to our webinar
56:56
survey available on the bottom of the presentation window thank you all in advance for filling out the feedback
57:02
form again your participation in this survey allows us to better serve you and now on to uh the question and answer
57:09
portion of our event as a reminder to participate in the Q&A just type your question into the text box located on
57:16
the right of your presentation window or click the Q&A icon at the bottom of your
57:21
screen we'll be sure to share all of the submitted questions uh during today's webinar with our speakers who can reply
57:28
to each and every uh question submitted today offline um and so that is all the time
57:34
that we have for our broadcast today again we would like to thank you uh saman and clouse data center data center
57:41

knowledge appreciate your time and expertise on today's topic we would also like to thank our sponsor L Grand as
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well as to everyone in the audience today we appreciate your attention and participation within the next 24 hours
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58:27
thanks for your time and have a great day thanks so much everyone look forward to hearing from
58:55
You.
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