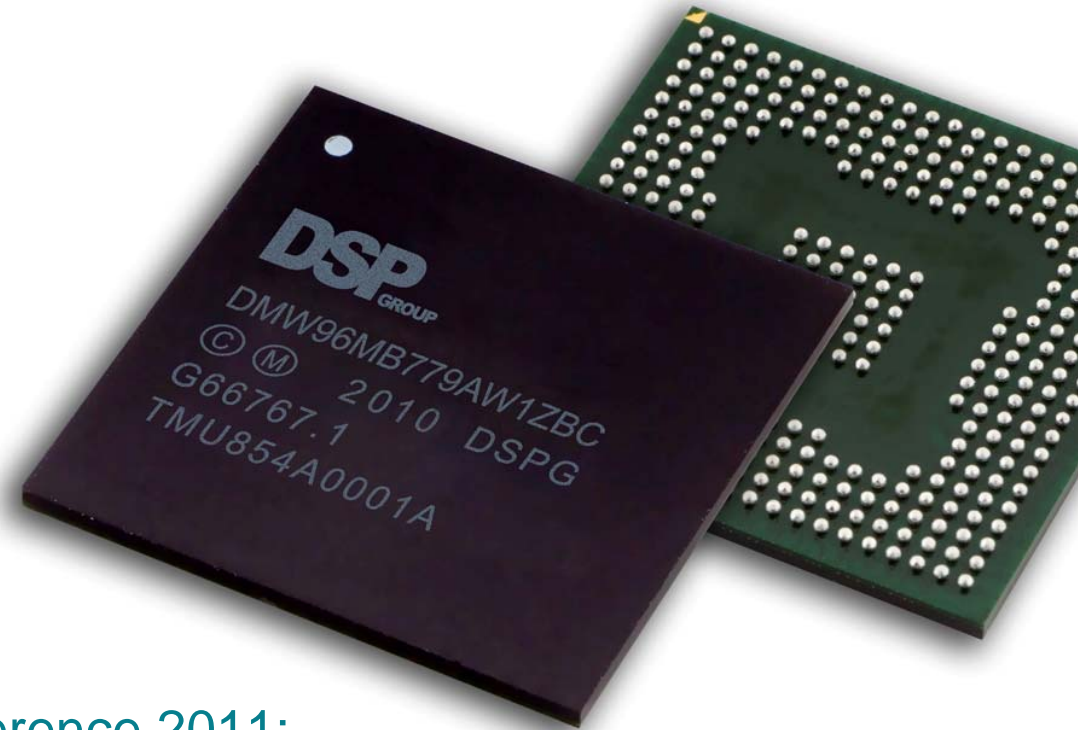


DSP Group Inc. (NASDAQ: DSPG)



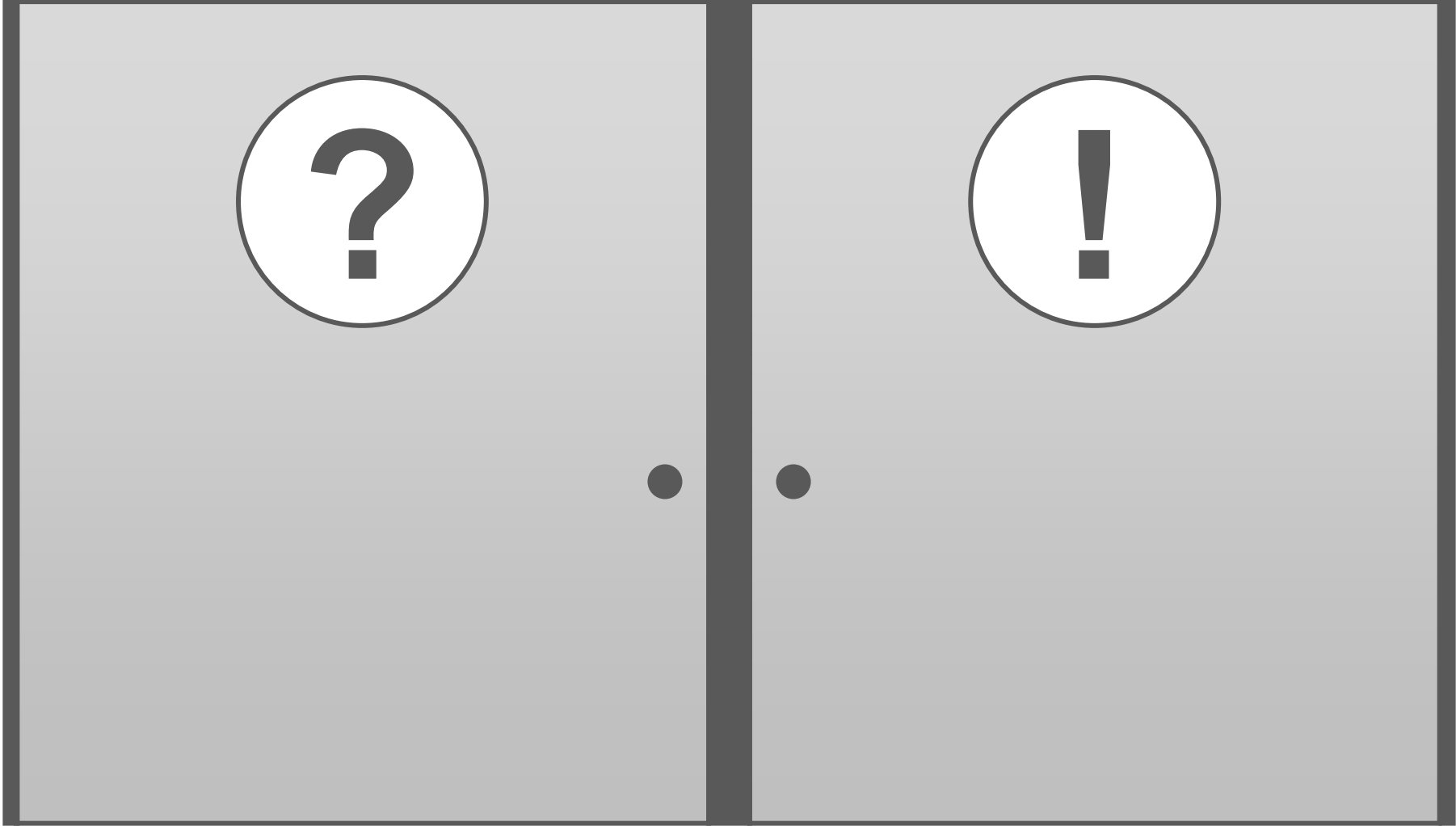
CAT-iq Developers Conference 2011:

Real-life Execution

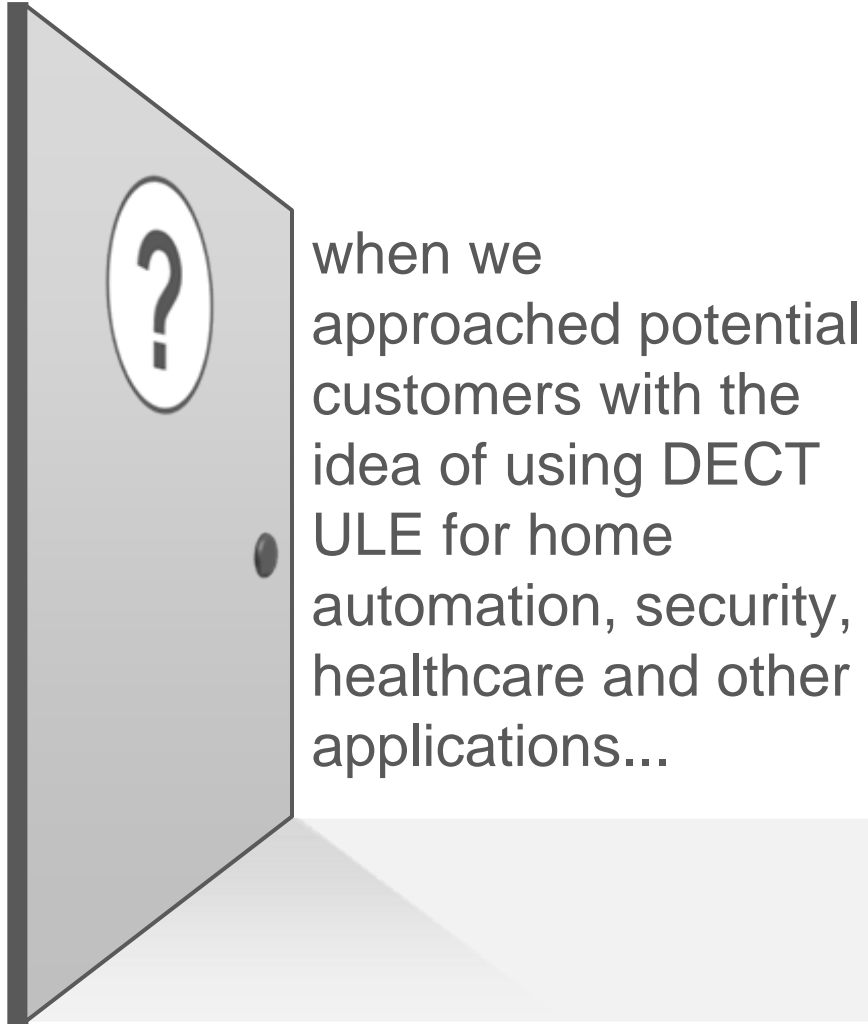
DECT ULE – Implementation Experiences

Jochen Kilian, September 2011

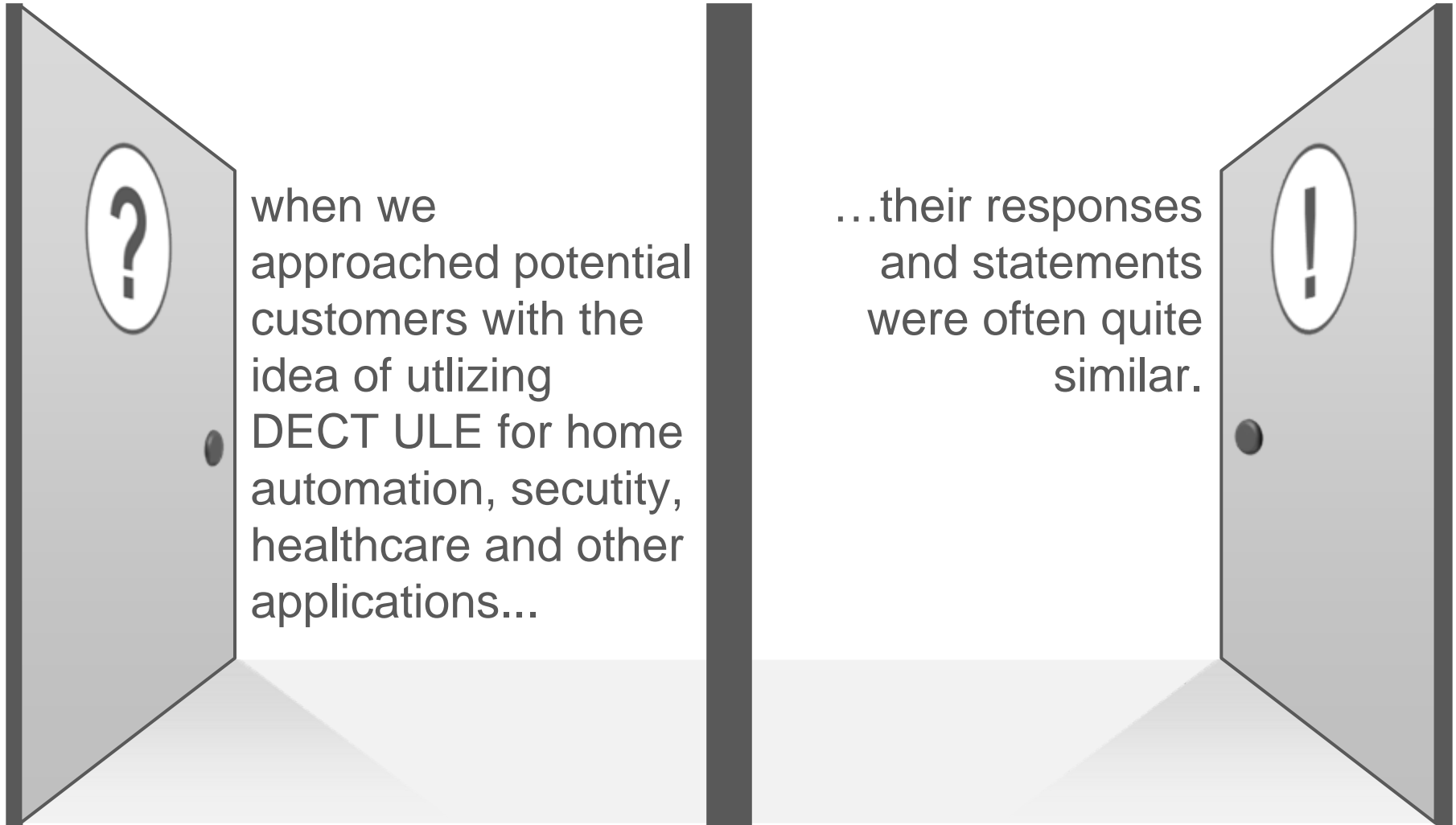
What Happened in Real Life ...



What Happened in Real Life ...



What Happened in Real Life ...



What Happened in Real Life ...

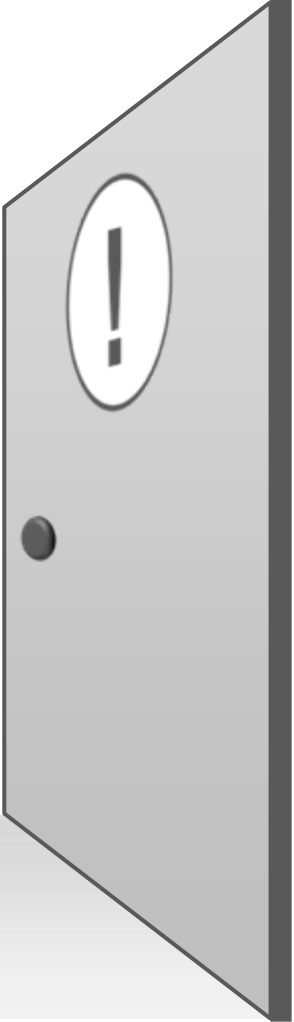
you are invited to listen in...



DSP Group



Customer





**DSP
Group**

Customer





... we have DECT ULE products available now to use with various applications such as:

- Home Automation & Home Security
- Smart Metering
- Device Tracking,
... and many, many others

What do you say?

DSP Group

Customer





DSP
Group

Customer

That is quite surprising!

We know about the capabilities of DECT/CAT-iq for voice , but why are you introducing it now for all these other applications when so many standards are already on the market?





Mmmh, we have to admit that DECT is a latecomer to these applications ...



DSP Group

Customer

That is quite surprising!
We know about the capabilities of DECT/CAT-iq for voice , but why are you introducing it now for all these other applications when so many standards are already on the market?





... but we got alerted to its benefits beyond voice...



DSP Group

Customer





... and woke up!

DECT ULE is on its way:
the first interop session
took place in June this
year.



DSP Group

Customer





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Group

Customer

Very interesting. We were actually considering DECT for these kind of applications years ago...

We know that DECT has many advantages such as:

- Dedicated frequency
- Extended range
- Easy to install





You are right!

DSP Group

Customer

Very interesting. We were actually considering DECT for these kind of applications years ago...

We know that DECT has many advantages such as:

- Dedicated frequency
- Extended range
- Easy to install





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Group

Customer

But what about capacity?

We need more than 6 devices per base station!





We actually support 12 handsets with our new Non Blind Slot RF chips, yet we agree that this is still not enough...
Let me tell you about DECT ULE.

DSP Group

Customer

But what about capacity?

We need more than 6 devices per base station!





DECT ULE Capacity Considerations

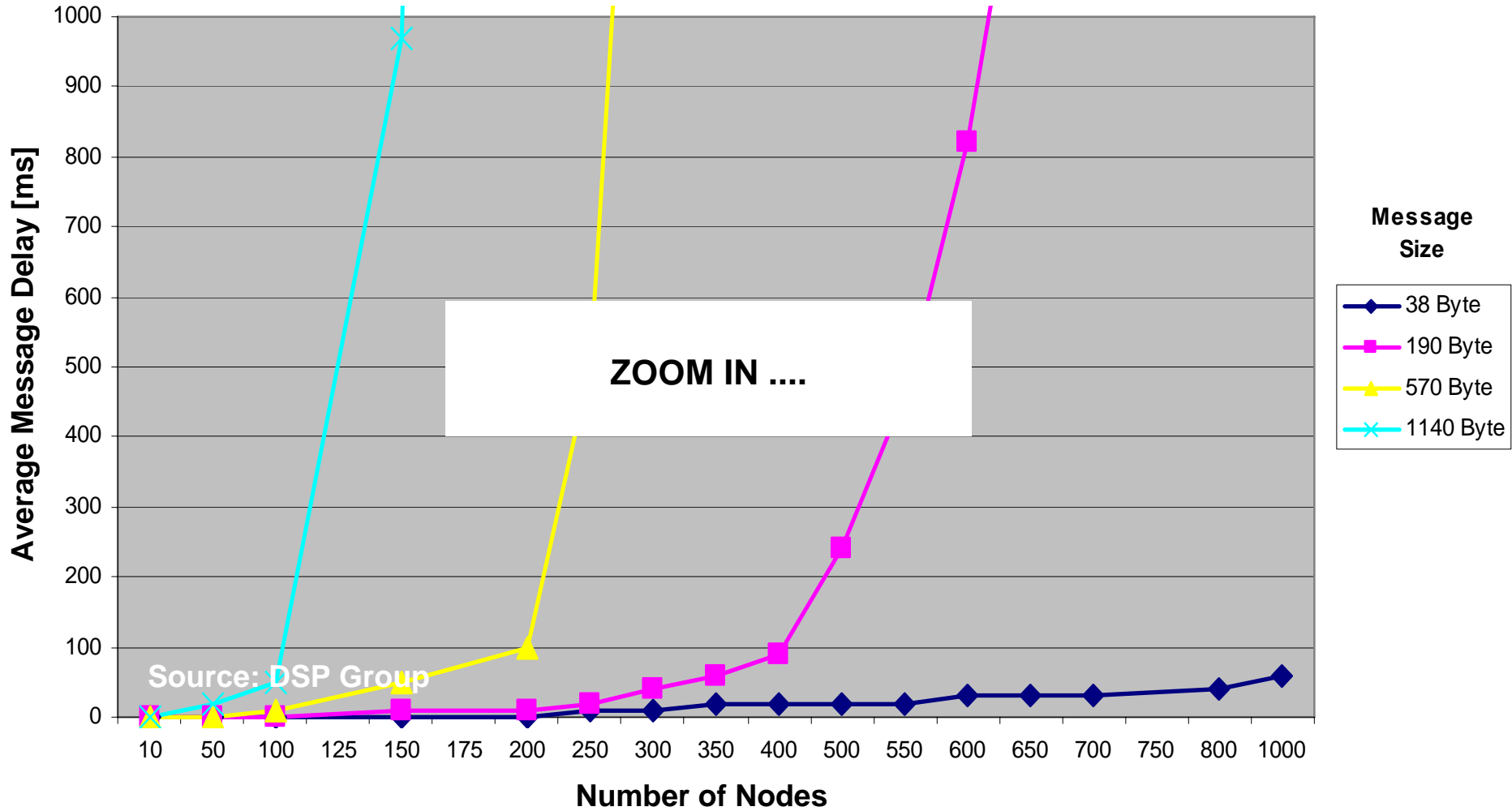
- What limits system capacity?
 - Your requirements
 - Message size
 - Message frequency
 - Average delay
 - Worst Case delay
 - Data Throughput
 - 38 bytes (t=10 ms)
 - 190 bytes (t=50 ms)
 - 570 bytes (t=150 ms)
 - 1140 bytes (t=300 ms)



DECT ULE Capacity Simulation

- Emulation of a DECT ULE system
 - Varying number of nodes per base station (from 10...1000)
 - Each node sends a message every minute to the base
 - Message size varies from 38 bytes to 1140 bytes per message
 - ULE behavior according to ETSI documents (the basis for the first interop event)
 - Using only 1 DECT slot pair for communication
- Not taken into account
 - Interference from other DECT systems

Average Message Delay

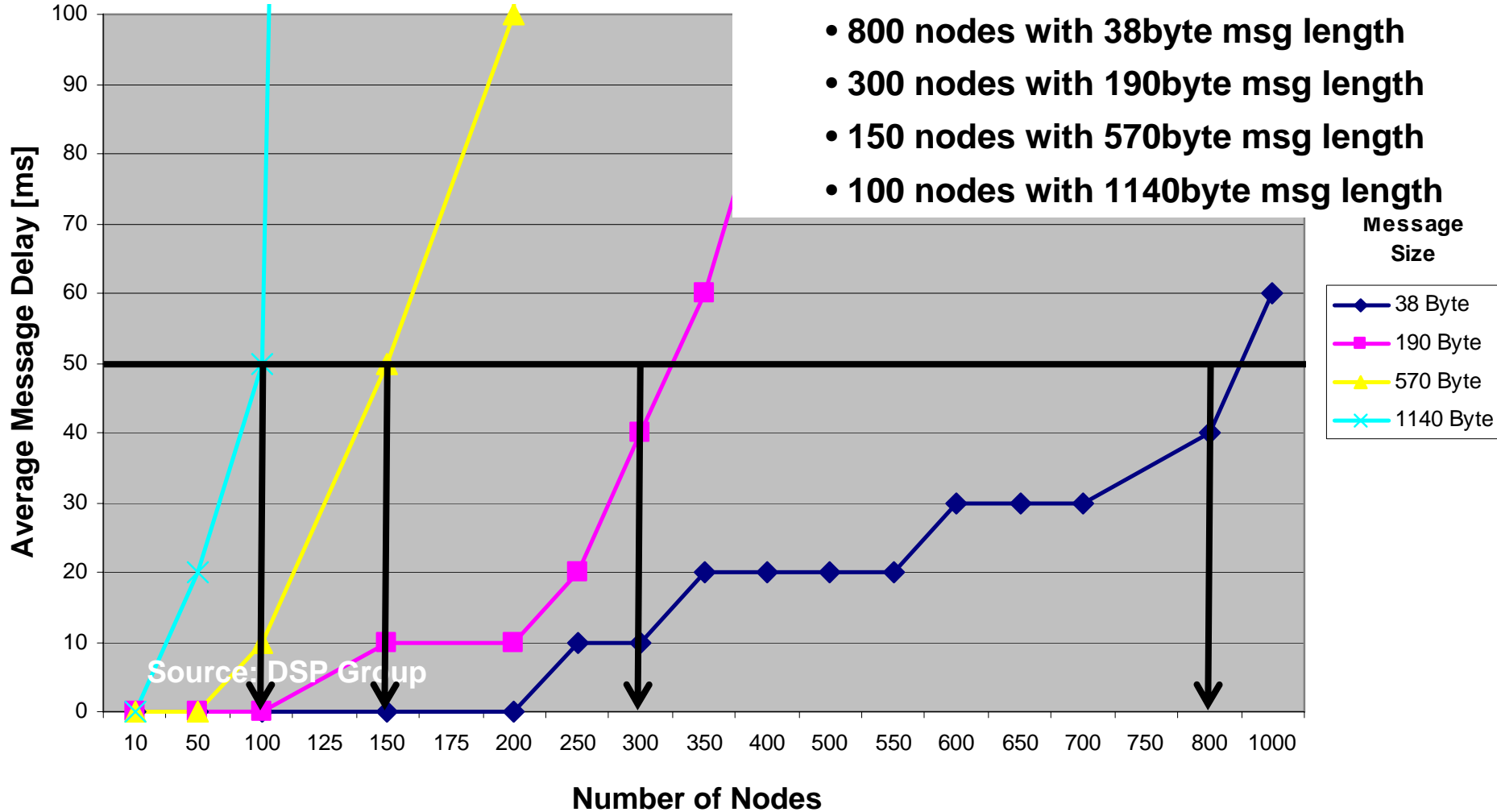




Average Message Delay

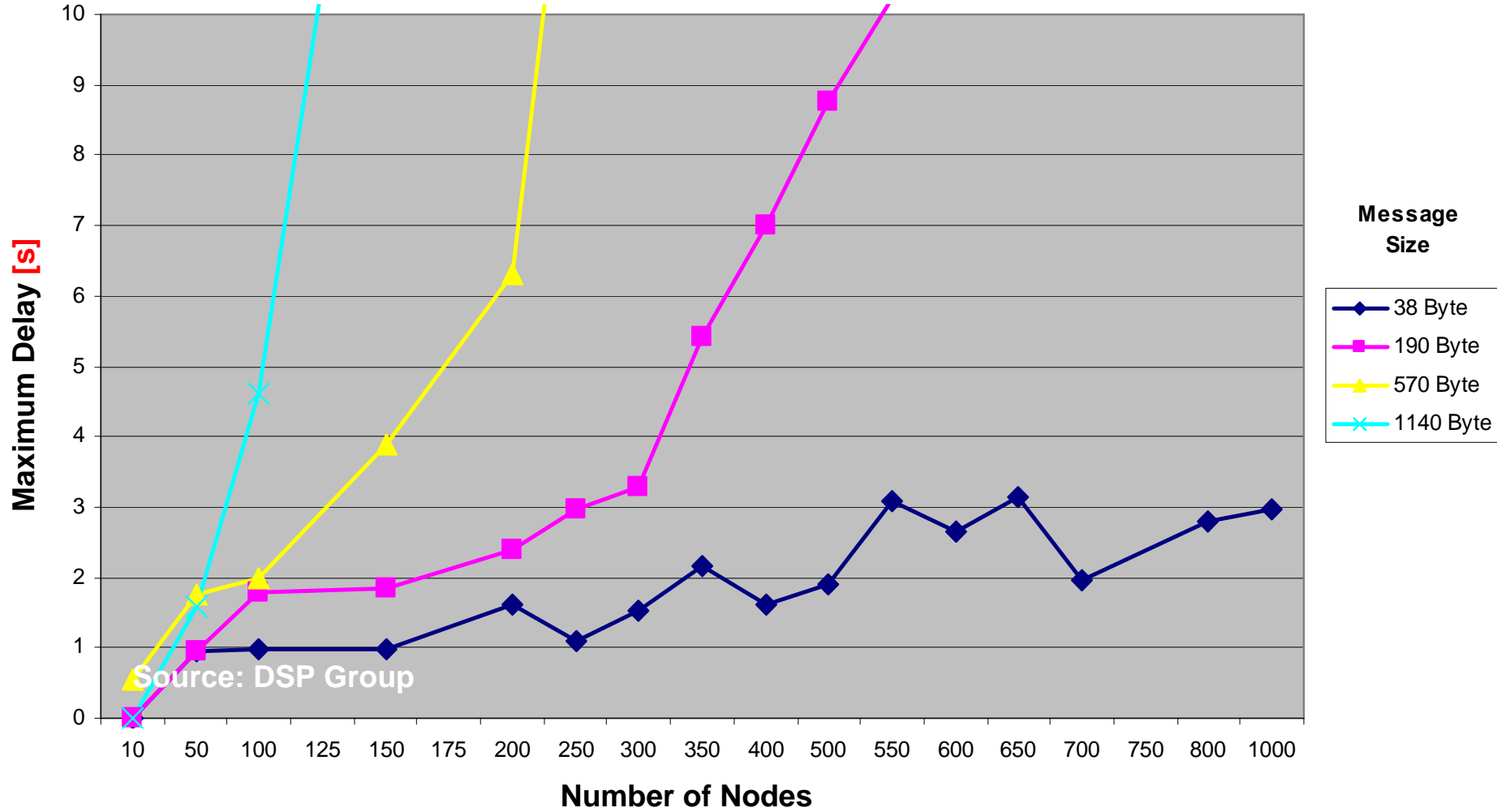
Assume 50ms
as average delay requirement:

- 800 nodes with 38byte msg length
- 300 nodes with 190byte msg length
- 150 nodes with 570byte msg length
- 100 nodes with 1140byte msg length





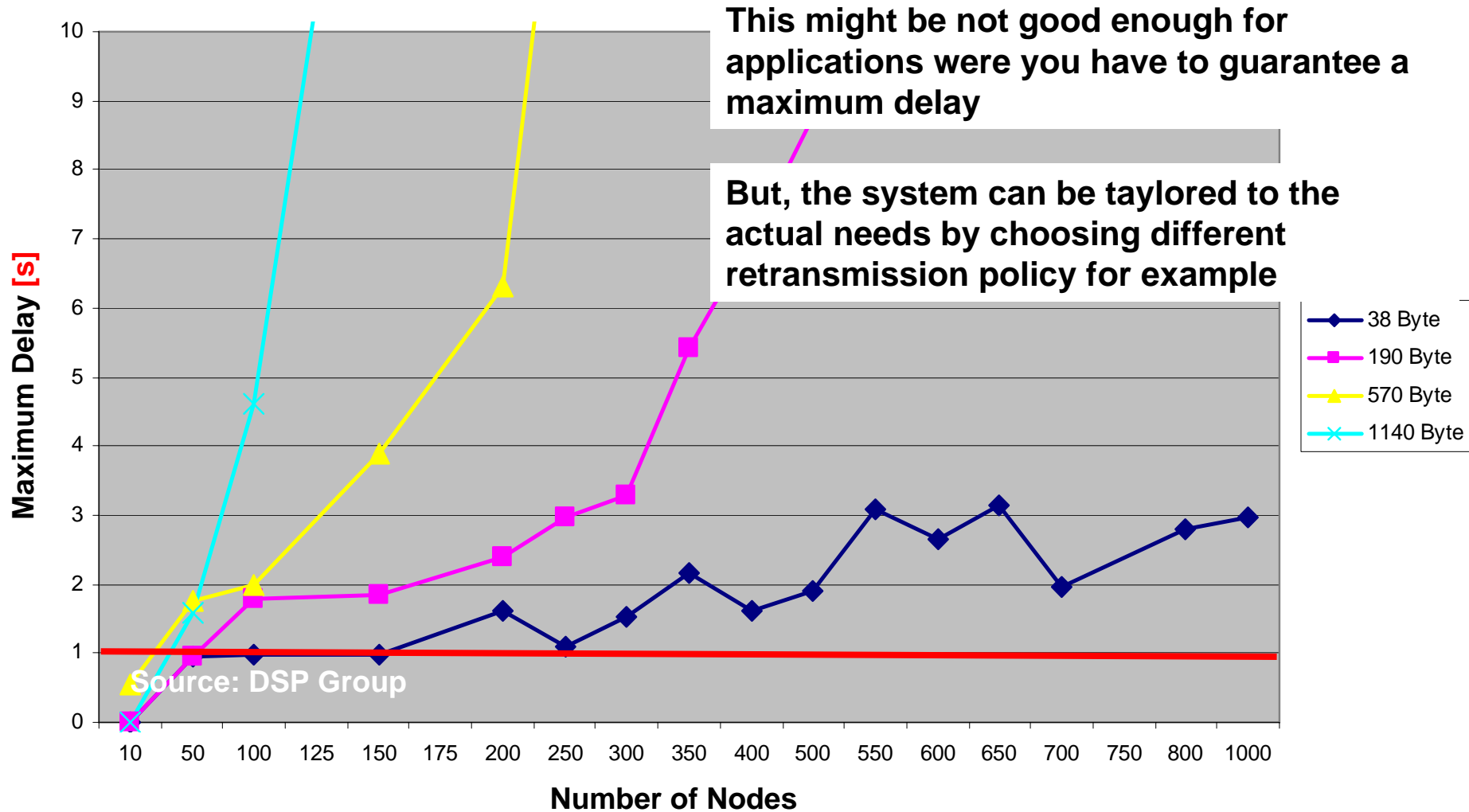
Worst Case Message Delay



Source: DSP Group

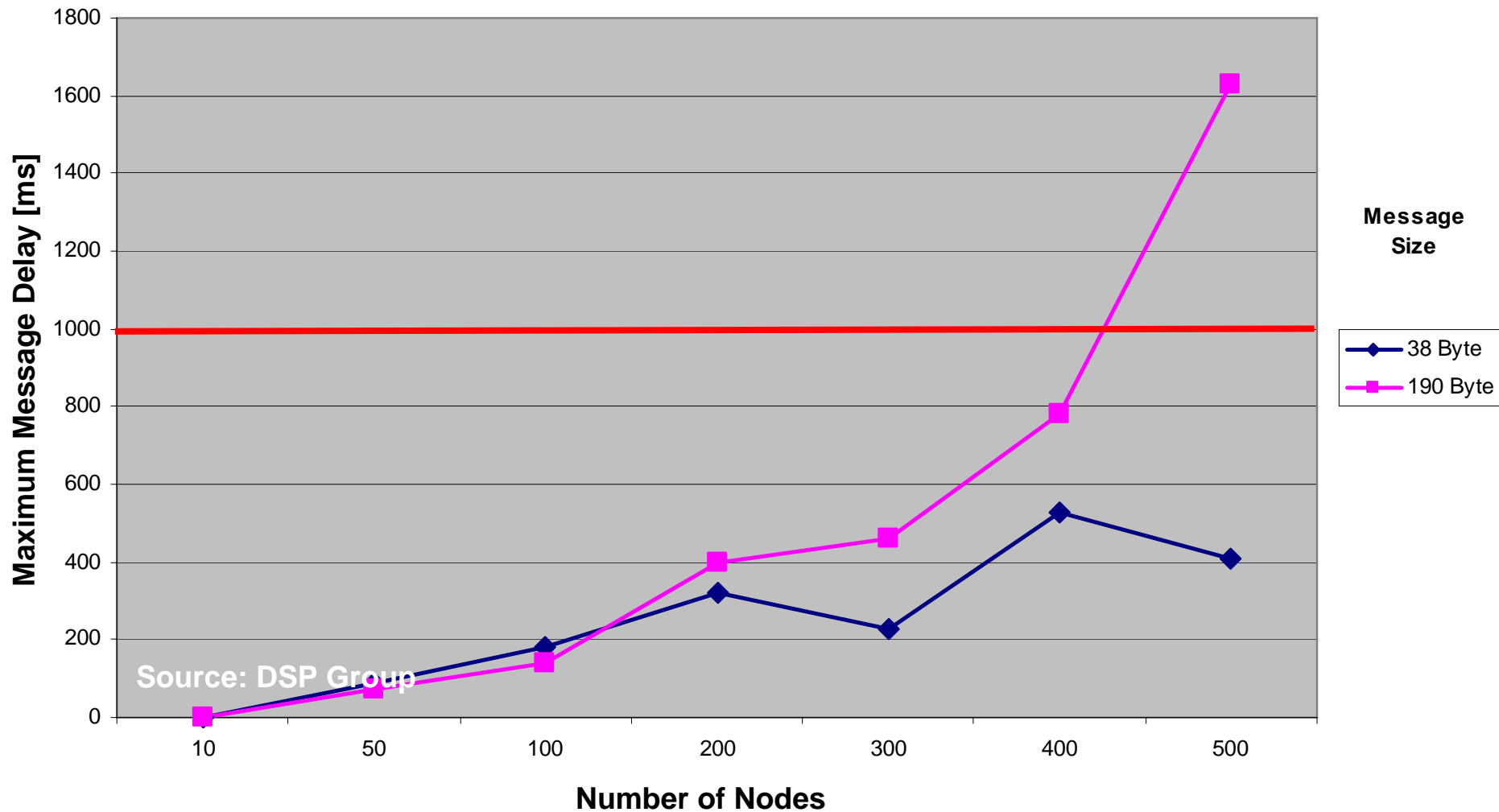


Worst Case Message Delay





Worst Case Delay (with optimized parameters for short messages)



Source: DSP Group



Summary: DECT ULE Capacity Considerations

- Legacy DECT limit of 6 or 12 handsets is not valid for the DECT ULE use cases
- DECT ULE is scalable for more than thousand nodes per base station depending on:
 - Required bandwidth
 - Maximum and average delay requirements



Keep in mind:

All simulations were done for a certain use case:

- Every node sending one message per minute
- Only 1 slot is used for the data transmission



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Group

Customer

Looks like this covers all our needs easily!
But what about Battery Life Time?

4 weeks standby is not good enough.
Do you have an answer to this as well?





Sure! DECT ULE enables multiple years of battery life time!!
Depending on the use case, you can expect 10+ years

DSP Group

Customer

Looks like this covers all our needs easily!
But what about Battery Life Time?

4 weeks standby is not good enough.
Do you have an answer to this as well?





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Group

Customer

That's quite impressive but.
But, what about a valid standard?

Seems like there is no endorsed standard today. We do not want to work with a proprietary solution!





Actually, lots of activity nowadays is taking place

- in the DECT industry,
- in ETSI and
- in the DECT Forum.

DSP Group

Customer

That's quite impressive but.
But, what about a valid standard?

Seems like there is no endorsed standard today. We do not want to work with a proprietary solution!





Actually, lots of activity nowadays is taking place

- in the DECT industry,
- in ETSI and
- in the DECT Forum.

Anyone can start developing today since the silicon does not need to be changed for the DECT ULE.
A simple SW update will let you convert to the standard when ready!

DSP Group

Customer

That is quite impressive but ...
What's about a valid standard?

There is no valid standard today. We do not want to work with a proprietary solution!





DSP
Group

Customer

Looks like you have an answer for everything but ...
Whats about an ecosystem?

There seem to be no vendors for sensors in the market! How can I start without having the right partners?





There is a lot of progress going on as we speak.

DSP Group

Customer

Looks like you have an answer for everything but ...
Whats about a ecosystem?

There seem to be no vendors for sensors on the market! How can I start without having the right partners?





DECT ULE ECO System

- Eco partners are a very important part of the success equation.
- We're greatly addressing this 'Chicken and an Egg' subject
- Focused efforts and actions taken by the DECT industry, and the "gap" is about to be closed very soon!!
- We are progressing fast with global-players in the marketplace





DECT ULE ECO System

- As of today DSP Group already cooperates with:
 - Ranked #1 Solution Provider in Home Automation
 - A major Sensor Manufacturer ODM
 - ‘Pre-standard’ DECT ULE already integrated into different sensor devices
 - Samples available starting Q3/2011
 - Mass production planned from Q1/2012



DSP
Group

Customer

WOW. Things are moving much faster than I realized.

This also opens new business opportunities for us!

Let's hold a follow up discussion to evaluate DECT-ULE based solutions.





We will do so.
Thank you

DSP Group

Customer

WOW. Things are moving much faster than expected ...
This also opens new business opportunities for us.
Let hold a follow up discussion to evaluate DECT-ULE based solutions ...



Thank You