

Crisis, Opportunity and the Submarine Cable Industry



Apricot 07 28 February
2007

Wilfred Kwan
CTO, Asia Netcom



Empowering Communications in the Asian Century

Agenda

- The Recent Crisis
- How We Survive
- The Current Status
- The Future
- Discussion

GMT 12:26:01, 26 December 2006

- 7.1 magnitude quake
- Multiple aftershocks
- 6 cable systems effected



We are the only cable system managed to stay up in Asia...

Was it Luck that ANC Survived the Quake ?

Luck ?

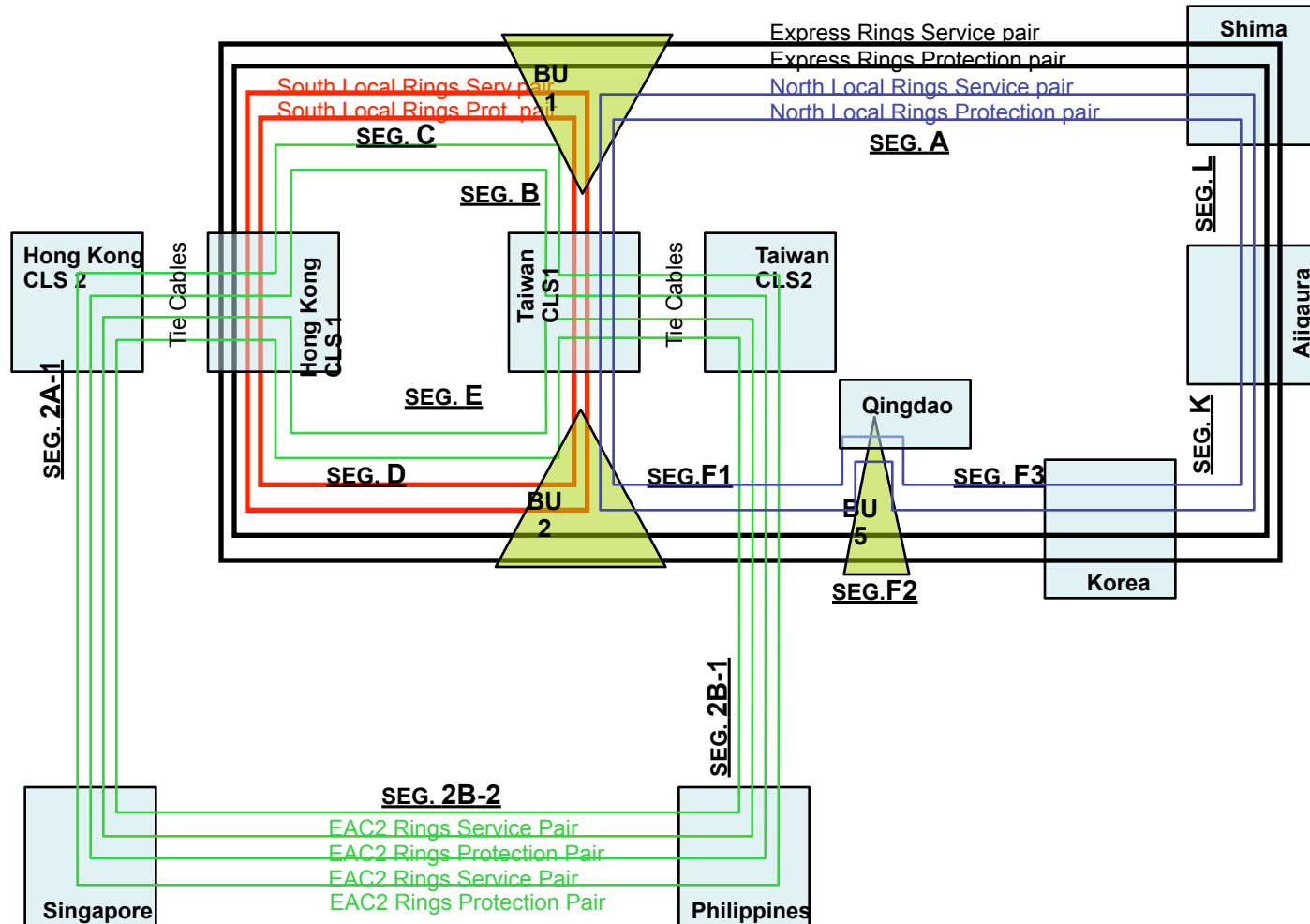
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Made Our Own
Luck

EAC Topology



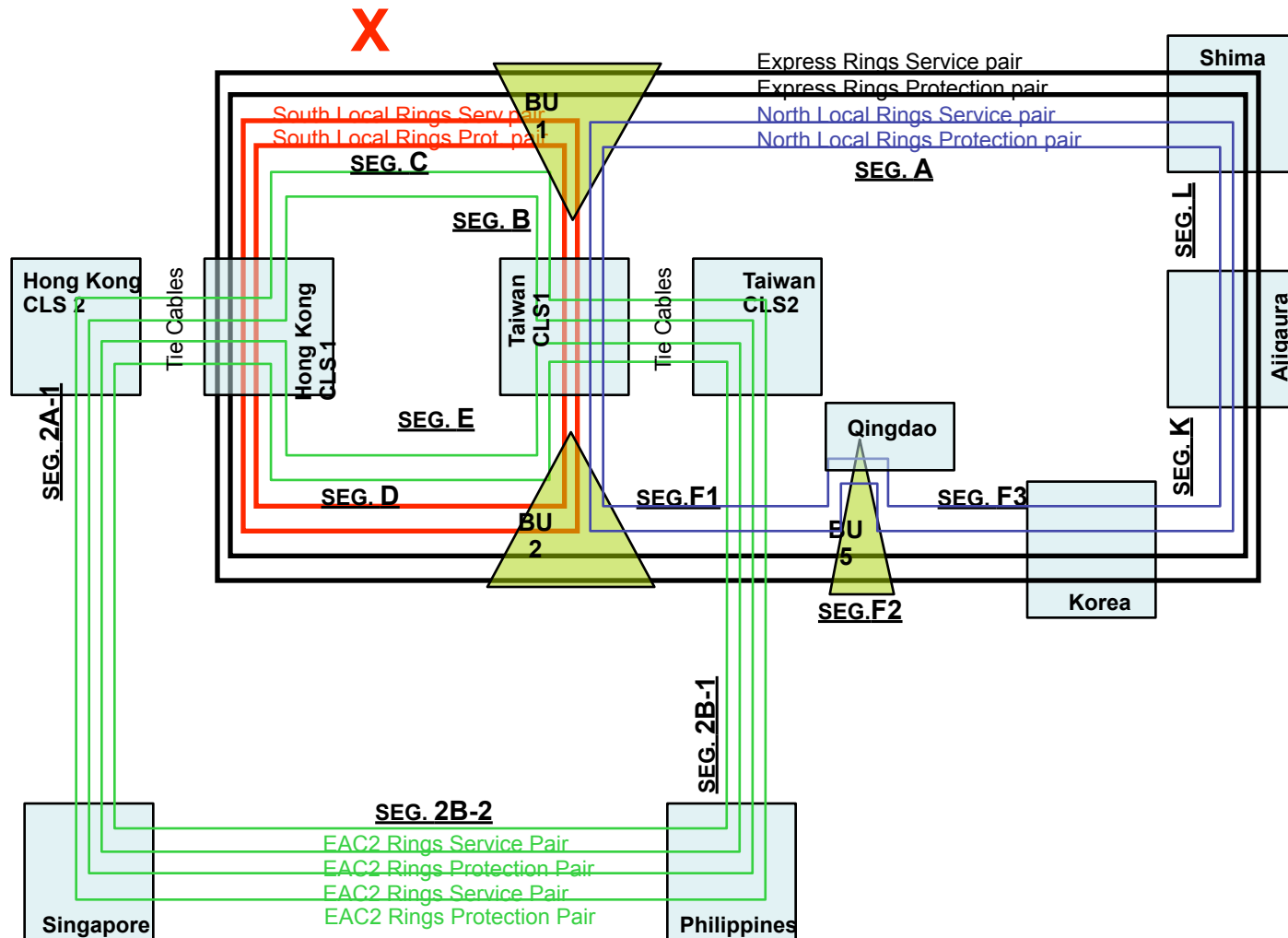
24 Hours at Asia Netcom...First Cut

- GMT 17:27 - EAC suffers first cut
- Restoration Control started 15 minutes after the cut
- Proactively informed customers
- Cable Ship mobilized
- COTDR readings to pinpoint exact fault location
- First service outage: 1 hour 06 minutes



Around 60 minutes service disruption

EAC Faults 26th Dec 07 to 5th Feb 07



24 Hours at Asia Netcom... Second Cut



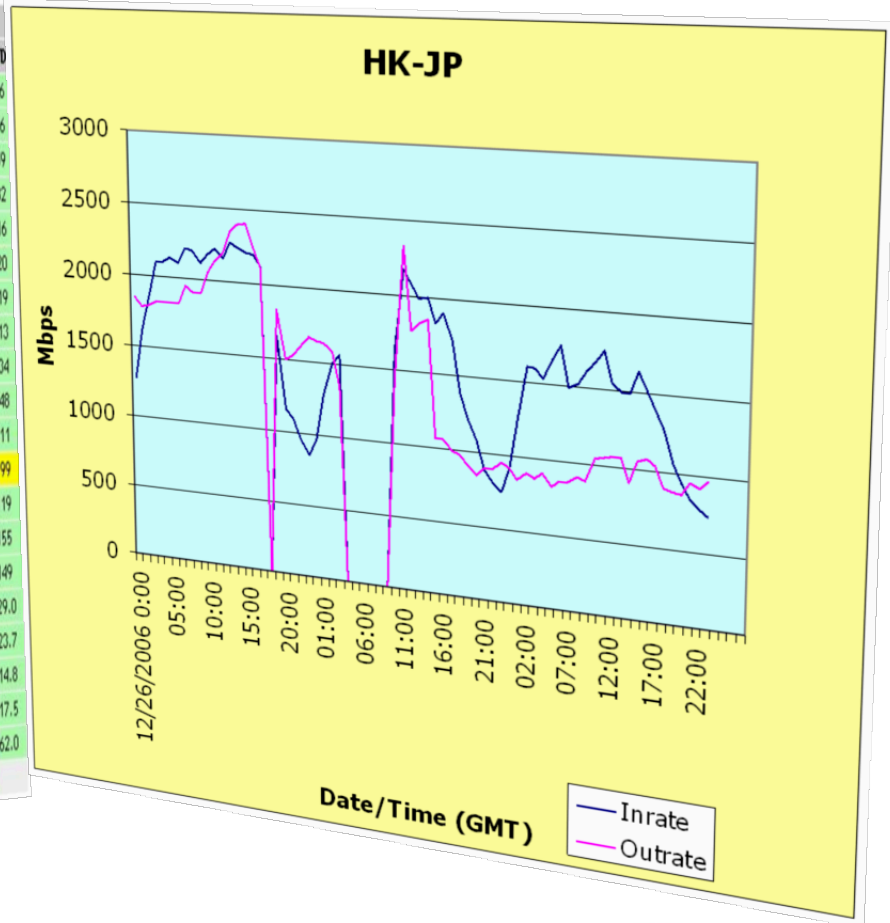
We are the only cable system still up
in Asia...

Provided 20Gb of emergency
restoration bandwidth to the industry

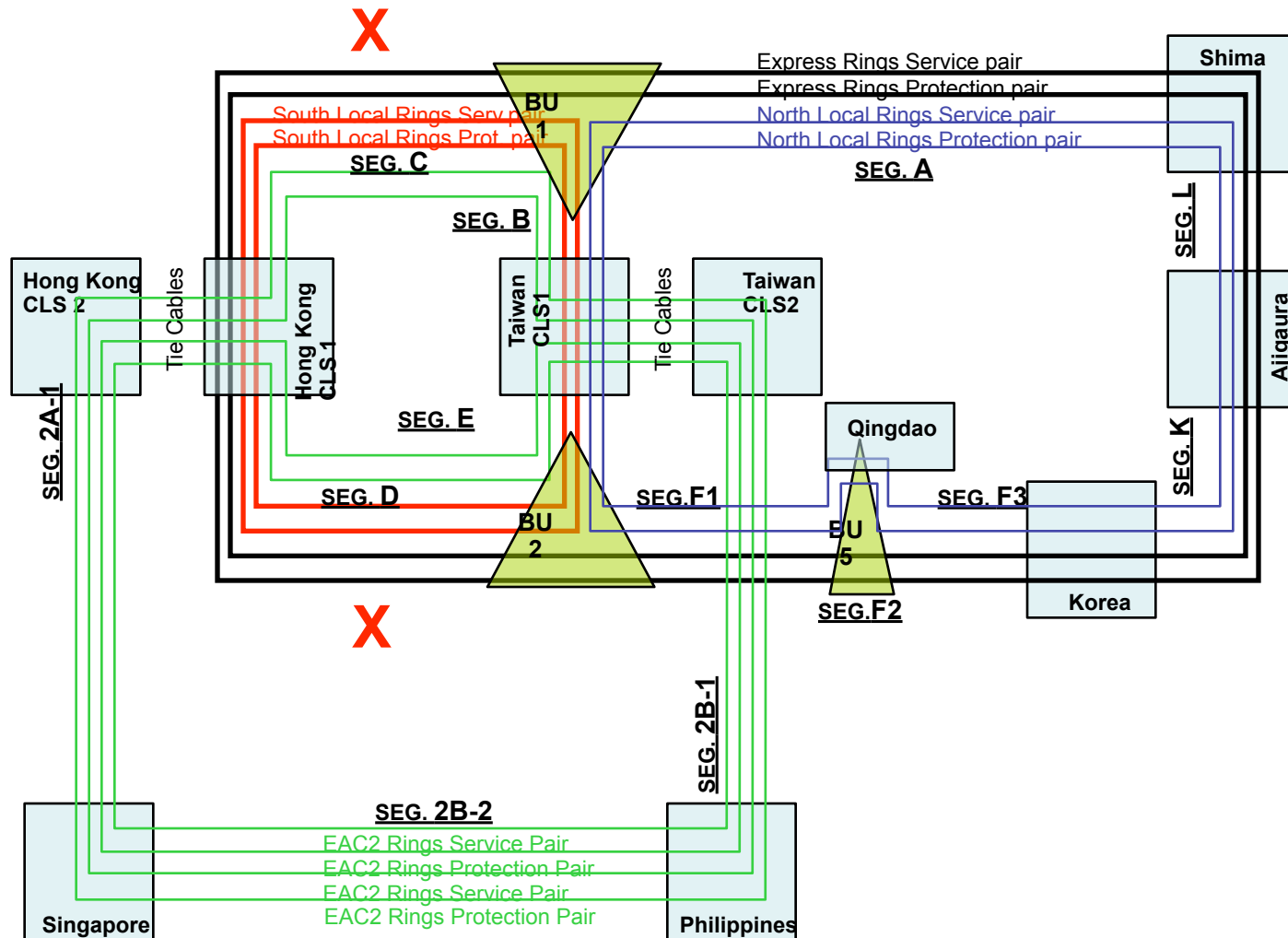
- GMT 03:30 – EAC suffers second cut
- Double cut
- Team really under test, not drills!!
- Stayed focus
- Planned for manual restoration
- Notified customers despite no resolution in place yet
- Searched external restoration possibility
- Executed Manual Restoration Plan
- Real-time L1 to L3 visibility
- GMT 14:13 – All customer services restored via southern ring
- Summary
- Total duration of service disruption: 11 hours and 49 minutes
- Total capacity restored: + 100Gbps

L1 - L3 Monitoring Capability

From/To	N Asia										S Asia				US		ANZ					
	HKG3	TPE2	TPE3	NGO1	NRT1	NRT2	NRT4	NRT5	OSA1	SEL2	SIN1	MNL1	KUL1	SJC1	LAX1	ADL1	AKL1	BNE1	MEL1	PER1	SYD	
N Asia	HKG3	22.2	17.7	72.4	53.6	53.9	53.4	53.8	67.5	83.9	30.4	35.5	37.8	161	171	198	189	185	185	227	166	
	TPE2	22.5		5.03	61.8	41.0	41.8	41.6	42.4	55.1	91.6	52.8	56.2	59.6	149	164	186	182	175	170	219	156
	TPE3	17.7	4.91		55.6	36.3	36.8	36.7	36.8	51.1	86.9	47.8	52.9	55.3	145	151	179	175	163	169	215	159
	NGO1	72.0	60.2	55.7		19.8	20.0	19.8	19.8	4.85	55.5	100	74.1	108	139	133	162	158	150	152	198	132
	NRT1	53.5	41.0	36.3	19.3		0.66	0.58	0.57	14.8	36.2	81.8	54.8	89.0	109	120	145	139	130	131	174	116
	NRT2	53.9	41.3	36.9	19.8	0.64		0.90	0.49	15.2	36.6	81.8	55.3	89.8	108	124	141	136	131	141	178	120
	NRT4	53.4	43.1	36.7	19.5	0.55	0.92		0.86	15.1	37.2	81.7	83.3	89.7	109	124	148	143	134	137	181	119
	NRT5	53.8	42.1	36.8	19.7	0.56	0.48	0.85		15.1	36.8	82.0	54.3	89.2	109	114	143	136	128	134	174	113
	OSA1	67.5	55.8	51.1	4.65	14.8	15.2	15.1	15.1		49.3	96.3	69.5	103	124	128	156	154	145	152	189	134
	SEL2	84.0	90.2	87.0	55.9	36.2	36.5	37.2	36.8	49.2		112	91.8	120	145	154	181	180	165	168	216	148
S Asia	SIN1	30.4	52.6	47.8	101	81.8	81.7	81.7	82.0	96.3	112		65.4	7.72	190	205	141	135	126	129	49.9	111
	MNL1	35.5	56.2	52.9	73.9	54.7	55.1	83.3	54.4	69.5	91.7	65.4		72.9	164	177	228	225	215	216	262	199
	KUL1	37.7	60.4	55.2	108	88.9	89.7	89.6	89.3	103	120	7.69	72.9		197	209	148	143	134	136	57.3	119
US	SJC1	161	150	145	139	109	108	109	109	124	145	190	164	197		8.07	184	152	173	176	217	155
	LAX1	171	165	152	134	120	124	124	114	128	154	205	177	209	8.11		177	136	164	166	211	149
	ADL1	197	186	178	161	145	142	149	142	157	181	140	228	148	184	177		52.7	43.7	46.4	91.1	29.0
	AKL1	189	181	175	159	139	136	143	136	154	181	135	225	142	152	136	52.8		38.3	41.0	85.4	23.7
	BNE1	182	175	163	150	131	128	134	128	145	165	127	214	134	173	164	43.7	38.4		32.4	76.7	14.8
	MEL1	185	171	170	152	132	144	137	134	152	169	129	216	137	176	167	46.4	41.1	32.1		79.4	62.0
	PER1	227	219	214	197	174	178	181	175	189	216	49.9	262	57.4	217	210	90.9	85.7	77.0	79.4		
	SYD1	165	157	162	132	116	120	119	113	134	147	111	199	119	155	149	29.2	23.7	14.9	17.5	61.8	



EAC Faults 26th Dec 07 to 5th Feb 07



Was it Luck that ANC Survived the Quake ?

Luck ?

- **The Almighty spared ANC by taking down only two of the three segments connecting Hong Kong and Taiwan**
- **Multi-point Topology**

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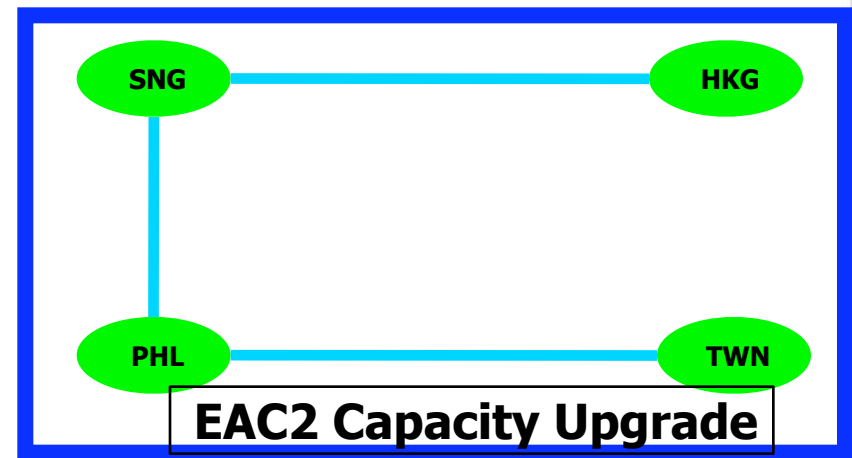
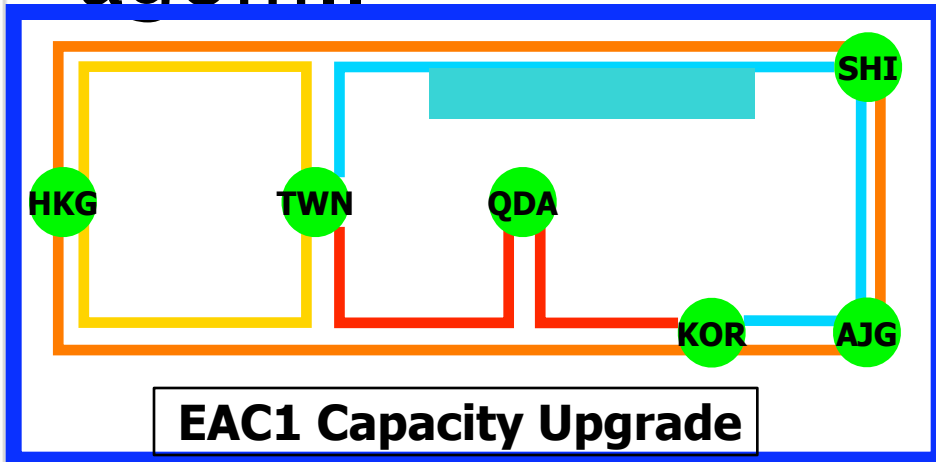
- Operational efficiency
 - Teamwork
 - Routine Preparations & Drills
 - Stayed Focus
- Proactive attitude in customer communications
- L1 through L3 visibility

A network diagram with white nodes and lines on a teal background. The nodes are arranged in a somewhat circular pattern, and the lines connect them in a complex, interconnected manner. The background is a solid teal color.

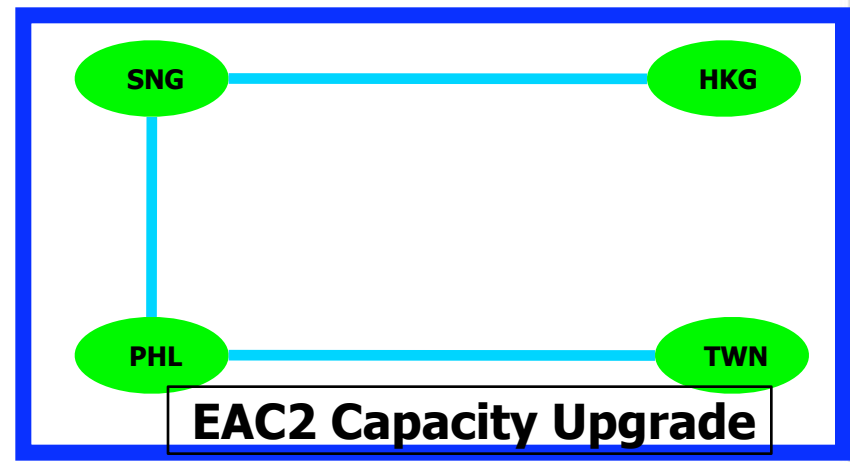
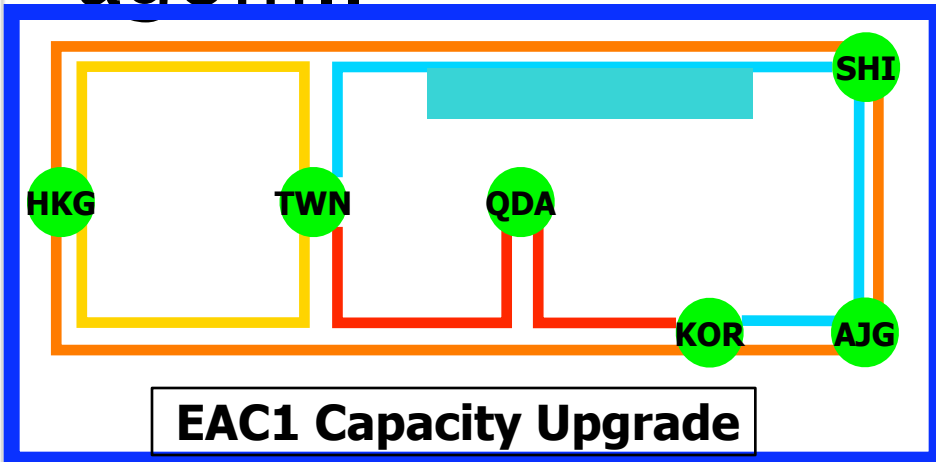
Still skeptical....?

The Preparations started 12 months ago.....

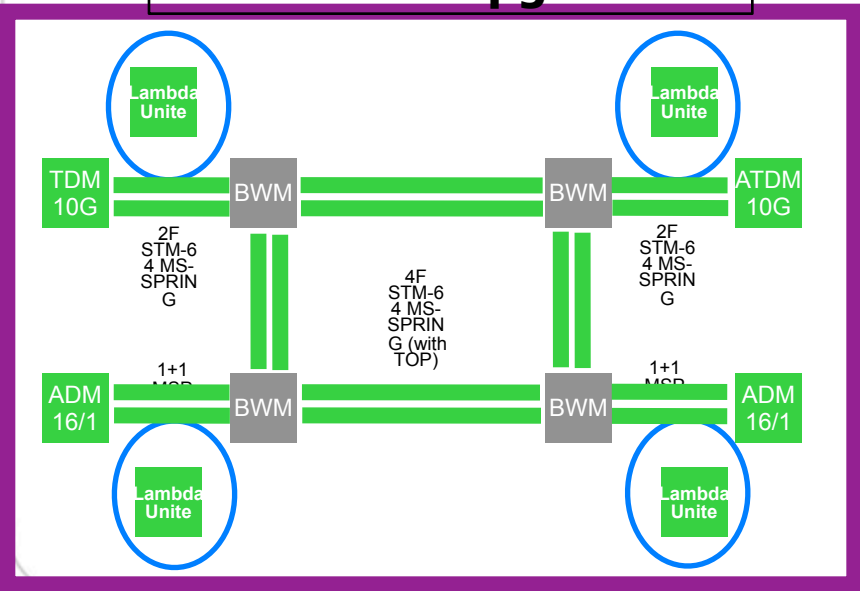
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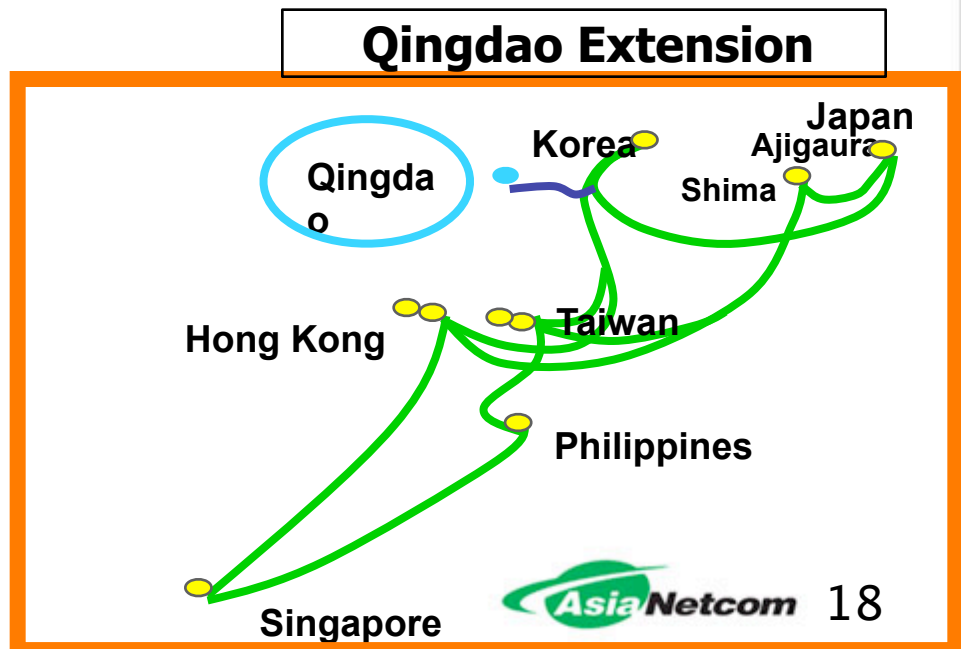
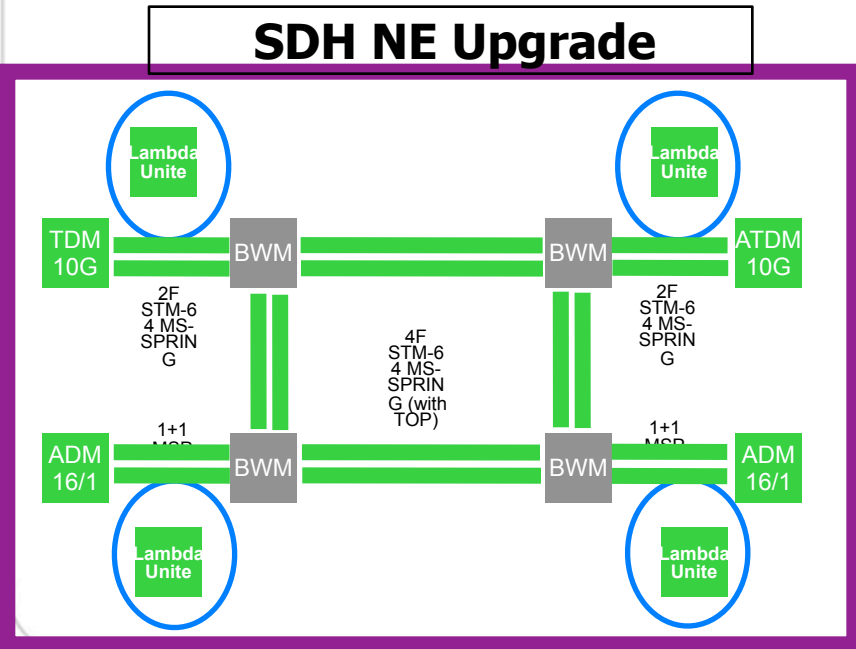
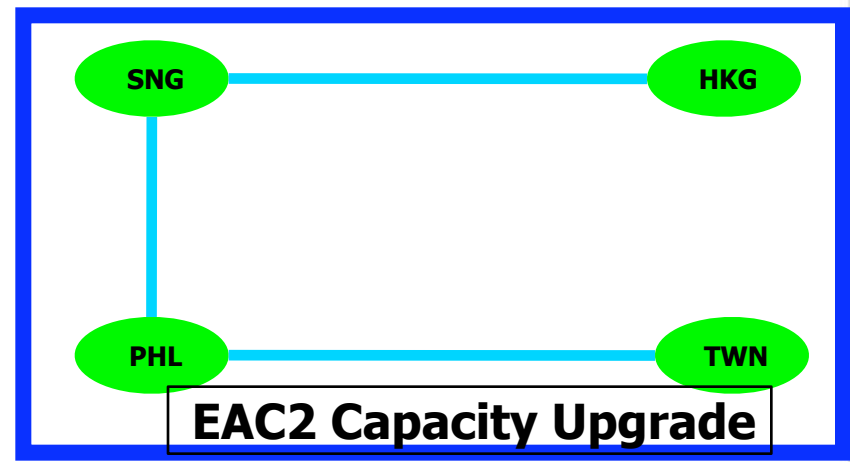
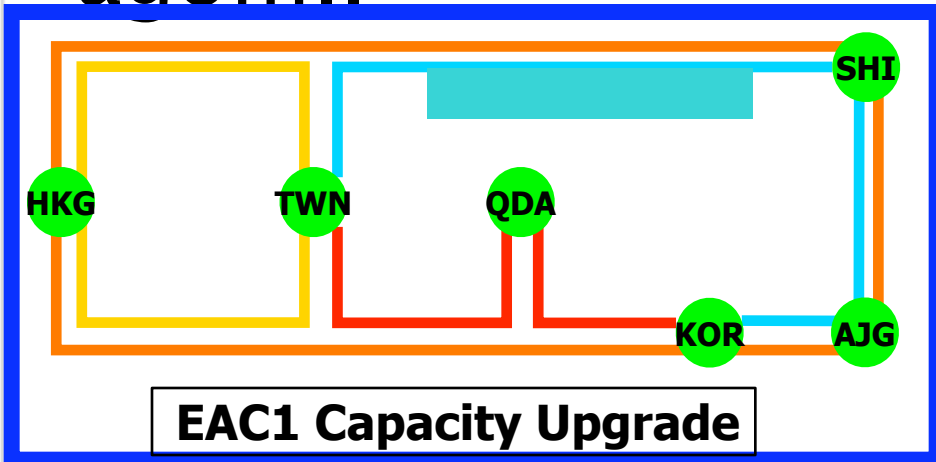
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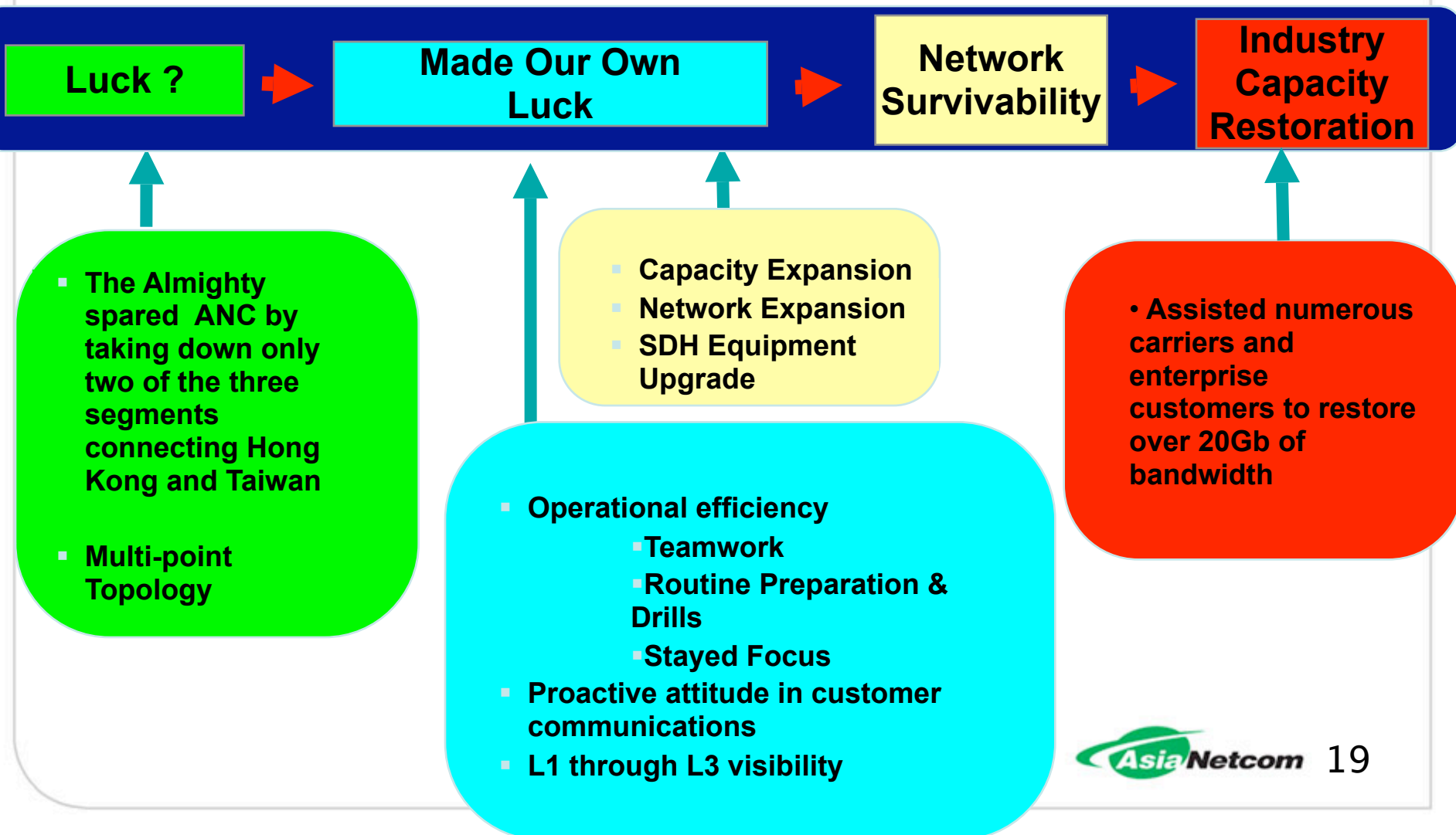
SDH NE Upgrade



The Preparations started 12 months ago.....



Was it Luck that ANC Survived the Quake ?



The background of the slide is a teal color with a network diagram. The diagram consists of numerous white circular nodes of varying sizes, connected by thin white lines. The nodes are scattered across the frame, with some appearing more prominent than others. The overall effect is a sense of interconnectedness and complexity.

...and the future

Future Enhancements

- Network-to-Network Overlay / Backup Solution
- Meshed Topology
- Protection Schemes
 - SDH
 - ASON / GMPLS
 - IP over DWDM
- Pre-emptive Service
- Unprotect Service

Cable Construction of EAC Pacific



Some Closing Thoughts...

- It took the right technology, the right preparation, the right attitude and definitely some luck to successfully conduct any restorations.
- You can't prevent natural events like earthquakes, but what you can do is to prepare well, in advance, and have the people with the right attitude to execute the plan.
- Co-operations amongst carriers can improve the chances of overcoming subsea network events, whether these events are triggered by natural disasters, external

Discussion...



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