

EFM Copper

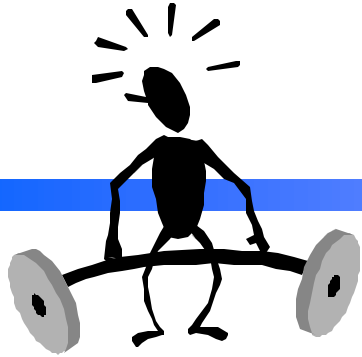
5 Criteria for the VDSL Line Code

EFM June, 2003

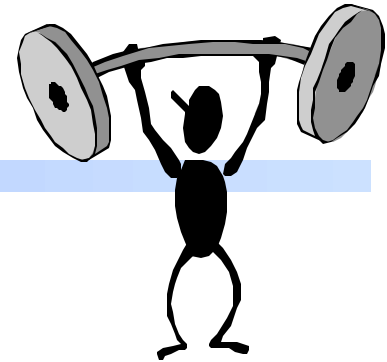
Scott Simon (Cisco Systems),

Supporters

- **Names to be added**
- **Sorry about the short notice**



Due Weight



- T1E1.4 has selected the preferred line code for VDSL
DMT elevated to full ANSI standard
QAM maintained as Technical Requirement Document
Still may be referenced
- We promised to give “due weight” to the decision
What does due weight mean?
- We must take into account the decision made
Including the context...
... and the applicability for Ethernet

Criteria

- **T1E1.4 used its criteria for the decision**
 - Relation to other DSL standards**
 - Results of “VDSL Olympics”**
- **802.3 must assess any decision against the 5 criteria**
 - Broad market potential**
 - Compatibility**
 - Distinct identity**
 - Technical feasibility**
 - Economic feasibility**
- **Where does T1E1.4 decision fit into our criteria?**
 - Go through the 5**



Technical Feasibility

- Clearly VDSL Olympics results address technical feasibility
DMT outperformed QAM in tests
- Technical feasibility **does not** require the best performance
Only “good enough”
- QAM VDSL has proven that it meets objective
Plus ~3 million lines implies it meets customer requirements
How many million data points to outweigh two?
- DMT may be technically “better” than QAM
Just as ATM is technically “better” than Ethernet;
VG-AnyLAN is technically “better” than 100BASE-T

Compatibility

- T1E1 is primarily concerned with ADSL
DMT VDSL is most compatible with ADSL
- But EFM has chosen SHDSL for long reach PHY
QAM VDSL is most compatible with SHDSL
- What about other Ethernet?
QAM VDSL has more in common with 1000BASE-T...
... and proposals for 10GBASE-T

Distinct Identity

- T1E1 has chosen DMT VDSL to sit alongside ADSL
ATM is universal over ADSL
- EFM is defining Ethernet over VDSL
Different encapsulation to EoATMoDSL
- How much distinction
EoVDSL will not appear sufficiently different to
EoATMoVDSL
Therefore combo ADSL/VDSL will be EoATMoDSL
EFM defining DMT has questionable distinct identity

Economic Feasibility

- **T1E1 has strict rules regarding cost discussions**
Mention of cost, power, die size etc. is ruled out of order
T1E1.4 decision did not take these into account
- **QAM VDSL is lower die size and power**
Better economic feasibility
- **Flexibility used to demonstrate “superior” performance**
Flexibility = cost
Either in terms of device cost; management cost; or interoperability
Long time to interoperability = slow commoditization
- **QAM superior economic feasibility outweighs technical**
Ethernet principle: cheaper, simpler, sooner

Broad Market Potential

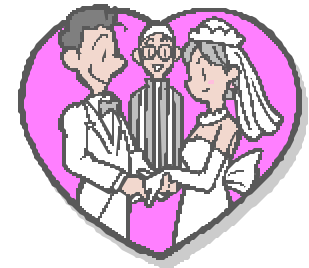
- **T1E1 considered 38 million lines of ADSL**
Crucial that backward compatibility preserved => DMT
But those lines are running ATM
- **EFM VDSL can only be targeted at new services**
Already showing great potential
- **~3 million lines of QAM VDSL already (and growing)**
Almost all VDSL lines installed are Ethernet over VDSL
Pre-EFM but vendors will ensure backward compatibility
- **EFM market potential requires QAM**
Ethernet principle: cheaper, simpler, sooner



A Marriage Made in Heaven



- **ATM & DMT are made for each other**
Infinite flexibility, the perfect solution if it can be tweaked enough
ATM over ADSL, DMT VDSL – the logical choice for T1E1.4
- **Ethernet and QAM are soul mates**
Use the simple solution, rapid interoperability, easy install etc.
- **Real competition in the market place**
Existing (ATM) architecture; disruptive new (Ethernet) architecture
Let the operators choose which one they want
(plus liaison with ITU ensure crossover solutions)



QAM is the solution for EFM

- **T1E1.4 made the right choice...**
... for their WG, for their reasons
- **EFM must make the right choice...**
... for our WG, for our reasons