





Figure S2. Fault diagnosis tree of traction system under unreliable test.

Table S1. The FMECA of Traction system.

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number	components	fault	specific failure mode	failure	failure rate λ
1	three-position isolating switch	f_1	main isolating switch failure	V	0.57
2	high-speed circuit breaker	f_2	high-speed circuit breaker failure	III	0.21
3	charging contactor	f_3	charging contactor fault	III	0.19
4	charging resistance	f_4	charging resistance failure	IV	0.15
5	reactorL	f_5	reactor failure	IV	0.19
6	DC capacitance	f_6	capacitor failure	V	0.19
7	converter module 1	f_7	IGBT fault	III	0.60
		f_8	module burnout	III	0.91
		f_9	IGBT failure	III	0.60
8	converter module 2	f_{10}	module burnout	III	0.91
		f_{11}	drive power failure	III	0.10
9	drive power	f_{11}	drive power failure	III	0.10
10	pulse distribution board	f_{12}	pulse distribution board fault	III	0.90
11	driver board	f_{13}	driver board fault	III	0.60
12	radiator	f_{14}	radiator fault	III	0.60
13	auxiliary processing unit APU	f_{15}	APU fault	III	0.60
14	signal processing unit SPU	f_{16}	SPU fault	III	0.89
15	motor control unit MCU	f_{17}	MCU fault	III	0.30
16	pulse conversion unit PCU	f_{18}	PCU fault	III	0.30
17	system management and communications SMC	f_{19}	SMC fault	III	0.60
18	Switching powerPWR	f_{20}	PWR fault	III	0.40
19	traction motor 1	f_{21}	motor overtemperature	III	0.38
		f_{22}	motor overspeed	III	0.38
		f_{23}	motor overspeed	III	0.38
20	traction motor 2	f_{24}	motor overtemperature	III	0.38
		f_{25}	motor overspeed	III	0.38
21	traction motor 3	f_{26}	motor overtemperature	III	0.38
		f_{27}	motor overspeed	III	0.38
22	traction motor 4	f_{28}	motor overtemperature	III	0.38

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Table S2. Complete test set failure-test dependency matrix(a)

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	t_1	t_2	t_3	t_4	t_5	t_6	t_7	t_8	t_9	t_{10}	t_{11}	t_{12}
f_1	1	1	1	0	1	0	1	1	0	0	0	0
f_2	0	1	1	0	1	0	1	1	0	0	0	0
f_3	0	0	1	1	1	0	1	1	0	0	0	0
f_4	0	0	1	0	1	0	1	1	0	0	0	0
f_5	0	0	0	0	1	0	1	1	0	0	0	0
f_6	0	0	0	0	1	0	1	1	0	0	0	0
f_7	0	0	0	0	0	0	1	0	1	0	0	0
f_8	0	0	0	0	0	0	1	0	0	0	0	0
f_9	0	0	0	0	0	0	0	1	0	0	0	0
f_{10}	0	0	0	0	0	0	0	1	0	0	0	0
f_{11}	0	0	0	0	0	1	0	0	0	0	0	0
f_{12}	0	0	0	0	0	0	0	0	0	0	0	0
f_{13}	0	0	0	0	0	0	0	0	0	0	0	0
f_{14}	0	0	0	0	0	0	0	0	0	0	0	0
f_{15}	0	0	1	0	0	0	0	0	0	0	0	0
f_{16}	0	0	1	0	0	0	0	0	0	0	0	0
f_{17}	0	0	0	0	0	0	0	0	0	0	0	0
f_{18}	0	0	0	0	0	0	0	0	0	0	0	0
f_{19}	1	0	1	1	0	0	0	0	0	0	0	0
f_{20}	0	0	1	0	0	0	0	0	0	0	0	0
f_{21}	0	0	0	0	0	0	0	0	1	0	0	0
f_{22}	0	0	0	0	0	0	0	0	0	1	0	0
f_{23}	0	0	0	0	0	0	0	0	0	0	0	1
f_{24}	0	0	0	0	0	0	0	0	0	0	1	0
f_{25}	0	0	0	0	0	0	0	0	0	0	0	0
f_{26}	0	0	0	0	0	0	0	0	0	0	0	0
f_{27}	0	0	0	0	0	0	0	0	0	0	0	0
f_{28}	0	0	0	0	0	0	0	0	0	0	0	0

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Table S2. Complete test set failure-test dependency matrix(b)

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f_i	t_{13}	t_{14}	t_{15}	t_{16}	t_{17}	t_{18}	t_{19}	t_{20}	t_{21}	t_{22}	t_{23}	t_{24}
f_1	0	0	0	0	1	0	0	0	0	0	0	0
f_2	0	0	0	0	1	0	0	0	0	0	0	0
f_3	0	0	0	0	1	0	0	0	0	0	0	0
f_4	0	0	0	0	1	0	0	0	0	0	0	0
f_5	0	0	0	0	1	0	0	0	0	0	0	0
f_6	0	0	0	0	0	0	0	0	0	0	0	0
f_7	0	0	0	0	0	0	0	0	0	0	0	0
f_8	0	0	0	0	0	0	0	0	0	0	0	0
f_9	1	0	0	0	0	0	0	0	0	0	0	0
f_{10}	0	0	0	0	0	0	0	0	0	0	0	0
f_{11}	0	0	0	0	0	0	0	0	0	0	0	0
f_{12}	0	0	0	0	0	1	1	0	0	0	0	0
f_{13}	0	0	0	0	0	1	0	0	0	0	0	0
f_{14}	0	0	0	0	0	0	0	1	0	0	0	0
f_{15}	0	0	0	0	1	0	0	0	0	1	1	0
f_{16}	0	0	0	0	1	0	0	0	0	0	1	0
f_{17}	0	0	0	0	0	1	1	0	0	0	1	1
f_{18}	0	0	0	0	0	1	1	0	0	0	0	1
f_{19}	0	0	0	0	1	0	0	0	0	0	1	0
f_{20}	0	0	0	0	1	0	0	0	1	1	1	0
f_{21}	0	0	0	0	0	0	0	0	0	0	0	0
f_{22}	0	0	0	0	0	0	0	0	0	0	0	0
f_{23}	0	0	0	0	0	0	0	0	0	0	0	0
f_{24}	0	0	0	0	0	0	0	0	0	0	0	0
f_{25}	0	1	0	0	0	0	0	0	0	0	0	0
f_{26}	1	0	0	0	0	0	0	0	0	0	0	0
f_{27}	0	0	1	0	0	0	0	0	0	0	0	0
f_{28}	0	0	0	1	0	0	0	0	0	0	0	0

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Table S3. Expert cloud matrix 1.

	B_1	B_2	B_3	B_4	B_5
t_1	(90,1.031,0.13)	(96.91,0.64,0.08)	(96.91,0.64,0.08)	(90,1.031,0.13)	(93.09,0.64,0.08)
t_2	(96.91,0.64,0.08)	(93.09,0.64,0.08)	(93.09,0.64,0.08)	(100,1.031,0.13)	(95,0.39,0.053)
t_3	(100,1.031,0.13)	(96.91,0.64,0.08)	(90,1.031,0.13)	(100,1.031,0.13)	(93.09,0.64,0.08)
t_4	(96.91,0.64,0.08)	(100,1.031,0.13)	(96.91,0.64,0.08)	(100,1.031,0.13)	(100,1.031,0.13)
t_5	(93.09,0.64,0.08)	(100,1.031,0.13)	(90,1.031,0.13)	(100,1.031,0.13)	(96.91,0.64,0.08)
t_6	(96.91,0.64,0.08)	(100,1.031,0.13)	(95,0.39,0.053)	(95,0.39,0.053)	(93.09,0.64,0.08)
t_7	(95,0.39,0.053)	(93.09,0.64,0.08)	(100,1.031,0.13)	(100,1.031,0.13)	(93.09,0.64,0.08)
t_8	(93.09,0.64,0.08)	(95,0.39,0.053)	(95,0.39,0.053)	(96.91,0.64,0.08)	(100,1.031,0.13)
t_9	(90,1.031,0.13)	(100,1.031,0.13)	(93.09,0.64,0.08)	(95,0.39,0.053)	(93.09,0.64,0.08)
t_{10}	(90,1.031,0.13)	(90,1.031,0.13)	(96.91,0.64,0.08)	(100,1.031,0.13)	(93.09,0.64,0.08)
t_{11}	(93.09,0.64,0.08)	(100,1.031,0.13)	(96.91,0.64,0.08)	(95,0.39,0.053)	(90,1.031,0.13)
t_{12}	(100,1.031,0.13)	(95,0.39,0.053)	(93.09,0.64,0.08)	(96.91,0.64,0.08)	(95,0.39,0.053)
t_{13}	(100,1.031,0.13)	(100,1.031,0.13)	(96.91,0.64,0.08)	(95,0.39,0.053)	(100,1.031,0.13)
t_{14}	(100,1.031,0.13)	(96.91,0.64,0.08)	(93.09,0.64,0.08)	(100,1.031,0.13)	(95,0.39,0.053)
t_{15}	(90,1.031,0.13)	(93.09,0.64,0.08)	(90,1.031,0.13)	(90,1.031,0.13)	(95,0.39,0.053)
t_{16}	(96.91,0.64,0.08)	(95,0.39,0.053)	(95,0.39,0.053)	(96.91,0.64,0.08)	(95,0.39,0.053)
t_{17}	(96.91,0.64,0.08)	(100,1.031,0.13)	(90,1.031,0.13)	(93.09,0.64,0.08)	(90,1.031,0.13)
t_{18}	(95,0.39,0.053)	(90,1.031,0.13)	(95,0.39,0.053)	(90,1.031,0.13)	(100,1.031,0.13)
t_{19}	(95,0.39,0.053)	(93.09,0.64,0.08)	(95,0.39,0.053)	(96.91,0.64,0.08)	(93.09,0.64,0.08)
t_{20}	(100,1.031,0.13)	(95,0.39,0.053)	(95,0.39,0.053)	(95,0.39,0.053)	(90,1.031,0.13)
t_{21}	(95,0.39,0.053)	(95,0.39,0.053)	(93.09,0.64,0.08)	(96.91,0.64,0.08)	(95,0.39,0.053)
t_{22}	(100,1.031,0.13)	(93.09,0.64,0.08)	(93.09,0.64,0.08)	(93.09,0.64,0.08)	(90,1.031,0.13)
t_{23}	(95,0.39,0.053)	(95,0.39,0.053)	(100,1.031,0.13)	(96.91,0.64,0.08)	(95,0.39,0.053)
t_{24}	(90,1.031,0.13)	(96.91,0.64,0.08)	(96.91,0.64,0.08)	(100,1.031,0.13)	(95,0.39,0.053)
t_{25}	(95,0.39,0.053)	(100,1.031,0.13)	(100,1.031,0.13)	(90,1.031,0.13)	(100,1.031,0.13)
t_{26}	(100,1.031,0.13)	(100,1.031,0.13)	(96.91,0.64,0.08)	(90,1.031,0.13)	(100,1.031,0.13)

Table S3. Expert cloud matrix 2.

	B_1	B_2	B_3	B_4	B_5
t_1	(93.09,0.64,0.08)	(96.91,0.64,0.08)	(100,1.031,0.13)	(100,1.031,0.13)	(90,1.031,0.13)
t_2	(96.91,0.64,0.08)	(90,1.031,0.13)	(90,1.031,0.13)	(96.91,0.64,0.08)	(95,0.39,0.053)
t_3	(100,1.031,0.13)	(100,1.031,0.13)	(93.09,0.64,0.08)	(96.91,0.64,0.08)	(93.09,0.64,0.08)
t_4	(93.09,0.64,0.08)	(96.91,0.64,0.08)	(96.91,0.64,0.08)	(90,1.031,0.13)	(100,1.031,0.13)
t_5	(90,1.031,0.13)	(95,0.39,0.053)	(93.09,0.64,0.08)	(96.91,0.64,0.08)	(96.91,0.64,0.08)
t_6	(93.09,0.64,0.08)	(93.09,0.64,0.08)	(90,1.031,0.13)	(96.91,0.64,0.08)	(93.09,0.64,0.08)
t_7	(96.91,0.64,0.08)	(95,0.39,0.053)	(95,0.39,0.053)	(90,1.031,0.13)	(90,1.031,0.13)
t_8	(96.91,0.64,0.08)	(100,1.031,0.13)	(93.09,0.64,0.08)	(100,1.031,0.13)	(96.91,0.64,0.08)
t_9	(93.09,0.64,0.08)	(100,1.031,0.13)	(93.09,0.64,0.08)	(96.91,0.64,0.08)	(96.91,0.64,0.08)
t_{10}	(93.09,0.64,0.08)	(95,0.39,0.053)	(95,0.39,0.053)	(93.09,0.64,0.08)	(100,1.031,0.13)
t_{11}	(93.09,0.64,0.08)	(96.91,0.64,0.08)	(90,1.031,0.13)	(90,1.031,0.13)	(100,1.031,0.13)
t_{12}	(90,1.031,0.13)	(93.09,0.64,0.08)	(95,0.39,0.053)	(90,1.031,0.13)	(100,1.031,0.13)
t_{13}	(90,1.031,0.13)	(90,1.031,0.13)	(96.91,0.64,0.08)	(100,1.031,0.13)	(96.91,0.64,0.08)
t_{14}	(93.09,0.64,0.08)	(93.09,0.64,0.08)	(96.91,0.64,0.08)	(96.91,0.64,0.08)	(93.09,0.64,0.08)
t_{15}	(95,0.39,0.053)	(96.91,0.64,0.08)	(90,1.031,0.13)	(93.09,0.64,0.08)	(100,1.031,0.13)
t_{16}	(100,1.031,0.13)	(95,0.39,0.053)	(100,1.031,0.13)	(96.91,0.64,0.08)	(95,0.39,0.053)
t_{17}	(93.09,0.64,0.08)	(96.91,0.64,0.08)	(95,0.39,0.053)	(96.91,0.64,0.08)	(96.91,0.64,0.08)
t_{18}	(90,1.031,0.13)	(93.09,0.64,0.08)	(90,1.031,0.13)	(93.09,0.64,0.08)	(95,0.39,0.053)
t_{19}	(90,1.031,0.13)	(96.91,0.64,0.08)	(95,0.39,0.053)	(90,1.031,0.13)	(90,1.031,0.13)
t_{20}	(90,1.031,0.13)	(93.09,0.64,0.08)	(95,0.39,0.053)	(95,0.39,0.053)	(95,0.39,0.053)
t_{21}	(90,1.031,0.13)	(100,1.031,0.13)	(96.91,0.64,0.08)	(90,1.031,0.13)	(95,0.39,0.053)
t_{22}	(100,1.031,0.13)	(96.91,0.64,0.08)	(96.91,0.64,0.08)	(93.09,0.64,0.08)	(100,1.031,0.13)
t_{23}	(90,1.031,0.13)	(96.91,0.64,0.08)	(93.09,0.64,0.08)	(90,1.031,0.13)	(95,0.39,0.053)
t_{24}	(100,1.031,0.13)	(96.91,0.64,0.08)	(95,0.39,0.053)	(100,1.031,0.13)	(90,1.031,0.13)
t_{25}	(93.09,0.64,0.08)	(90,1.031,0.13)	(93.09,0.64,0.08)	(100,1.031,0.13)	(96.91,0.64,0.08)
t_{26}	(95,0.39,0.053)	(90,1.031,0.13)	(95,0.39,0.053)	(93.09,0.64,0.08)	(93.09,0.64,0.08)

Table S3. Expert cloud matrix 3.

	B_1	B_2	B_3	B_4	B_5
t_1	(96.91,0.64,0.08)	(90,1.031,0.13)	(100,1.031,0.13)	(95,0.39,0.053)	(100,1.031,0.13)
t_2	(95,0.39,0.053)	(95,0.39,0.053)	(95,0.39,0.053)	(96.91,0.64,0.08)	(90,1.031,0.13)
t_3	(93.09,0.64,0.08)	(93.09,0.64,0.08)	(100,1.031,0.13)	(100,1.031,0.13)	(90,1.031,0.13)
t_4	(90,1.031,0.13)	(90,1.031,0.13)	(90,1.031,0.13)	(95,0.39,0.053)	(90,1.031,0.13)
t_5	(96.91,0.64,0.08)	(93.09,0.64,0.08)	(95,0.39,0.053)	(93.09,0.64,0.08)	(100,1.031,0.13)
t_6	(90,1.031,0.13)	(90,1.031,0.13)	(95,0.39,0.053)	(90,1.031,0.13)	(90,1.031,0.13)
t_7	(96.91,0.64,0.08)	(100,1.031,0.13)	(95,0.39,0.053)	(95,0.39,0.053)	(100,1.031,0.13)
t_8	(96.91,0.64,0.08)	(96.91,0.64,0.08)	(100,1.031,0.13)	(96.91,0.64,0.08)	(93.09,0.64,0.08)
t_9	(93.09,0.64,0.08)	(90,1.031,0.13)	(93.09,0.64,0.08)	(96.91,0.64,0.08)	(96.91,0.64,0.08)
t_{10}	(100,1.031,0.13)	(93.09,0.64,0.08)	(95,0.39,0.053)	(100,1.031,0.13)	(95,0.39,0.053)
t_{11}	(95,0.39,0.053)	(93.09,0.64,0.08)	(95,0.39,0.053)	(95,0.39,0.053)	(90,1.031,0.13)
t_{12}	(90,1.031,0.13)	(93.09,0.64,0.08)	(93.09,0.64,0.08)	(90,1.031,0.13)	(93.09,0.64,0.08)
t_{13}	(95,0.39,0.053)	(93.09,0.64,0.08)	(90,1.031,0.13)	(100,1.031,0.13)	(96.91,0.64,0.08)
t_{14}	(96.91,0.64,0.08)	(95,0.39,0.053)	(90,1.031,0.13)	(93.09,0.64,0.08)	(100,1.031,0.13)
t_{15}	(90,1.031,0.13)	(93.09,0.64,0.08)	(96.91,0.64,0.08)	(100,1.031,0.13)	(95,0.39,0.053)
t_{16}	(90,1.031,0.13)	(96.91,0.64,0.08)	(100,1.031,0.13)	(93.09,0.64,0.08)	(96.91,0.64,0.08)
t_{17}	(95,0.39,0.053)	(100,1.031,0.13)	(100,1.031,0.13)	(93.09,0.64,0.08)	(95,0.39,0.053)
t_{18}	(100,1.031,0.13)	(95,0.39,0.053)	(93.09,0.64,0.08)	(93.09,0.64,0.08)	(95,0.39,0.053)
t_{19}	(96.91,0.64,0.08)	(90,1.031,0.13)	(93.09,0.64,0.08)	(96.91,0.64,0.08)	(96.91,0.64,0.08)
t_{20}	(93.09,0.64,0.08)	(90,1.031,0.13)	(96.91,0.64,0.08)	(96.91,0.64,0.08)	(95,0.39,0.053)
t_{21}	(95,0.39,0.053)	(96.91,0.64,0.08)	(100,1.031,0.13)	(96.91,0.64,0.08)	(96.91,0.64,0.08)
t_{22}	(95,0.39,0.053)	(90,1.031,0.13)	(95,0.39,0.053)	(96.91,0.64,0.08)	(96.91,0.64,0.08)
t_{23}	(96.91,0.64,0.08)	(100,1.031,0.13)	(95,0.39,0.053)	(90,1.031,0.13)	(96.91,0.64,0.08)
t_{24}	(93.09,0.64,0.08)	(100,1.031,0.13)	(100,1.031,0.13)	(93.09,0.64,0.08)	(90,1.031,0.13)
t_{25}	(90,1.031,0.13)	(93.09,0.64,0.08)	(100,1.031,0.13)	(96.91,0.64,0.08)	(93.09,0.64,0.08)
t_{26}	(95,0.39,0.053)	(95,0.39,0.053)	(93.09,0.64,0.08)	(90,1.031,0.13)	(100,1.031,0.13)

Table S3. Expert cloud matrix 4.

	B_1	B_2	B_3	B_4	B_5
t_1	(100,1.031,0.13)	(93.09,0.64,0.08)	(93.09,0.64,0.08)	(90,1.031,0.13)	(90,1.031,0.13)
t_2	(95,0.39,0.053)	(96.91,0.64,0.08)	(96.91,0.64,0.08)	(90,1.031,0.13)	(90,1.031,0.13)
t_3	(100,1.031,0.13)	(93.09,0.64,0.08)	(90,1.031,0.13)	(95,0.39,0.053)	(93.09,0.64,0.08)
t_4	(93.09,0.64,0.08)	(96.91,0.64,0.08)	(90,1.031,0.13)	(93.09,0.64,0.08)	(90,1.031,0.13)
t_5	(95,0.39,0.053)	(96.91,0.64,0.08)	(93.09,0.64,0.08)	(95,0.39,0.053)	(95,0.39,0.053)
t_6	(95,0.39,0.053)	(96.91,0.64,0.08)	(95,0.39,0.053)	(95,0.39,0.053)	(100,1.031,0.13)
t_7	(93.09,0.64,0.08)	(90,1.031,0.13)	(96.91,0.64,0.08)	(90,1.031,0.13)	(100,1.031,0.13)
t_8	(90,1.031,0.13)	(93.09,0.64,0.08)	(90,1.031,0.13)	(90,1.031,0.13)	(90,1.031,0.13)
t_9	(96.91,0.64,0.08)	(90,1.031,0.13)	(96.91,0.64,0.08)	(100,1.031,0.13)	(90,1.031,0.13)
t_{10}	(100,1.031,0.13)	(90,1.031,0.13)	(100,1.031,0.13)	(93.09,0.64,0.08)	(93.09,0.64,0.08)
t_{11}	(95,0.39,0.053)	(95,0.39,0.053)	(90,1.031,0.13)	(96.91,0.64,0.08)	(90,1.031,0.13)
t_{12}	(90,1.031,0.13)	(90,1.031,0.13)	(95,0.39,0.053)	(93.09,0.64,0.08)	(90,1.031,0.13)
t_{13}	(95,0.39,0.053)	(90,1.031,0.13)	(93.09,0.64,0.08)	(95,0.39,0.053)	(93.09,0.64,0.08)
t_{14}	(93.09,0.64,0.08)	(90,1.031,0.13)	(95,0.39,0.053)	(95,0.39,0.053)	(96.91,0.64,0.08)
t_{15}	(93.09,0.64,0.08)	(100,1.031,0.13)	(93.09,0.64,0.08)	(96.91,0.64,0.08)	(96.91,0.64,0.08)
t_{16}	(100,1.031,0.13)	(93.09,0.64,0.08)	(90,1.031,0.13)	(96.91,0.64,0.08)	(95,0.39,0.053)
t_{17}	(96.91,0.64,0.08)	(93.09,0.64,0.08)	(96.91,0.64,0.08)	(95,0.39,0.053)	(93.09,0.64,0.08)
t_{18}	(90,1.031,0.13)	(95,0.39,0.053)	(93.09,0.64,0.08)	(93.09,0.64,0.08)	(95,0.39,0.053)
t_{19}	(95,0.39,0.053)	(96.91,0.64,0.08)	(90,1.031,0.13)	(90,1.031,0.13)	(90,1.031,0.13)
t_{20}	(93.09,0.64,0.08)	(90,1.031,0.13)	(90,1.031,0.13)	(96.91,0.64,0.08)	(93.09,0.64,0.08)
t_{21}	(93.09,0.64,0.08)	(100,1.031,0.13)	(90,1.031,0.13)	(95,0.39,0.053)	(90,1.031,0.13)
t_{22}	(90,1.031,0.13)	(100,1.031,0.13)	(100,1.031,0.13)	(95,0.39,0.053)	(100,1.031,0.13)
t_{23}	(90,1.031,0.13)	(93.09,0.64,0.08)	(90,1.031,0.13)	(100,1.031,0.13)	(93.09,0.64,0.08)
t_{24}	(96.91,0.64,0.08)	(93.09,0.64,0.08)	(96.91,0.64,0.08)	(93.09,0.64,0.08)	(93.09,0.64,0.08)
t_{25}	(93.09,0.64,0.08)	(100,1.031,0.13)	(96.91,0.64,0.08)	(96.91,0.64,0.08)	(100,1.031,0.13)
t_{26}	(95,0.39,0.053)	(96.91,0.64,0.08)	(100,1.031,0.13)	(96.91,0.64,0.08)	(93.09,0.64,0.08)

Table S4. Comprehensive Cloud Evaluation Matrix.

	B_1	B_2	B_3	B_4	B_5
t_1	(95.12,0.83,0.10)	(94.19,0.74,0.09)	(97.46,0.84,0.11)	(93.78,0.87,0.11)	(93.22,0.94,0.12)
t_2	(95.93,0.51,0.07)	(93.78,0.68,0.09)	(93.78,0.68,0.09)	(95.83,0.83,0.10)	(92.45,0.72,0.09)
t_3	(98.28,0.93,0.12)	(95.74,0.74,0.09)	(93.27,0.93,0.12)	(97.91,0.76,0.10)	(92.32,0.74,0.09)
t_4	(93.22,0.74,0.09)	(95.92,0.83,0.10)	(93.38,0.84,0.11)	(94.41,0.77,0.10)	(94.89,1.03,0.13)
t_5	(93.76,0.67,0.09)	(96.20,0.67,0.08)	(92.84,0.67,0.09)	(96.19,0.67,0.08)	(97.18,0.67,0.09)
t_6	(93.72,0.67,0.08)	(94.95,0.83,0.10)	(93.74,0.55,0.07)	(94.24,0.61,0.08)	(94.13,0.84,0.11)
t_7	(95.45,0.58,0.07)	(94.48,0.78,0.09)	(96.68,0.61,0.08)	(93.61,0.87,0.11)	(95.84,0.94,0.12)
t_8	(94.20,0.74,0.09)	(96.24,0.68,0.08)	(94.45,0.78,0.09)	(95.88,0.84,0.11)	(94.88,0.83,0.1)
t_9	(93.36,0.73,0.09)	(94.89,1.03,0.13)	(94.09,0.64,0.08)	(97.27,0.68,0.09)	(94.20,0.74,0.09)
t_{10}	(95.89,0.93,0.12)	(92.03,0.77,0.10)	(96.76,0.62,0.08)	(96.44,0.83,0.10)	(95.31,0.68,0.09)
t_{11}	(94.07,0.51,0.07)	(96.19,0.67,0.08)	(92.88,0.78,0.10)	(94.24,0.62,0.08)	(92.53,1.03,0.13)
t_{12}	(92.36,1.03,0.13)	(92.73,0.68,0.09)	(94.07,0.51,0.06)	(92.44,0.84,0.11)	(94.48,0.78,0.10)
t_{13}	(94.92,0.70,0.09)	(93.13,0.93,0.12)	(94.19,0.74,0.09)	(97.51,0.71,0.09)	(96.64,0.74,0.09)
t_{14}	(95.67,0.73,0.09)	(93.66,0.68,0.08)	(93.79,0.67,0.09)	(96.19,0.67,0.08)	(96.26,0.68,0.08)
t_{15}	(92.07,0.77,0.09)	(95.87,0.74,0.09)	(92.53,0.83,0.10)	(95.08,0.83,0.10)	(96.77,0.62,0.08)
t_{16}	(96.78,0.94,0.12)	(94.98,0.52,0.07)	(96.20,0.88,0.11)	(95.96,0.64,0.08)	(95.48,0.45,0.06)
t_{17}	(95.47,0.58,0.07)	(97.40,0.83,0.10)	(95.57,0.77,0.10)	(94.56,0.57,0.07)	(93.80,0.67,0.09)
t_{18}	(93.67,0.88,0.11)	(93.34,0.60,0.08)	(92.76,0.68,0.09)	(92.36,0.73,0.09)	(96.18,0.54,0.07)
t_{19}	(94.21,0.61,0.08)	(94.29,0.74,0.09)	(93.21,0.62,0.08)	(93.35,0.84,0.11)	(92.45,0.84,0.11)
t_{20}	(93.93,0.83,0.10)	(91.96,0.78,0.10)	(94.17,0.62,0.08)	(95.98,0.52,0.07)	(93.32,0.61,0.08)
t_{21}	(93.23,0.62,0.08)	(98.05,0.78,0.10)	(94.97,0.84,0.11)	(94.66,0.67,0.09)	(94.17,0.62,0.08)
t_{22}	(96.14,0.87,0.11)	(95.10,0.84,0.11)	(96.34,0.68,0.09)	(94.54,0.57,0.07)	(96.87,0.93,0.12)
t_{23}	(92.90,0.78,0.10)	(96.23,0.68,0.09)	(94.39,0.77,0.10)	(94.25,0.94,0.12)	(94.98,0.52,0.07)
t_{24}	(95.11,0.83,0.10)	(96.68,0.74,0.09)	(97.20,0.67,0.09)	(96.47,0.83,0.10)	(91.99,0.78,0.10)

Table S5. Reliability failure - test dependency matrix (a) (Unity: %)

	t_1	t_2	t_3	t_4	t_5	t_6	t_7	t_8	t_9	t_{10}	t_{11}	t_{12}
f_1	94.75	94.4	95.5	5.64	95.23	5.84	95.21	95.13	5.24	4.71	6.02	6.78
f_2	5.25	94.4	95.5	5.64	95.23	5.84	95.21	95.13	5.24	4.71	6.02	6.78
f_3	5.25	5.6	95.5	94.36	95.23	5.84	95.21	95.13	5.24	4.71	6.02	6.78
f_4	5.25	5.6	95.5	5.64	95.23	5.84	95.21	95.13	5.24	4.71	6.02	6.78
f_5	5.25	5.6	4.5	5.64	95.23	5.84	95.21	95.13	5.24	4.71	6.02	6.78
f_6	5.25	5.6	4.5	5.64	95.23	5.84	95.21	95.13	5.24	4.71	6.02	6.78
f_7	5.25	5.6	4.5	5.64	4.77	5.84	95.21	4.87	94.76	4.71	6.02	6.78
f_8	5.25	5.6	4.5	5.64	4.77	5.84	95.21	4.87	5.24	4.71	6.02	6.78
f_9	5.25	5.6	4.5	5.64	4.77	5.84	4.79	95.13	5.24	4.71	6.02	6.78
f_{10}	5.25	5.6	4.5	5.64	4.77	5.84	4.79	95.13	5.24	4.71	6.02	6.78
f_{11}	5.25	5.6	4.5	5.64	4.77	94.16	4.79	4.87	5.24	4.71	6.02	6.78
f_{12}	5.25	5.6	4.5	5.64	4.77	5.84	4.79	4.87	5.24	4.71	6.02	6.78
f_{13}	5.25	5.6	4.5	5.64	4.77	5.84	4.79	4.87	5.24	4.71	6.02	6.78
f_{14}	5.25	5.6	4.5	5.64	4.77	5.84	4.79	4.87	5.24	4.71	6.02	6.78
f_{15}	5.25	5.6	95.5	5.64	4.77	5.84	4.79	4.87	5.24	4.71	6.02	6.78
f_{16}	5.25	5.6	95.5	5.64	4.77	5.84	4.79	4.87	5.24	4.71	6.02	6.78
f_{17}	5.25	5.6	4.5	5.64	4.77	5.84	4.79	4.87	5.24	4.71	6.02	6.78
f_{18}	5.25	5.6	4.5	5.64	4.77	5.84	4.79	4.87	5.24	4.71	6.02	6.78
f_{19}	94.75	5.6	95.5	94.36	4.77	5.84	4.79	4.87	5.24	4.71	6.02	6.78
f_{20}	5.25	5.6	95.5	5.64	4.77	5.84	4.79	4.87	5.24	4.71	6.02	6.78
f_{21}	5.25	5.64	4.5	5.64	4.77	5.84	4.79	4.87	94.76	4.71	6.02	6.78
f_{22}	5.25	5.64	4.5	5.64	4.77	5.84	4.79	4.87	5.24	95.29	6.02	6.78
f_{23}	5.25	5.64	4.5	5.64	4.77	5.84	4.79	4.87	5.24	4.71	6.02	93.22
f_{24}	5.25	5.64	4.5	5.64	4.77	5.84	4.79	4.87	5.24	4.71	94.0	6.78
f_{25}	5.25	5.64	4.5	5.64	4.77	5.84	4.79	4.87	5.24	4.71	6.02	6.78
f_{26}	5.25	5.64	4.5	5.64	4.77	5.84	4.79	4.87	5.24	4.71	6.02	6.78
f_{27}	5.25	5.64	4.5	5.64	4.77	5.84	4.79	4.87	5.24	4.71	6.02	6.78
f_{28}	5.25	5.64	4.5	5.64	4.77	5.84	4.79	4.87	5.24	4.71	6.02	6.78

Table S5. Reliability failure - test dependency matrix (b) (Unity: %)

	t_{13}	t_{14}	t_{15}	t_{16}	t_{17}	t_{18}	t_{19}	t_{20}	t_{21}	t_{22}	t_{23}	t_{24}
f_1	4.72	4.89	5.54	4.12	95.36	6.34	6.5	6.13	4.98	4.2	5.45	4.51
f_2	4.72	4.89	5.54	4.12	95.36	6.34	6.5	6.13	4.98	4.2	5.45	4.51
f_3	4.72	4.89	5.54	4.12	95.36	6.34	6.5	6.13	4.98	4.2	5.45	4.51
f_4	4.72	4.89	5.54	4.12	95.36	6.34	6.5	6.13	4.98	4.2	5.45	4.51
f_5	4.72	4.89	5.54	4.12	95.36	6.34	6.5	6.13	4.98	4.2	5.45	4.51
f_6	4.72	4.89	5.54	4.12	4.64	6.34	6.5	6.13	4.98	4.2	5.45	4.51
f_7	4.72	4.89	5.54	4.12	4.64	6.34	6.5	6.13	4.98	4.2	5.45	4.51
f_8	4.72	4.89	5.54	4.12	4.64	6.34	6.5	6.13	4.98	4.2	5.45	4.51
f_9	95.28	4.89	5.54	4.12	4.64	6.34	6.5	6.13	4.98	4.2	5.45	4.51
f_{10}	4.72	4.89	5.54	4.12	4.64	6.34	6.5	6.13	4.98	4.2	5.45	4.51
f_{11}	4.72	4.89	5.54	4.12	4.64	6.34	6.5	6.13	4.98	4.2	5.45	4.51
f_{12}	4.72	4.89	5.54	4.12	4.64	93.66	93.5	6.13	4.98	4.2	5.45	4.51
f_{13}	4.72	4.89	5.54	4.12	4.64	93.66	6.5	6.13	4.98	4.2	5.45	4.51
f_{14}	4.72	4.89	5.54	4.12	4.64	6.34	6.5	93.87	4.98	4.2	5.45	4.51
f_{15}	4.72	4.89	5.54	4.12	95.36	6.34	6.5	6.13	4.98	95.8	94.55	4.51
f_{16}	4.72	4.89	5.54	4.12	95.36	6.34	6.5	6.13	4.98	4.2	94.55	4.51
f_{17}	4.72	4.89	5.54	4.12	4.64	93.66	93.5	6.13	4.98	4.2	94.55	95.49
f_{18}	4.72	4.89	5.54	4.12	4.64	93.66	93.5	6.13	4.98	4.2	5.45	95.49
f_{19}	4.72	4.89	5.54	4.12	95.36	6.34	6.5	6.13	4.98	4.2	94.55	4.51
f_{20}	4.72	4.89	5.54	4.12	95.36	6.34	6.5	6.13	95.02	95.8	94.55	4.51
f_{21}	4.72	4.89	5.54	4.12	4.64	6.34	6.5	6.13	4.98	4.2	5.45	4.51
f_{22}	4.72	4.89	5.54	4.12	4.64	6.34	6.5	6.13	4.98	4.2	5.45	4.51
f_{23}	4.72	4.89	5.54	4.12	4.64	6.34	6.5	6.13	4.98	4.2	5.45	4.51
f_{24}	4.72	4.89	5.54	4.12	4.64	6.34	6.5	6.13	4.98	4.2	5.45	4.51
f_{25}	4.72	95.11	5.54	4.12	4.64	6.34	6.5	6.13	4.98	4.2	5.45	4.51
f_{26}	95.28	4.89	5.54	4.12	4.64	6.34	6.5	6.13	4.98	4.2	5.45	4.51
f_{27}	4.72	4.89	94.46	4.12	4.64	6.34	6.5	6.13	4.98	4.2	5.45	4.51
f_{28}	4.72	4.89	5.54	95.88	4.64	6.34	6.5	6.13	4.98	4.2	5.45	4.51