

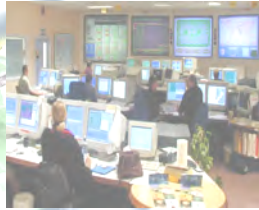


## Engineered Resilience

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### Low risk - high redundancy :

- Best of breed technology
- Processor redundancy
- Resilient network design
- Dual homed
- Low touch architecture



### Rapid restoration:

- 24/7 surveillance
- Service performance monitoring
- Milli second automatic switch over
- Operational pre plans
- High skills



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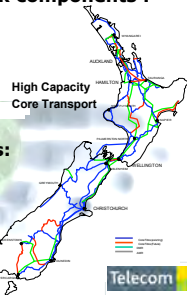
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## Engineered Resilience

5

### Geographic diversity is provided for all high capacity core links between core network components :

- Ladder networks with multiple rungs
- Physical separation
- High build standards
- Location services



### High availability is also applied to buildings and engineering services:

- Seismic design and bracing
- Fire detection, containment and suppression
- Back-up power
- Physical security



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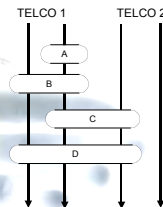
## Diversity Options

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### Resilience is primarily driven by Market Demand

### Diversity options available:

- A = Technology diversity
  - Access diversity
  - Folded diversity
  - Technology diversity
- B = Telco 1 diversity, dual route
- C = Telco 1 & 2 diversity, dual route
- D = Telco 1 & 2 diversity, triple route



The combinations of route and technology diversity are many.



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Business Considerations

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**Resilience is primarily driven by Market Demand.**

- No current impediments to achieving resilience
- Many options available for consideration
- Incentives to provide resilience if \$value > \$cost
- Correct resilience choices are derived from an informed market
- All options chosen are subject to the same level of engineering standards
- Multiple options assist the determination of business risk versus economic trade off



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Interdependencies with other Infrastructures

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**Utilities dependencies on Telecommunications (decreasing order):**

	<u>BAU</u>	<u>Crisis</u>
1	Power	Fuel
2	Roads	Roads
3	Fuel	Power



**Telecommunications dependencies:**

1	Power	Power	(hours for some sites)
2	Fuel	Fuel	(days)
3	Road	Road	(faults, repairs)



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Joint Responsibilities

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**Expectations of resilience change over time.**

**Customers and Service Providers need to regularly analyse the impact of infrastructure failure and adopt best solutions:**

- Engineered resilience
- Diversity options
- Business considerations
- Interdependencies on other infrastructure
- Acceptance of joint responsibilities



**Balance business value with business risk**



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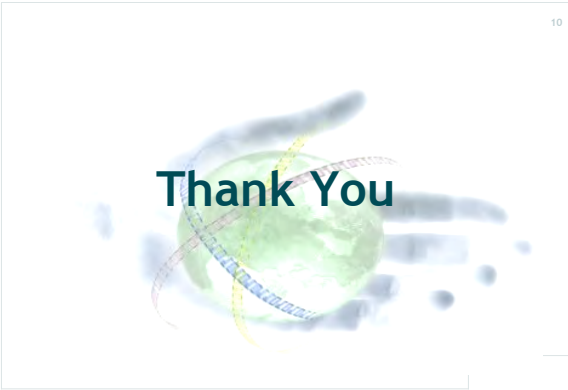
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