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NETWORK SERVICES

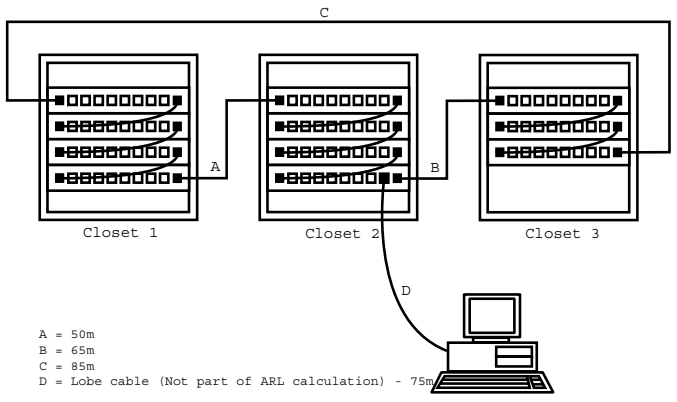
Black Box Explains... A.R.L. (Adjusted Ring Length) and Maximum Drive Distance

When designing Token Ring networks, two of the main things to be taken into consideration are the ARL and the maximum drive distance. The ARL is the calculation used to ascertain the maximum distance allowed between two nodes on a Token Ring Network - the maximum drive distance. Any Token Ring Network exceeding this specification runs the risk of data becoming corrupt.

Token Ring Networks suffer from these problems when you would least expect it - when nobody is there. When an office is full and everybody has their PC's turned on, each machine only has to push the signal a short distance to the next machine. When everybody leaves the office and the PC'S are turned off, the nodes which remain turned on will have to push the signal alot further, this is where data errors will be encountered.

To work out the ARL for your network, add together the length of cables between your wiring closets. Then subtract the shortest length from this figure. To work out the maximum drive distance on your network simply add the longest length of lobe cable to your ARL. This final length is the furthest distance any one of your nodes will have to push the signal.

The diagram below illustrates this calculation:



A = 50m
B = 65m
C = 85m
D = Lobe cable (Not part of ARL calculation) - 75m

ARL = (sum of all inter closet cable lengths) - shortest length of inter closet cab
= (A + B + C) - A
= (50 + 65 + 85) = 150m

Maximum Drive Distance = ARL + length of longest lobe = 150 + 75 = 225m

Once you have worked out the ARL and Maximum drive distance for your Network, you can use one of the two following tables to work out whether or not it falls within specification. Simply add up the number of MAUs and wiring closets on your network and cross-reference it against one of these two charts:

Maximum Drive Distance for 4Mbps Network (Metres)

Number of MAUS \ Number of Wiring Closets	2	3	4	5	6	7	8	9	10	11	12
2	363										
3	354	350									
4	346	341	338								
5	337	332	328	323							
6	328	324	319	314	310						
7	319	315	310	306	301	296					
8	311	306	302	297	292	288	283				
9	302	297	293	288	284	279	274	270			
10	293	289	284	280	275	270	266	261	257		
11	285	280	275	271	266	262	257	252	248	243	
12	276	271	267	262	258	253	248	244	239	235	230
13	267	263	258	253	249	244	240	235	230	226	221
14	259	254	249	245	240	236	231	226	222	217	213
15	250	245	241	236	231	227	222	218	213	206	204
16	241	237	232	227	223	218	214	209	204	200	195
17	232	228	223	219	214	209	205	200	196	191	186
18	224	219	215	210	205	201	196	192	187	182	178
19	215	210	206	201	197	192	187	183	178	174	169
20	206	202	197	193	188	183	179	174	170	165	160
21	198	193	188	184	179	175	170	165	181	156	152
22	189	184	180	175	171	166	161	157	152	148	143
23	180	176	171	168	162	157	153	148	143	139	134
24	172	167	162	158	153	149	144	139	135	130	126
25	153	158	154	149	144	140	135	131	126	121	117
26	144	150	145	140	136	131	127	122	117	113	108
27	135	141	136	132	127	122	118	113	109	104	99

Maximum Drive Distance for 16 Mbps Network (Metres)

Number of MAUS \ Number of Wiring Closets	2	3	4	5	6	7	8	9	10
2	162								
3	155	150							
4	149	144	139						
5	142	137	132	127					
6	135	130	125	120	115				
7	129	124	119	114	109	104			
8	122	117	112	107	102	98	92		
9	115	110	105	100	95	90	85	80	
10	109	104	99	194	89	84	79	74	69
11	102	98	92	87	82	77	72	67	62
12	95	90	85	80	75	70	65	60	55
13	82	77	72	67	82	57	52	47	42
14	69	64	59	54	49	44	29	34	29
15	26	51	48	41	36	31	26	21	16
16	43	38	33	28	23	18	13	8	3
17	30	25	20	15	10	5	-	-	-
18	17	12	7	-	-	-	-	-	-

If you look back to the diagram on the previous page, you can see that if it is a 4Mbps network, the maximum drive distance falls within the specification but not if it is a 16 Mbps network.