TSGRAN#6 **RAN#6(99)674**

December 13-15, 1999

Nice, France

Agenda Item:	**4.2**
Source:	**Golden Bridge Technology**
Subject:	**CPCH vs DCH vs RACH**
Contribution for	**Information and Discussion**

Introduction:

With the rise of interest in wireless Internet on a global basis, there is a need to provide some guidelines on various packet data mechanisms in W-CDMA. There are several options for transfer of packet data within W-CDMA specifications. Some, such as DCH/DCH are suited for real time data, some are suited for fast signaling purposes such as RACH/FACH and some are designed for Internet-type services, such as CPCH/FACH.

In this information-only presentation, we show that CPCH/FACH is optimal for the Internet-type services. However, the motivation of bringing this contribution to RAN is to inform of GBT's intention to introduce this to an impartial 3GPP group such as WG4. GBT will submit this contribution to WG4 for their next meeting.

Last Updated: November 15, 1999

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CPCH VS. Dedicated

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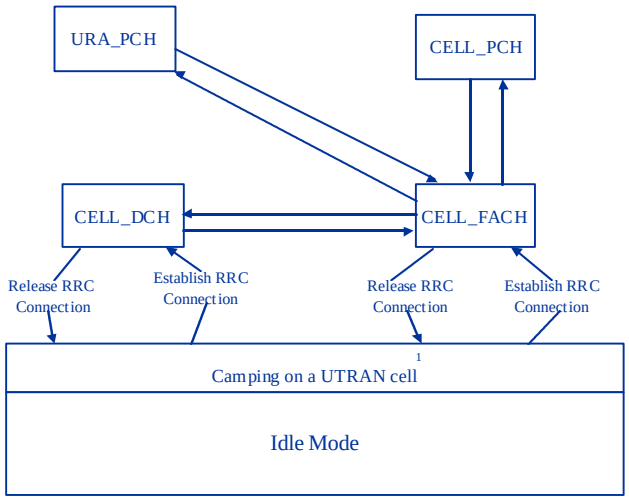
W-CDMA Packet Data Solutions at the Common Air Interface and CPCH
UTRAN Connected Mode



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DCH/DCH: Circuit Mode of operation

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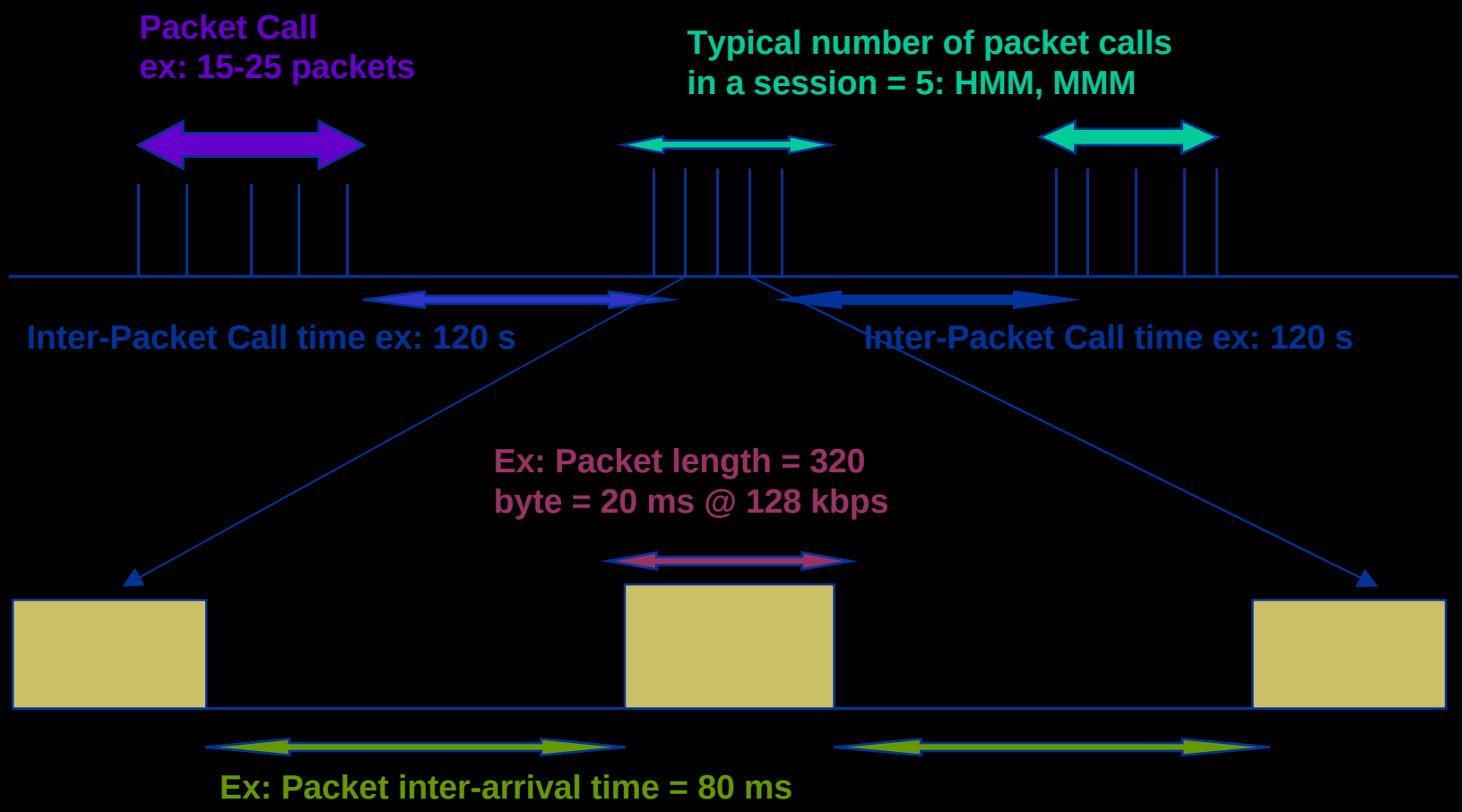
Packet Train Model



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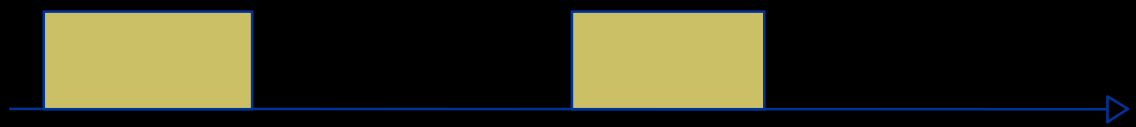
Problems with DCH in Packet Transmission

CPCH Operation



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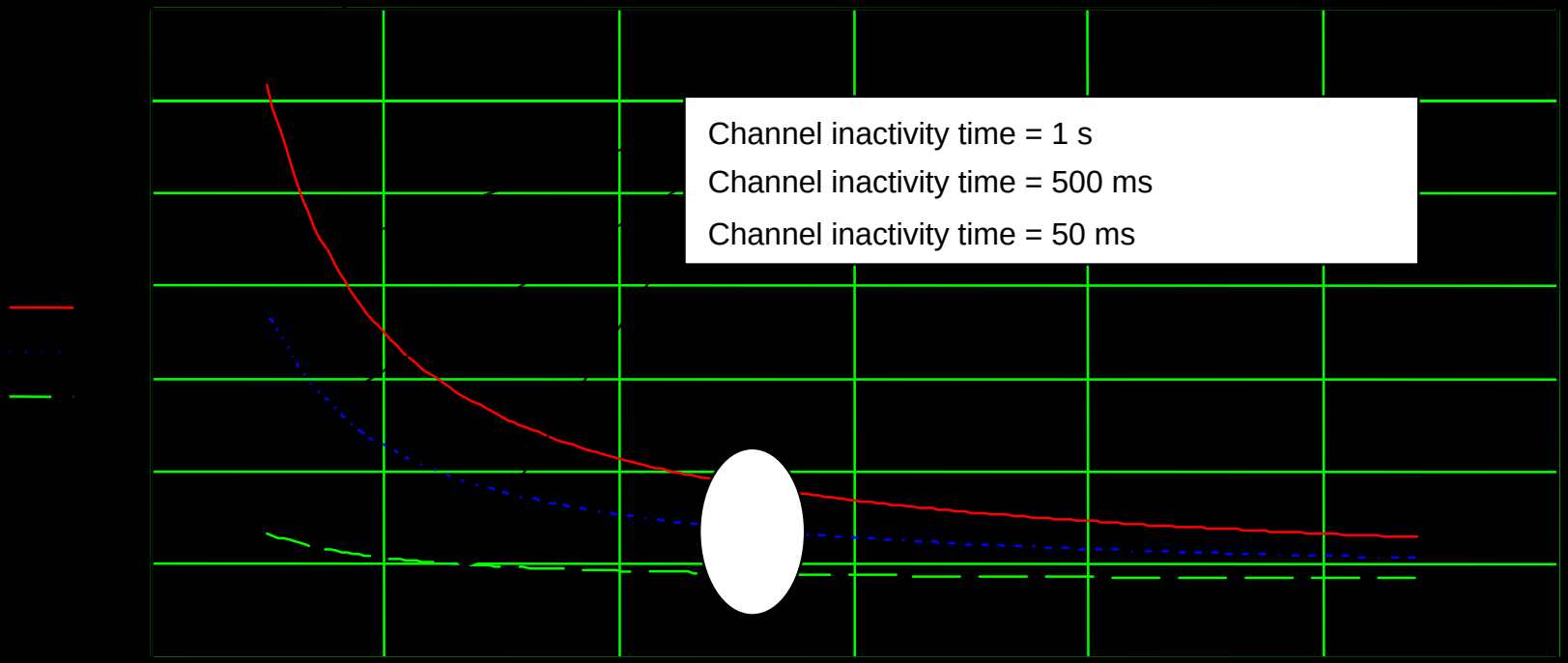
CPCH vs. DCH: Channel Resources



P_B=2% 100% Duty Cycle

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CPCH vs. DCH: Channel Resources (More)

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CPCH vs. DCH: Power & UL Capacity

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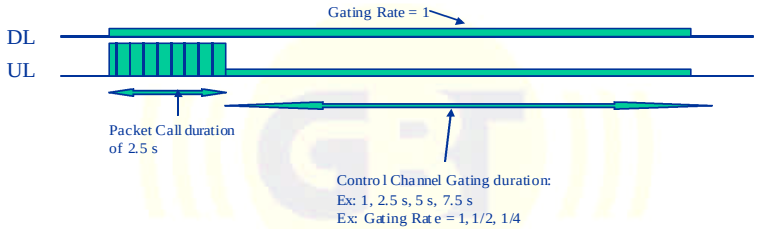
DCH Gating Method COSTs excessive interference in UL and DL



- Assume 20% duty cycle during packet call, 30 simultaneous packet calls for DCH operation, packet call duraion = 2.5 s
- TO = Control Channel Release Time-Out =1, 2.5, 5, 7.5 s
- GR = Gating Rate
- $UL_{cap\text{-}req} = N_{pkt\text{-}call} \times (1\text{-duty cycle}) \times f_{dpcch}$

  $+ (TO/pkt\text{-}call\text{-}dur) \times N_{pkt\text{-}call} \times f_{dpcch} \times GR$

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Examples of Downlink and Uplink Capacity wastage with DCH optimization methods such as Gating and Stop and Resumption Control:

- TO = 2.5 s, GR = 1/2, 60 parallel active sessions, 30 parallel packet calls:
- UL $_{cap\text{-}req}$ = 30%, DL $_{cap\text{-}req}$ = 15% (Gating method)
- TO = 1s, GR = 1, 42 parallel sessions, 30 parallel packet calls:
- UL $_{cap\text{-}req}$ = 28%, DL $_{cap\text{-}req}$ = 14% (Stop and Resumption control)

Conclusion: Both methods lead to excessive interference in DL and UL

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CPCH vs. DCH: Downlink Capacity

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CPCH Versus RACH

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CPCH vs. RACH: Capacity Gain

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CPCH vs. RACH: Throughput

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UE and Base Node Hardware Requirement for CPCH

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CONCLUSION