Science and Statistics of Better Legacy Network Reliability

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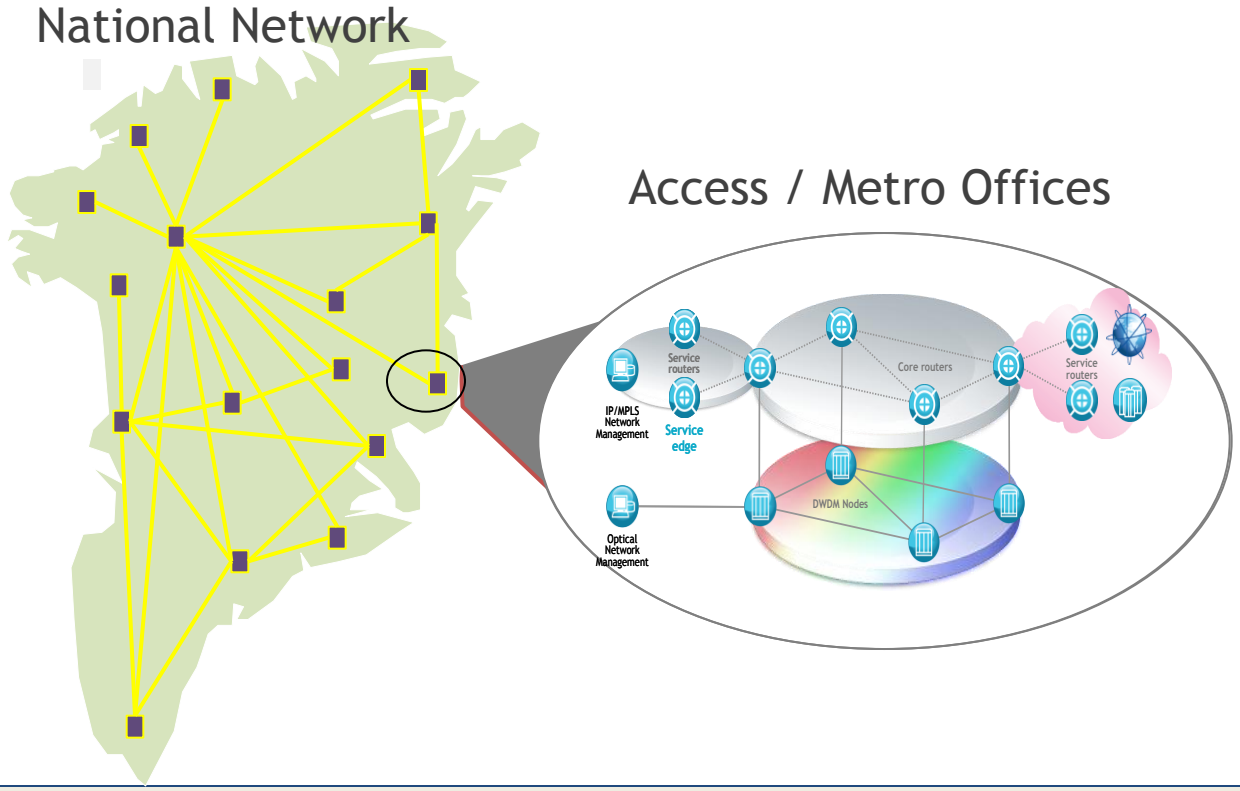
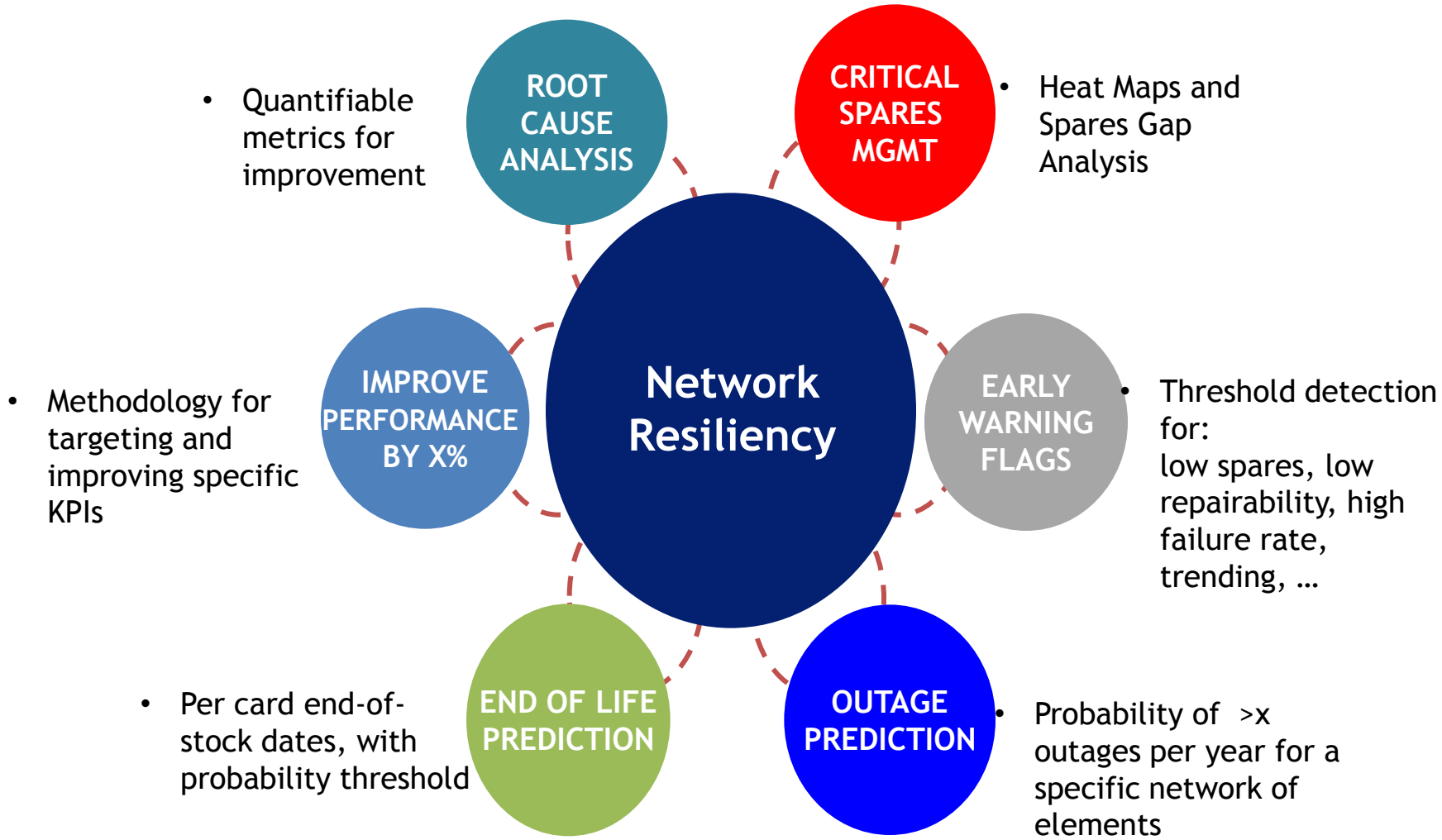
TYPICAL CUSTOMER QUESTIONS ADDRESSED BY NETWORK RESILIENCY OFFER

"My legacy SDH network is failing. Can it be managed? How? How long?"



"We have had a significant outage. Regulators are breathing down our necks. Can you help us?"

OFFER CAPABILITIES

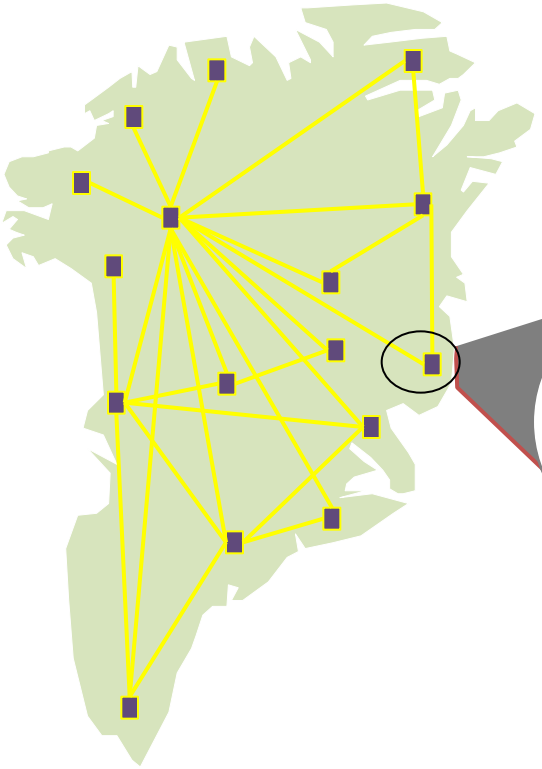


Six Key Capabilities that can be Combined to Address Complex Customers' Questions

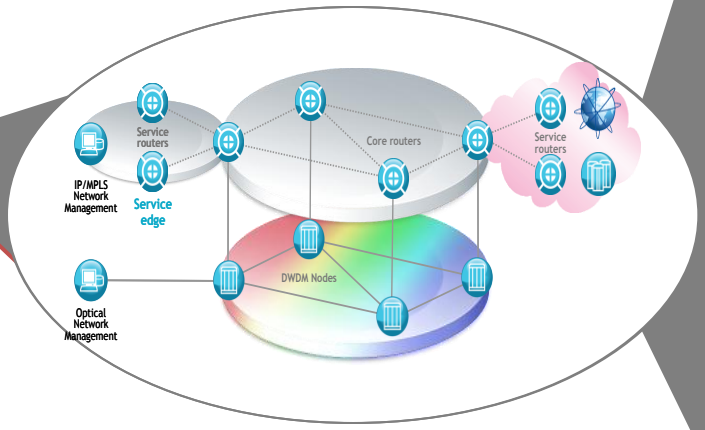
TECHNOLOGY SOLUTIONS

SDH NATIONAL BACKBONE

National Network



Access / Metro Offices



Project Scope

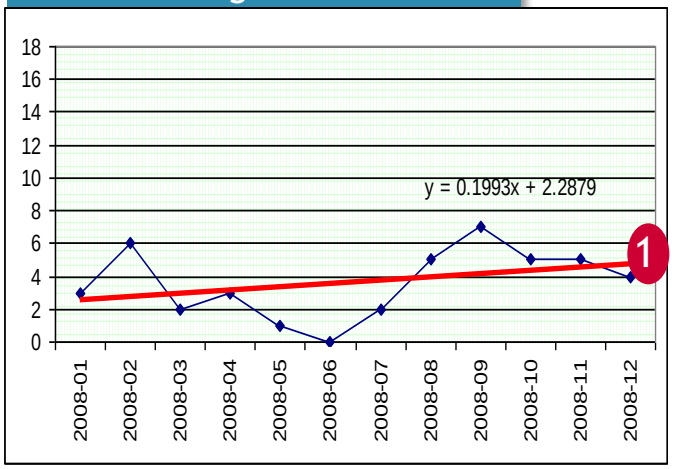
- A Analyze all cards in the network for Early Warning signs of failure
- B Analyze and establish the LCM baseline of the network (all SDH cards)
- C Show the LCM impact of a major transformation project
- D Calculate network Outage Probability as a critical element of the transformation is decommissioned

The SDH network is properly diversified and protected, but its challenges now center around sustainment of its legacy elements and containment of operational costs.

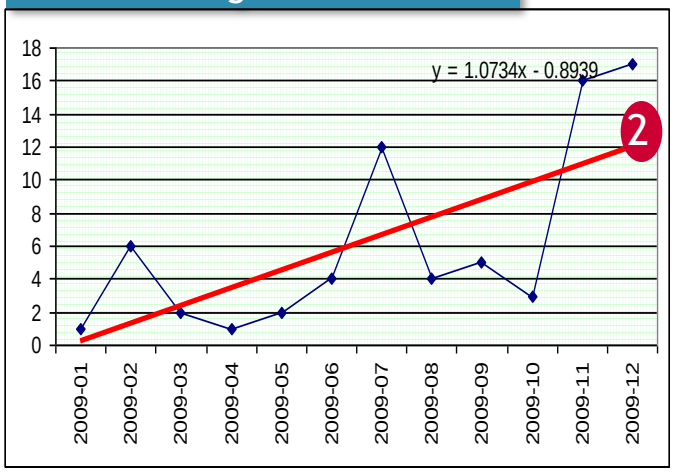
ZT TECHNOLOGY SOLUTIONS

FAILURE TRENDING

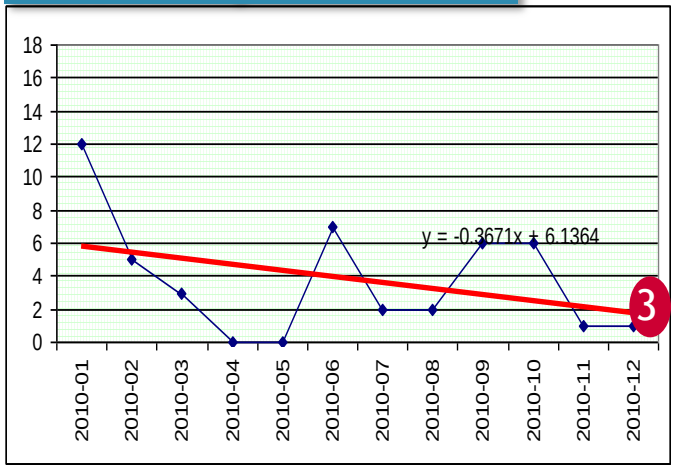
2008 Trending



2009 Trending



2010 Trending

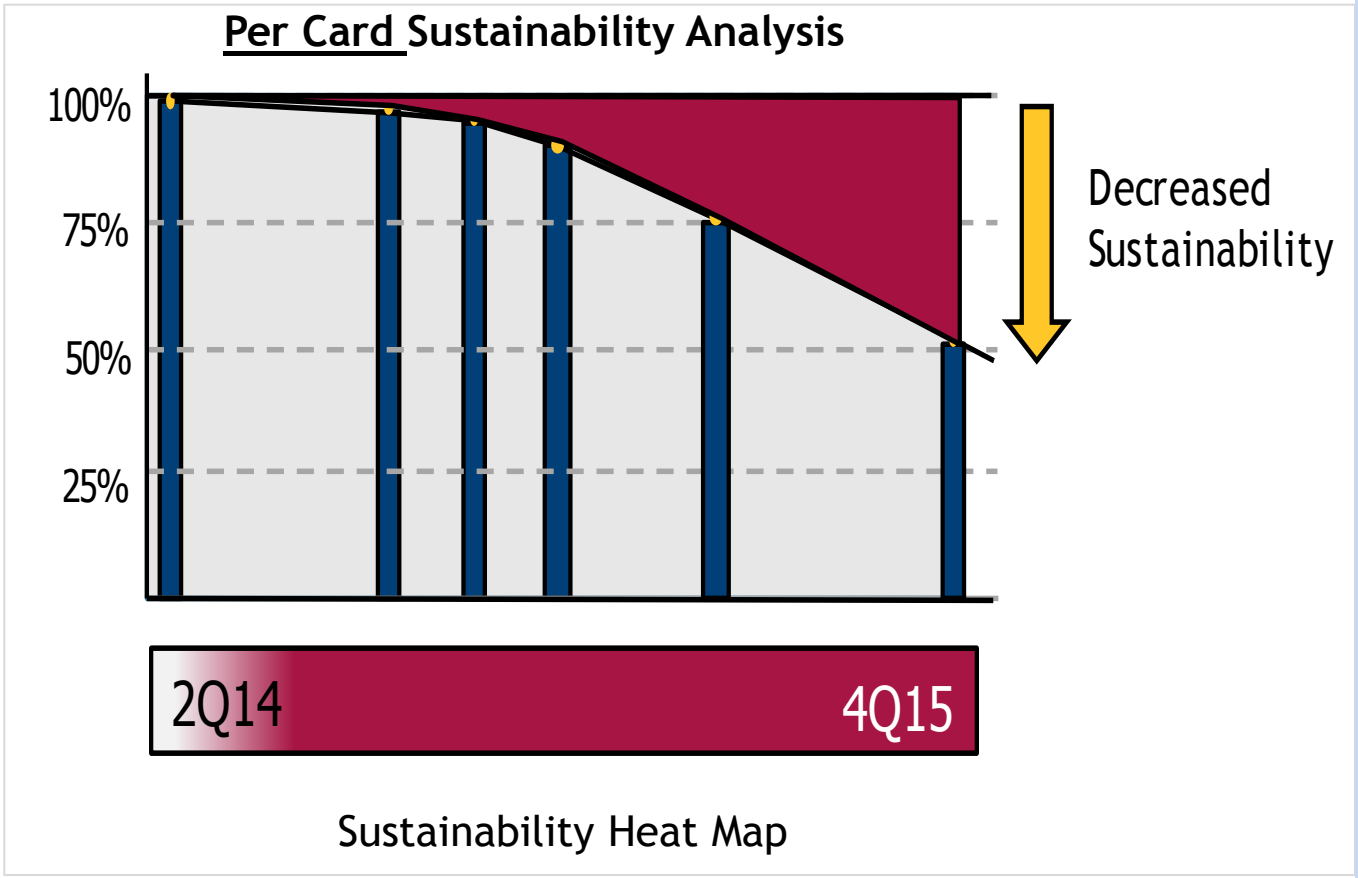


Heuristic Algorithm

- Estimate monthly failure rate for each year (=MAX(regression value at the end of year, average monthly failure rate))
- Predict monthly failure rate at the end of 2010 (=AVERAGE(2008's, 2009's, 2010's)) (6.81 per month or 82 per year)
- Validate the estimation with 1Q2011 data (20 in 1Q2011 or 80 per year)
- Develop a proxy prediction (need to know the installed base information)

TECHNOLOGY SOLUTIONS

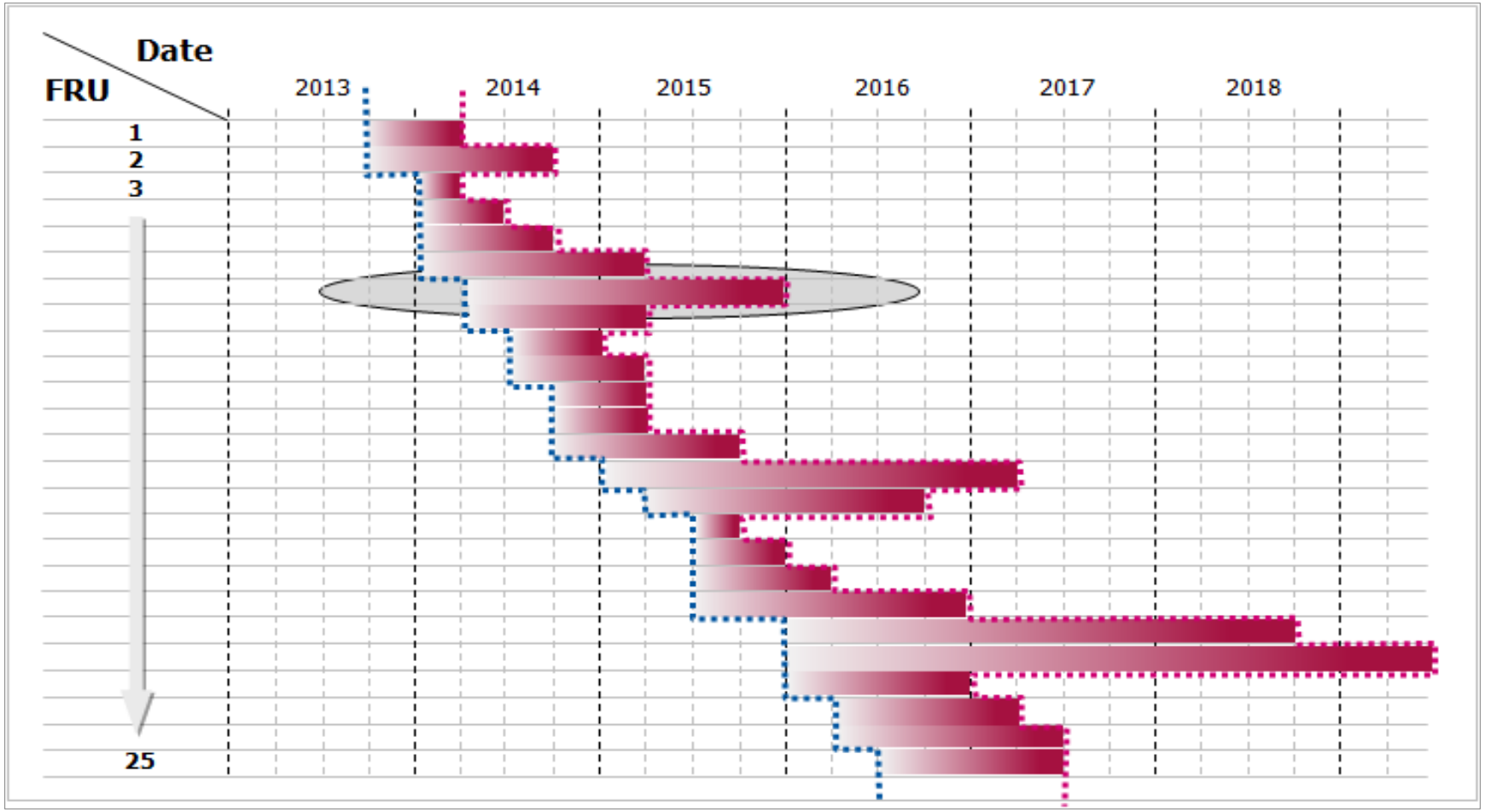
WHAT DOES A LIFE CYCLE MANAGEMENT (LCM) ANALYSIS LOOK LIKE?



- Identifies, based on projected failure rates, when key components will reach an End-of-Stock condition
- Uses a stand-alone, smart data acquisition template which contains historical network data including return counts and installed base
- Prediction module provides failure rate trending information required for network outage prediction modeling.

TECHNOLOGY SOLUTIONS

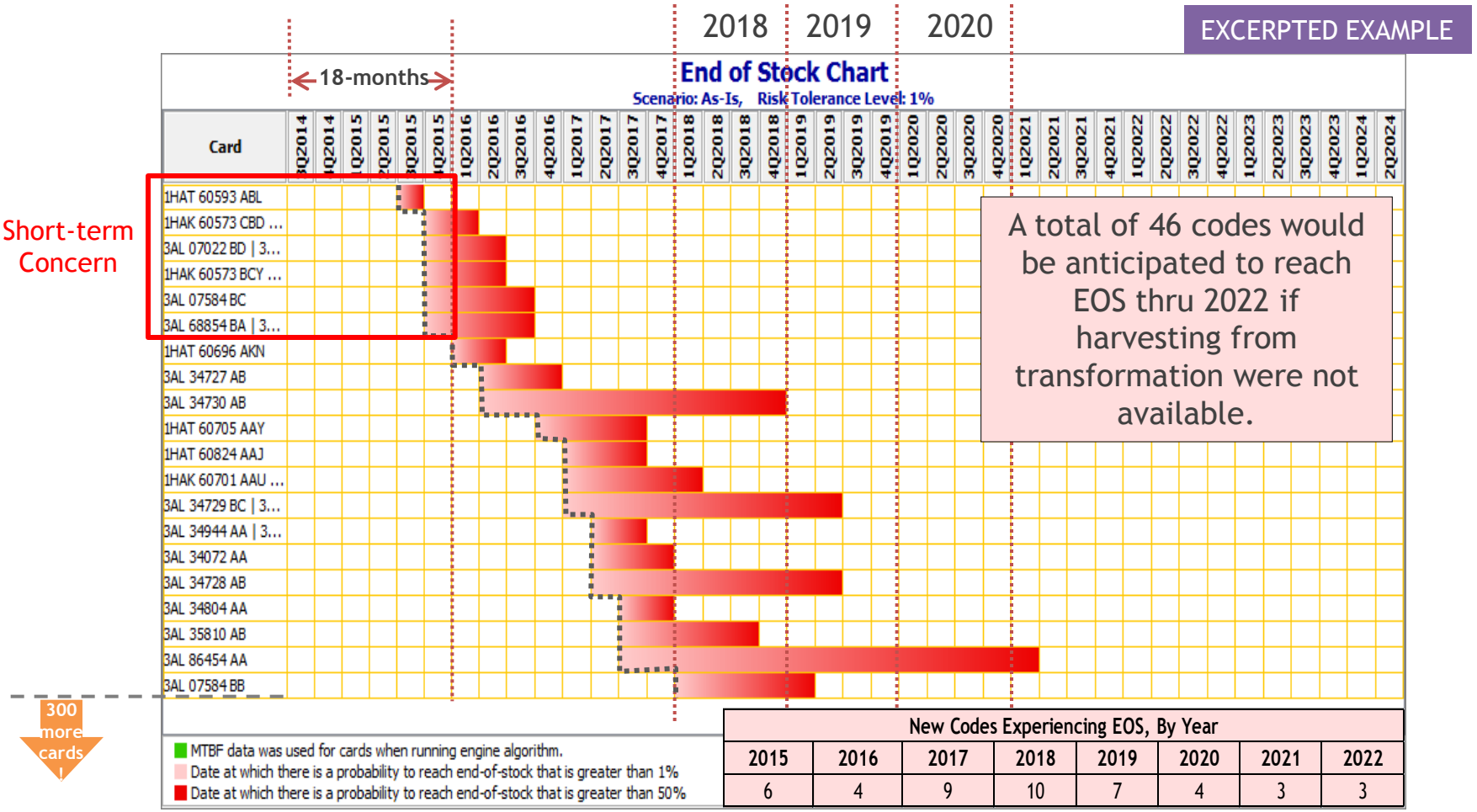
Sustainability Heat Map



HEAT MAP – "NO HARVEST" BASELINE

B Analyze and establish the LCM baseline of the network (all SDH cards)

EXCERPTED EXAMPLE



Short-term Concern

300 more cards !

A total of 46 codes would be anticipated to reach EOS thru 2022 if harvesting from transformation were not available.

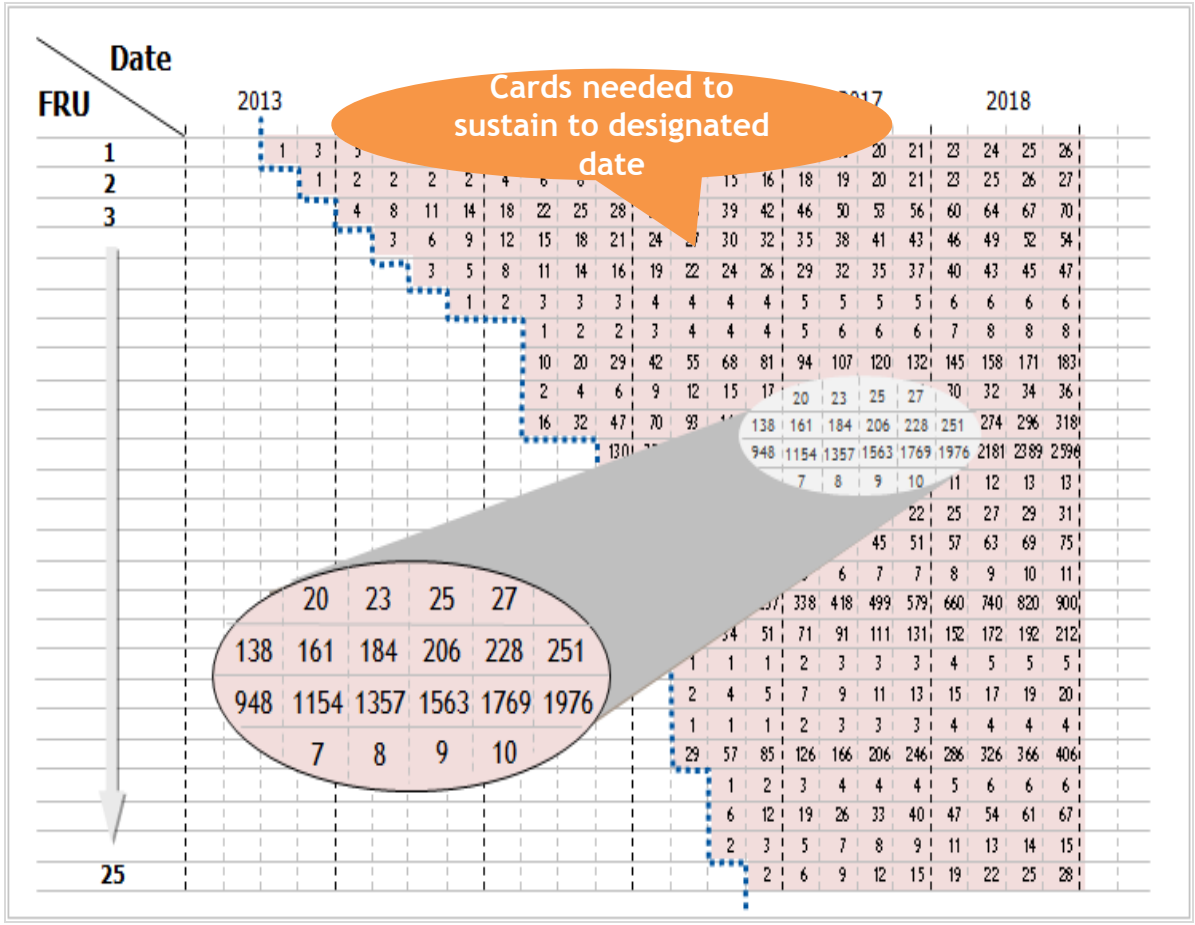
New Codes Experiencing EOS, By Year							
2015	2016	2017	2018	2019	2020	2021	2022
6	4	9	10	7	4	3	3

The "No Harvest" baseline shows that 6 codes (as indicated by the inset), in the absence of mitigations, are anticipated to reach EOS within Operator's 18-month short-term buffer zone.

TECHNOLOGY SOLUTIONS

WHAT DOES A LIFE CYCLE MANAGEMENT (LCM) ANALYSIS LOOK LIKE?

Spares Gap Analysis – <u>All Cards</u> in a Network



- Applies statistical analyses to capture trending and predict failure rates
- Calculates additional spares required to mitigate any out-of-stock threat
- Additional parameters such as repair contract duration, vendor performance, and on-hand inventory are analyzed
- Capacity to address up to 1000 cards (at a time) and accommodate up to 20 mitigation scenarios.

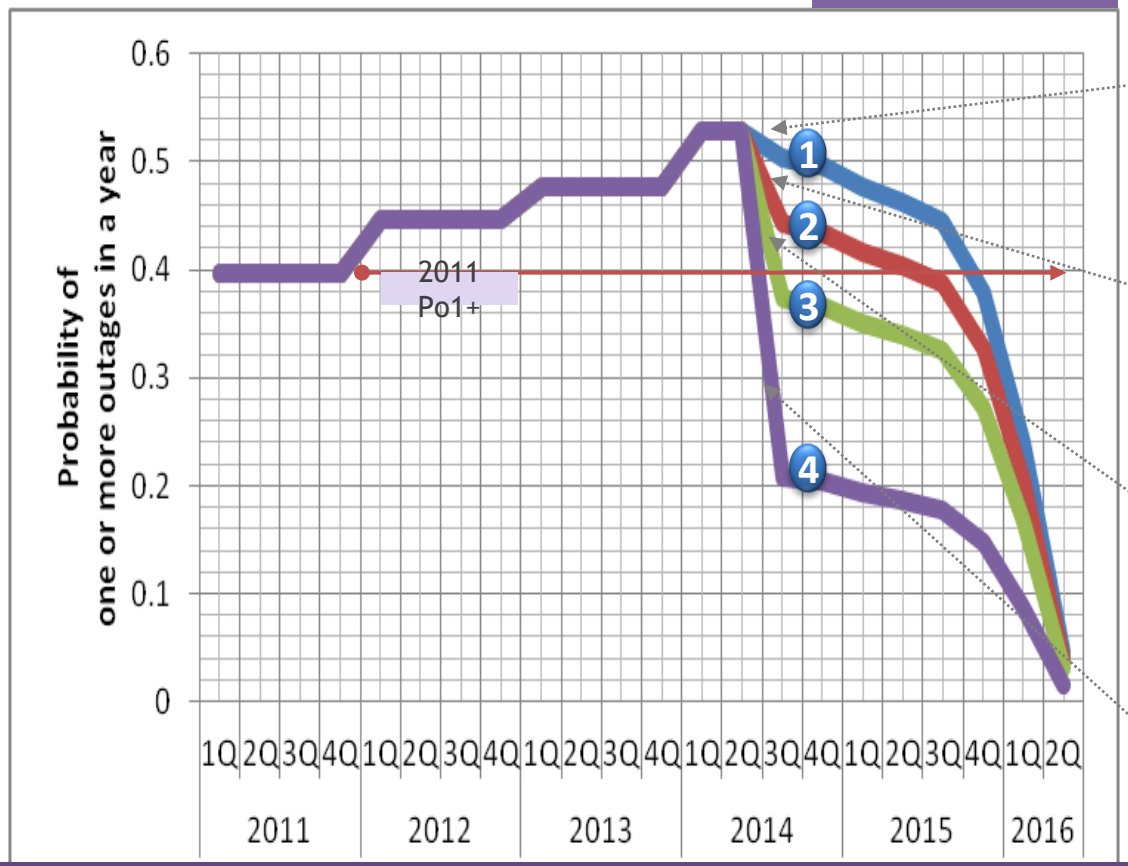
TECHNOLOGY SOLUTIONS

Po1+ CALCULATED PROFILE SCENARIO ANALYSIS

Note: Po1+ represents probability of one or more outages in a year

D Calculate network Outage Probability as a critical element of the transformation is decommissioned

EXCERPTED EXAMPLE



Scenario 1: This is the BASELINE scenario with current course of speed to implement decommissioning Plan of Record

Scenario 2: This is an improvement to reduce the average simplex recovery time of all common cards to be 2.5 days or less

Scenario 3: This is a significant improvement to reduce the average simplex recovery time of all common cards to be 2.0 days or less

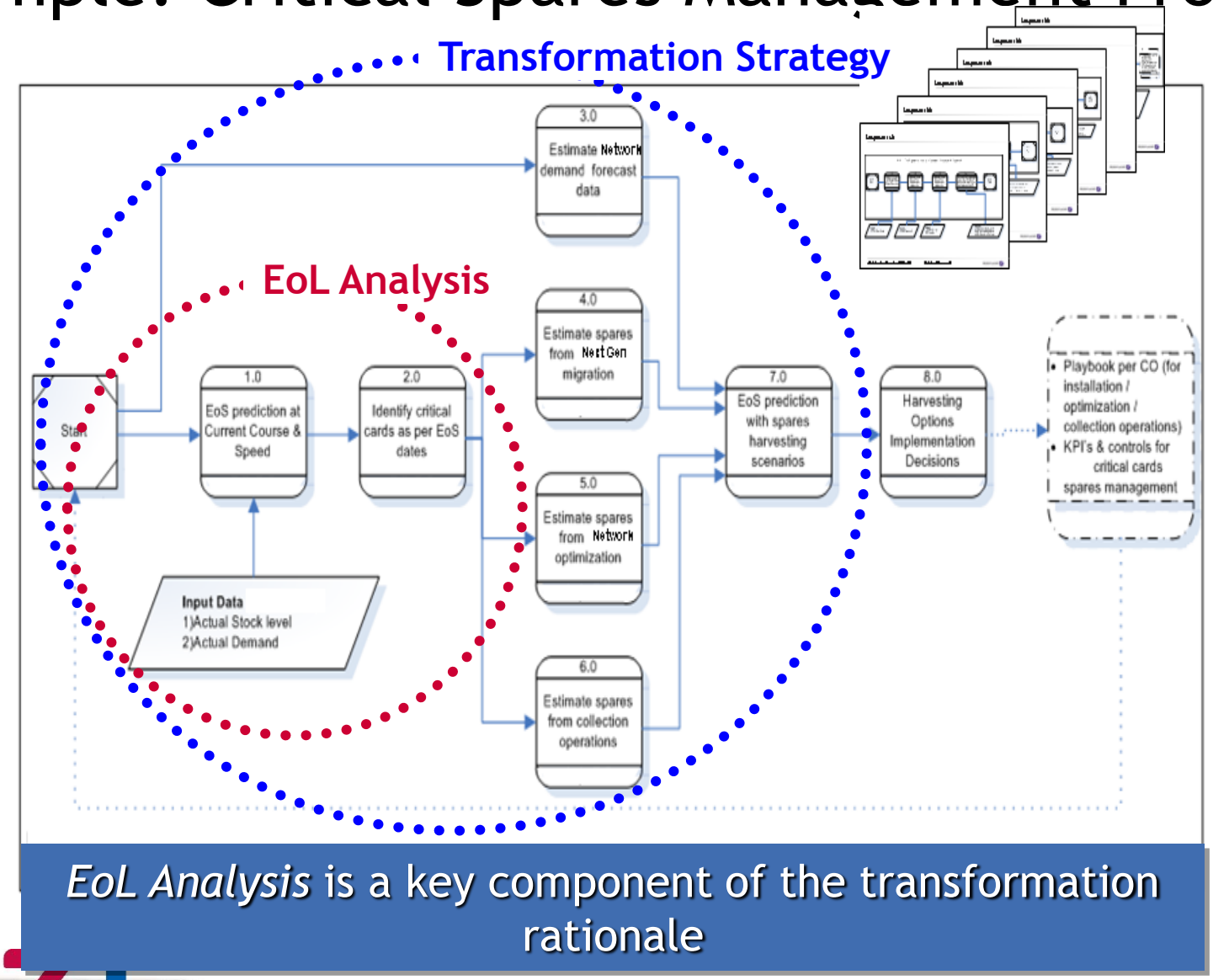
Scenario 4: This is a rapid team approach that all simplex trouble tickets are treated as outage trouble tickets; and simplex recovery time of all common cards is reduced to be 1.0 days or less

Scenario 2 can reduce Po1+ to 2011 level by 1H2015 that results in a six-month improvement compared with Baseline Scenario 1. For a more significant improvement, both Scenarios 3 and 4 should be considered.

ZT TECHNOLOGY SOLUTIONS

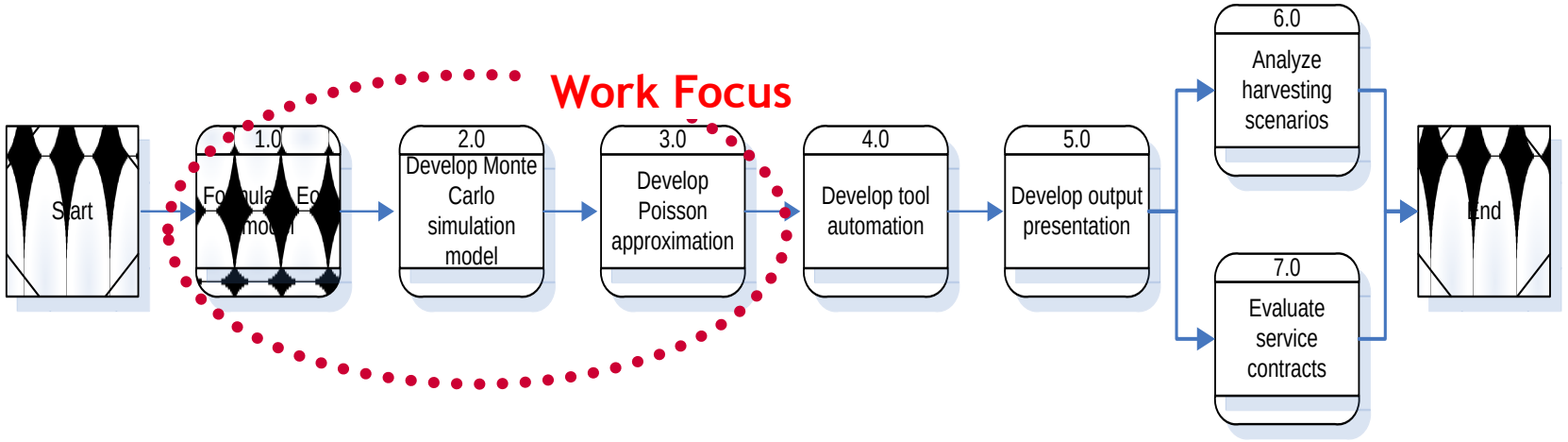
Backups

Life Cycle Management
Example: Critical Spares Management Process



EoL Analysis is a key component of the transformation rationale

EoS Modeling & Prediction Process

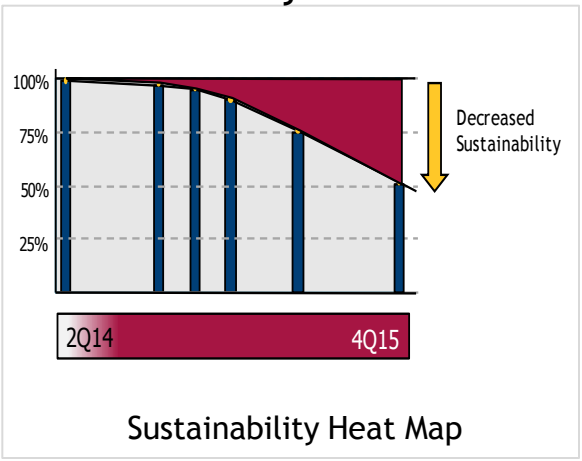


- Key Tasks
  - Cluster AR/PR data
  - Conduct trending analysis of each cluster
  - Define questions to be addressed in the business case
  - Develop EoS simulation model
  - Develop Poisson approximation model

TECHNOLOGY SOLUTIONS

WHAT DOES A LIFE CYCLE MANAGEMENT (LCM) ANALYSIS LOOK LIKE?

Per Card Sustainability Analysis



Sustainability Heat Map

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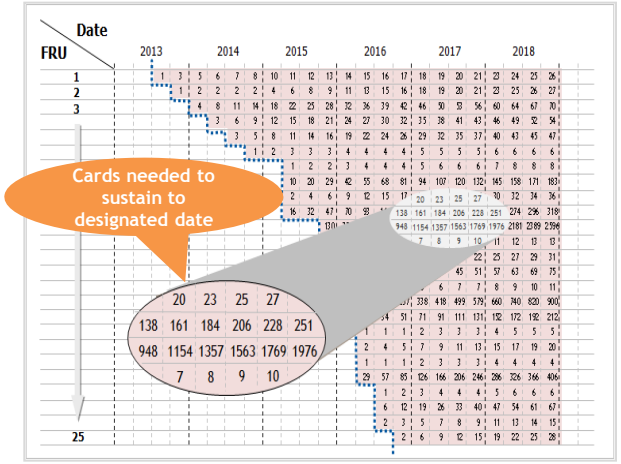
Spares Gap Analysis - All Cards in a Network



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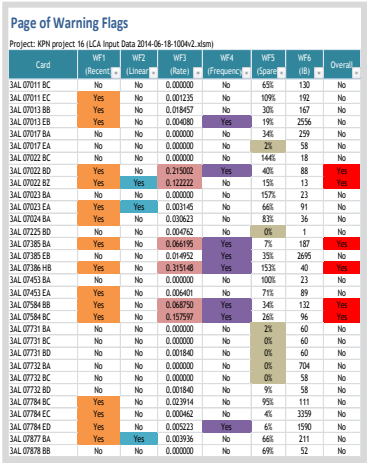
Warning Flags - All Cards in a Network



Page of Warning Flags

Project: KPN project 16 (LCA Input Data 2014-06-18-1004v2.xlsm)

Card	WF1 (Recent	WF2 (Linear	WF3 (Rate)	WF4 (Frequency	WF5 (Spare	WF6 (IB)	Overall
3AL 07011 BC	No	No	0.000000	No	65%	130	No
3AL 07011 EC	Yes	No	0.001235	No	109%	192	No
3AL 07013 BB	Yes	No	0.018457	No	30%	167	No
3AL 07013 EB	Yes	No	0.004080	Yes	19%	2556	No
3AL 07017 BA	No	No	0.000000	No	34%	259	No
3AL 07017 EA	No	No	0.000000	No	2%	58	No
3AL 07022 BC	No	No	0.000000	No	144%	18	No
3AL 07022 BD	Yes	No	0.215002	Yes	40%	88	Yes
3AL 07022 BZ	Yes	Yes	0.122222	No	15%	13	Yes
3AL 07023 BA	No	No	0.000000	No	157%	23	No
3AL 07023 EA	Yes	Yes	0.003145	No	66%	91	No
3AL 07024 BA	Yes	No	0.030623	No	83%	36	No
3AL 07225 BD	No	No	0.004762	No	0%	1	No
3AL 07385 BA	Yes	No	0.066195	Yes	7%	187	Yes
3AL 07385 EB	No	No	0.014952	Yes	35%	2695	No
3AL 07386 HB	Yes	No	0.315148	Yes	153%	40	Yes
3AL 07453 BA	No	No	0.000000	No	100%	23	No
3AL 07453 EA	Yes	No	0.006401	No	71%	89	No
3AL 07584 BB	Yes	No	0.068750	Yes	34%	132	Yes
3AL 07584 BC	Yes	No	0.157597	Yes	26%	96	Yes
3AL 07731 BA	No	No	0.000000	No	2%	60	No
3AL 07731 BC	No	No	0.000000	No	0%	60	No
3AL 07731 BD	No	No	0.001840	No	0%	60	No
3AL 07732 BA	No	No	0.000000	No	0%	704	No
3AL 07732 BC	No	No	0.000000	No	0%	58	No
3AL 07732 BD	No	No	0.001840	No	9%	58	No
3AL 07784 BC	Yes	No	0.023914	No	95%	111	No
3AL 07784 EC	Yes	No	0.000462	No	4%	3359	No
3AL 07784 ED	Yes	No	0.005223	Yes	6%	1590	No
3AL 07877 BA	Yes	Yes	0.003936	No	66%	211	No
3AL 07878 BB	No	No	0.000000	No	69%	52	No

- Consistent and proven technique to identify risk across all cards and enable clear, effective and transparent communication
- Algorithms and thresholds proactively identify high risk cards in advance
- Identifies and quantifies risk indicators in multiple dimensions.

ZT TECHNOLOGY SOLUTIONS

Leading Operators: Resiliency (Life Cycle Management)
Tier 1 European Fixed / Mobile Operator

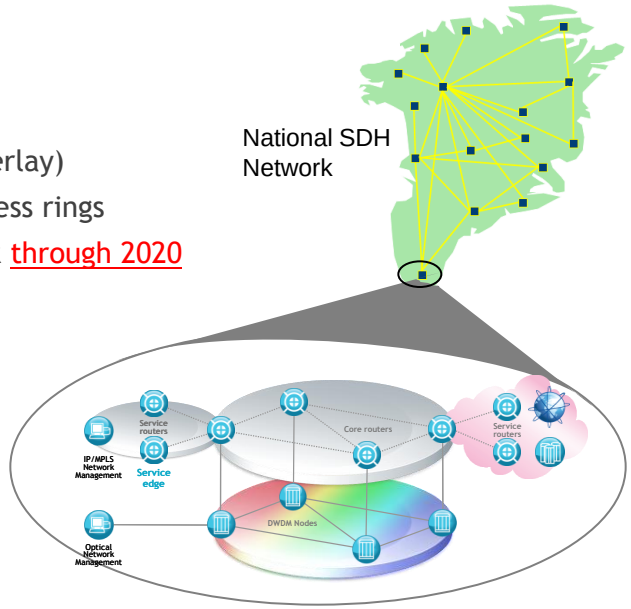
Type: National SDH network

Services: All legacy traffic - PSTN, ATM, Mobile, Private Lines (IP/Eth on next gen overlay)

Resiliency Highlights: Fully redundant core with dual-homed, self-healing metro/access rings

Comprehensive program in place to fully manage the Life Cycle of the legacy network through 2020

- All cards in the network are actively managed
  - Installed base (transformation is ongoing)
  - Field returns
  - Repair activities
- Spares managed to insure 12-18 months inventory on-hand
- Harvesting from transformation modeled to conserve OPEX (repair avoidance)
- Problematic products targeted for detailed Outage Prediction modeling
  - Drives targeted, accelerated decommissioning.



"(Operator) is in a fortunate position of being able to develop its quad-play strategy how it wants, at its own pace, because it is the dominant fixed and mobile operator. The huge customer bases in which to cross-sell has meant that (Operator) has been able to tactically move into quad play at its own pace." Ovum

Case Study: Life Cycle Management
Tier 1 European Fixed / Mobile Operator

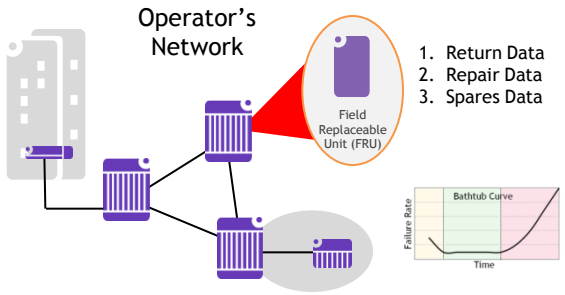
Background In order to sustain a PSTN to 2020, develop a comprehensive plan to manage the legacy transport network to the highest quality, maintaining the Operators reputation – and profitability – during their next gen transformation

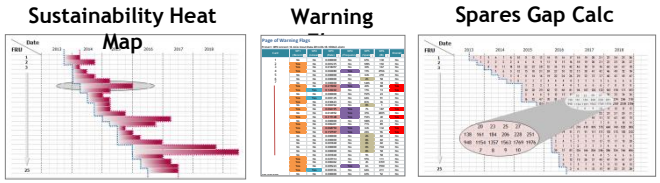
Scope Major transformation project of a problematic DXC was underway. Remaining network stays in place. Harvesting benefits to be modeled; decommissioning speed of DXCs to be analyzed (outage probability calc)

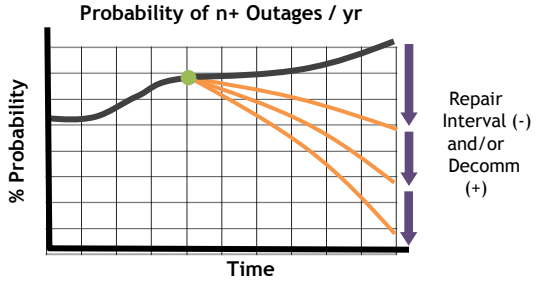
Original network deployed in early 90's; 12 product families from multiple vendors; 19K total NEs; approx 350 unique cards to analyze

Results Developed custom program for automated, validated customer data input to Proprietary Bell Labs Life Cycle Analytics tools

- **Sustainability Heat Maps** showed that harvesting program benefits will run out in 2018 (repair avoidance must cease)
- **Warning Flags** identified next problematic product and mitigation required
- **Spares Gap Analysis** developed plan for the recommended 18 mo inventory on hand
- **Outage Prediction** showed that, for the DXC, decommissioning must accelerate and repair interval must be significantly reduced to avoid increasing probability of outages in the near term.



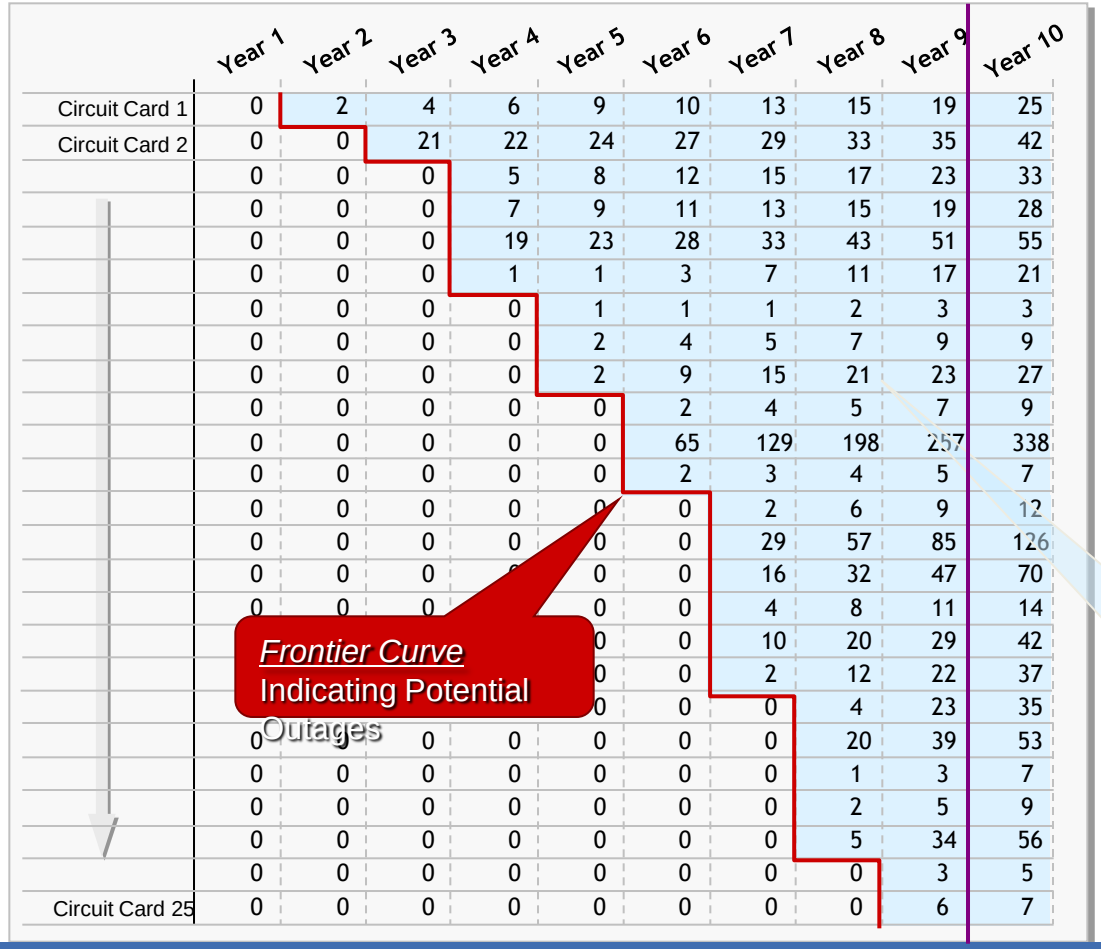




TECHNOLOGY SOLUTIONS

EOL ANALYSIS

CRITICAL SPARES DECISION SUPPORT TOOL → FIND / ELIMINATE STOCK-OUTS



	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Circuit Card 1	0	2	4	6	9	10	13	15	19	25
Circuit Card 2	0	0	21	22	24	27	29	33	35	42
	0	0	0	5	8	12	15	17	23	33
	0	0	0	7	9	11	13	15	19	28
	0	0	0	19	23	28	33	43	51	55
	0	0	0	1	1	3	7	11	17	21
	0	0	0	0	1	1	1	2	3	3
	0	0	0	0	2	4	5	7	9	9
	0	0	0	0	2	9	15	21	23	27
	0	0	0	0	0	2	4	5	7	9
	0	0	0	0	0	65	129	198	257	338
	0	0	0	0	0	2	3	4	5	7
	0	0	0	0	0	0	2	6	9	12
	0	0	0	0	0	0	29	57	85	126
	0	0	0	0	0	0	16	32	47	70
	0	0	0	0	0	0	4	8	11	14
	0	0	0	0	0	0	10	20	29	42
	0	0	0	0	0	0	2	12	22	37
	0	0	0	0	0	0	0	4	23	35
	0	0	0	0	0	0	0	20	39	53
	0	0	0	0	0	0	0	1	3	7
	0	0	0	0	0	0	0	2	5	9
	0	0	0	0	0	0	0	5	34	56
	0	0	0	0	0	0	0	0	3	5
Circuit Card 25	0	0	0	0	0	0	0	0	6	7

Sufficient spares (numbers in cells) must be acquired (harvest or refurbished) to extend life beyond Year N. Capital savings and sustained network reliability are typical.

ZT TECHNOLOGY SOLUTIONS

WARNING FLAG ANALYSIS

A Analyze all cards in the network for Early Warning signs of failure

EXCERPTED EXAMPLE

SDH Warning Flags Data Set -- Active Cards Only, sorted on Composite Score

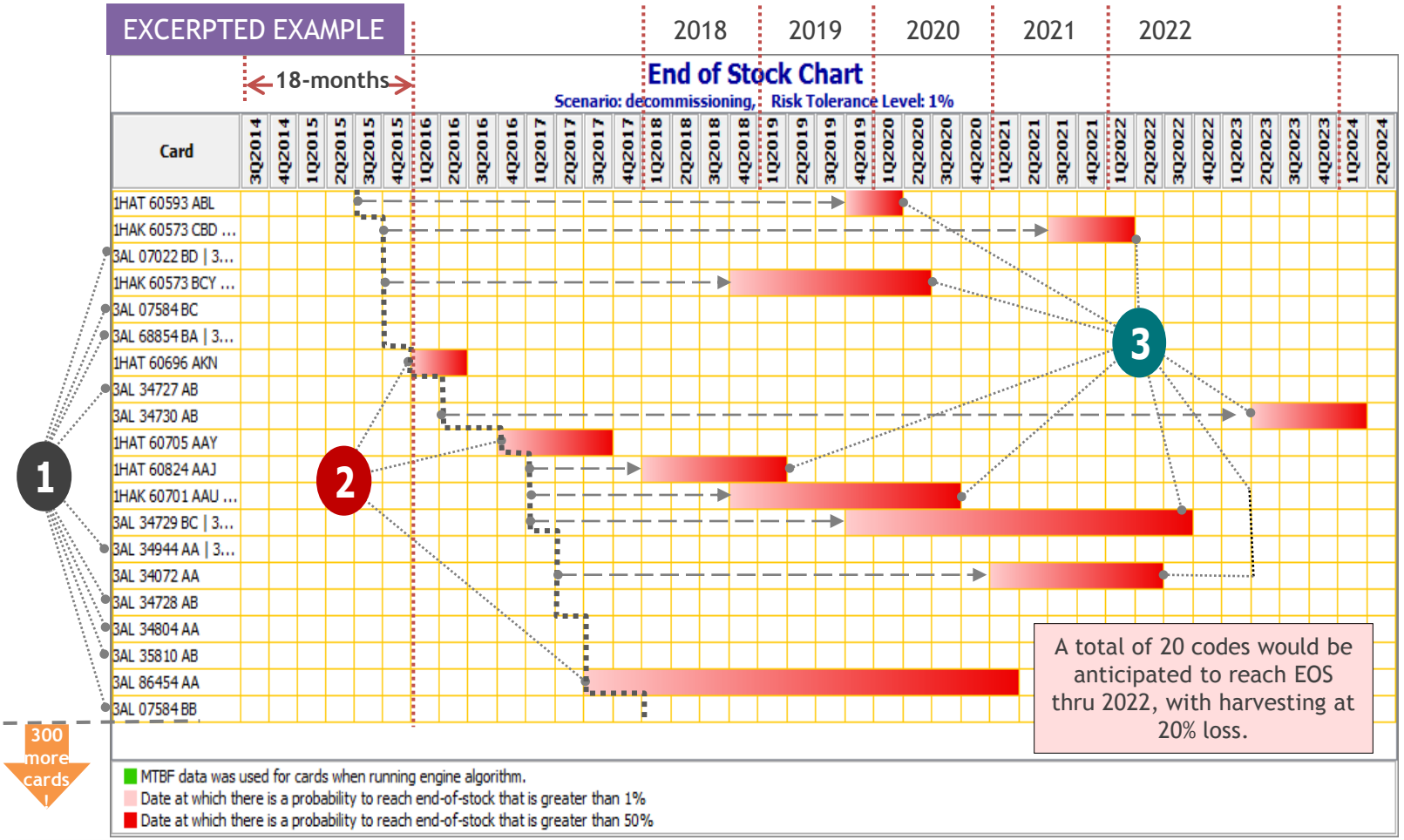
	Threshold	200%	75%	4%	6	4%	50%	5					
	170												
ID	Card	WF1 (Recent)	WF2 (Linear)	WF3 (Rate)	WF4 (Frequency)	WF5 (Spare)	WF6 (Repair)	CWF	Installed Base	Description	Supplier	Model	Type
76	3AL 34945 AA	307%	23%	7.7%	1	43%	5%	10	121	L-16.1 aggregate SC	Alcatel	1661SMC	ADM
63	3AL 34727 AB	217%	60%	4.8%	1	9%	1%	10	1149	Aggregate S-16.1	Alcatel	1664SM	ADM
179	1HAK 60573 BCY |	120%	16%	7.3%	1	14%	20%	8	517	1550nm TX STM-16 optical interface	Siemens	Siemens	ADM
178	1HAK 60573 CBD |	122%	11%	5.9%	1	9%	20%	8	4813	1300nm TX STM-16 optical interface	Siemens	Siemens	ADM
97	3AL 36424 **	208%	100%	4.2%	0	833%	70%	8	6	coluer aggarate	Alcatel	1661SMC	ADM
290	3AL 07022 BD | 3AL	99900%	-4%	17.2%	1	28%	80%	7	132	HDD 3 , 5"2.4 GByte	Alcatel	1641SX	DXC
20	3AL 07584 BC	677%	-32%	15.8%	1	30%	80%	7	96	Communication Controller Board A2	Alcatel	1641SX	DXC
289	3AL 68854 BA | 3AL	436%	-3%	12.7%	1	23%	50%	7	132	Master Clock Board	Alcatel	1641SX	DXC
285	1HAK 60701 AAU |	318%	21%	12.3%	1	56%	98%	7	81	STM-16 TX 1300	Siemens	Siemens	ADM
19	3AL 07584 BB	574%	-11%	6.9%	1	37%	80%	7	132	Communication Controller Board A1	Alcatel	1641SX	DXC
232	1HAT 60593 ABL	206%	24%	6.4%	1	7%	98%	7	11388	STM-4 mux interface card (MIC)	Siemens	Siemens	ADM/TMX
133	3AL 86454 AA	418%	165%	1.0%	0	6%	0%	7	104	F3 MAC FDU	Alcatel	1611SSU	SYNC
87	3AL 35904 AA	259%	43%	17.6%	0	290%	50%	6	21	L-16.2 JE aggregate SC	Alcatel	1664SM	ADM
254	131-7404/03	212%	-19%	12.4%	0	225%	98%	6	4	CCU	Siemens	Siemens	DXC
71	3AL 34731 AA	135%	111%	8.3%	0	225%	98%	6	8	Electric bitrib 140	Alcatel	1664SM	ADM
258	131-7408/01	107%	183%	5.6%	0	300%	98%	6	4	timing distributor	Siemens	Siemens	DXC
86	3AL 35854 AB	206%	49%	3.1%	1	21%	0%	6	396	L-16.2 JE1 HM1 SC Aggregate	Alcatel	1664SM	ADM
28	3AL 07784 EC	527%	31%	0.05%	0	4%	80%	6	3739	Converter 03	Alcatel	1641SX	DXC

Eighteen active cards are red-flagged — starting point for forensics examination

ZT TECHNOLOGY SOLUTIONS

HEAT MAP – TRANSFORMATION-BASED HARVEST (20% LOSS)

C Show the LCM impact of a major transformation project



1. EOS moved beyond planning horizon
2. No appreciable effect from harvest
3. EOS shifted due to harvest

The harvest from transformation, even when modeled with a 20% loss, proves to be a sufficient mitigation strategy for the short-term sustainment period of 18 months, thru 2015, but is insufficient beyond that. Anticipating 20 codes to reach EOS thru 2022.

TECHNOLOGY SOLUTIONS

FRONTIER CURVE – TRANSFORMATION-BASED HARVEST (20% LOSS)
FOCUSED LIST OF ANTICIPATED 20 EOS CODES

C Show the LCM impact of a major transformation project

EXCERPTED EXAMPLE

Frontier Chart

Scenario: decommissioning, Risk Tolerance Level: 1%

Card	3Q2014	4Q2014	1Q2015	2Q2015	3Q2015	4Q2015	1Q2016	2Q2016	3Q2016	4Q2016	1Q2017	2Q2017	3Q2017	4Q2017	1Q2018	2Q2018	3Q2018	4Q2018	1Q2019	2Q2019	3Q2019	4Q2019	1Q2020	2Q2020	3Q2020	4Q2020	1Q2021	2Q2021	3Q2021	4Q2021	1Q2022	2Q2022	3Q2022	4Q2022	1Q2023	2Q2023	3Q2023	4Q2023	1Q2024	2Q2024
1HAT 60593 ABL	-675	-635	-641	-754	-747	-628	-710	-1...	-18...	-1...	-16...	-1...	-13...	-1...	-10...	-921	-758	-593	-425	-253	-79	99	280	465	652	844	1039	1237	1439	1645	1854	2068	2285	2506	2731	2960	3193	3425	3656	3888
1HAK 60573 CBD ...	-346	-337	-341	-395	-412	-363	-393	-602	-911	-942	-892	-841	-791	-740	-690	-639	-589	-538	-488	-437	-386	-335	-284	-233	-182	-130	-79	-27	25	77	129	181	233	286	339	391	444	497	550	603
1HAK 60573 BCY ...	-59	-51	-50	-56	-57	-47	-46	-56	-66	-66	-57	-49	-41	-33	-24	-16	-8	0	7	15	23	31	39	47	55	63	70	78	86	94	102	110	118	125	133	141	149	157	165	172
1HAT 60696 AKN	-75	-62	-49	-35	-20	-3	18	33	48	62	76	90	104	118	132	146	161	175	189	204	218	233	248	263	278	293	308	324	339	355	371	386	402	419	435	452	468	485	501	518
1HAT 60705 AAY	-79	-71	-63	-55	-47	-38	-29	-20	-10	4	15	25	33	42	51	59	67	75	83	91	99	107	115	123	131	139	146	154	162	170	177	185	193	200	208	216	223	231	238	246
1HAT 60824 AAJ	-179	-162	-150	-141	-125	-109	-109	-98	-90	-76	-62	-46	-24	-8	6	20	34	47	60	73	86	99	112	125	138	151	163	176	189	201	214	226	239	251	264	276	289	301	313	326
1HAK 60701 AAU ...	-41	-38	-38	-37	-35	-32	-34	-34	-34	-32	-28	-24	-17	-13	-9	-5	-1	3	7	10	14	18	22	26	30	34	38	42	47	51	56	60	65	70	75	79	85	90	95	100
3AL 34729 BC | 3...	-14	-13	-12	-11	-9	-9	-9	-10	-12	-13	-12	-11	-10	-9	-7	-5	-4	-4	-3	-2	-1	0	0	1	2	2	3	4	4	5	6	6	7	8	8	9	9	10	11	11
3AL 34072 AA	-164	-158	-157	-145	-162	-207	-231	-244	-245	-232	-217	-202	-180	-165	-150	-137	-123	-110	-96	-83	-70	-58	-45	-32	-19	-7	6	19	31	44	56	69	81	94	106	119	131	143	156	168
3AL 86454 AA	-5	-5	-5	-4	-4	-4	-3	-3	-2	-2	-1	-1	1	2	2	3	3	4	5	5	6	6	7	8	8	9	9	10	11	11	12	13	14	14	15	16	17	18	18	19
3AL 97080 AD	-6	-6	-5	-5	-5	-4	-4	-4	-3	-3	-2	-2	-1	-1	1	1	2	2	3	3	3	4	4	5	5	5	6	6	6	7	7	7	8	8	8	9	9	9	10	10
3AL 65115 AA	-36	-34	-32	-30	-27	-25	-23	-21	-18	-16	-13	-11	-8	-5	-1	4	7	10	13	15	18	20	22	25	27	29	31	34	36	38	40	42	45	47	49	51	53	55	57	59
3AL 65103 ZZ | 3...	-19	-18	-17	-16	-15	-14	-13	-12	-11	-10	-8	-7	-5	-3	-1	2	4	6	8	10	12	14	16	17	19	21	23	25	27	29	32	34	36	39	41	44	46	49	51	54
3AL 97086 AA	-15	-14	-13	-12	-11	-10	-10	-9	-8	-7	-6	-5	-4	-2	-1	1	3	4	5	6	7	8	9	10	11	12	13	13	14	15	16	17	17	18	19	20	21	21	22	23
3AL 97078 AC	-7	-7	-6	-6	-6	-5	-5	-5	-4	-4	-3	-3	-2	-2	-1	-1	1	1	1	2	3	3	3	4	4	5	5	5	6	6	7	7	7	8	8	8	9	9	9	10
3AL 36517 BB	-12	-12	-11	-13	-12	-12	-12	-13	-14	-16	-15	-15	-14	-14	-13	-13	-12	-11	-11	-10	-9	-7	-7	-6	-5	-4	-3	-3	-2	-1	-1	0	0	1	2	2	3	3	4	5
1HAT 60585 CBT ...	-438	-419	-400	-381	-361	-341	-320	-299	-278	-256	-234	-211	-188	-164	-140	-115	-89	-63	-35	1	35	65	94	122	151	180	209	238	268	298	329	360	391	423	455	488	521	554	587	620
131-9114/03	-201	-193	-185	-176	-168	-159	-150	-141	-131	-122	-112	-102	-92	-81	-70	-59	-48	-36	-23	-9	11	25	39	52	65	78	91	104	117	131	144	158	172	186	200	215	229	244	258	272
131-7404/03	-8	-8	-8	-8	-7	-7	-7	-6	-6	-6	-5	-5	-5	-4	-4	-3	-3	-2	-1	-1	1	1	2	3	3	4	5	5	6	6	7	8	8	9	9	10	11	11	12	12
3AL 34653 AA	-8	-8	-8	-8	-7	-7	-7	-7	-7	-6	-6	-6	-6	-5	-5	-5	-5	-5	-4	-4	-4	-3	-3	-3	-3	-2	-2	-2	-1	-1	-1	1	1	1	1	2	2	2	3	3

The frontier curve of the anticipated 20 codes to reach EOS thru 2022 indicates the quantity of units required to sustain the SDH network, as shown in the inset.

WHAT DOES A LIFE CYCLE MANAGEMENT (LCM) ANALYSIS LOOK LIKE?

Warning Flags – <u>All Cards</u> in a Network

Page of Warning Flags

Project: KPN project 16 (LCA Input Data 2014-06-18-1004v2.xlsm)

Card	WF1 (Recent)	WF2 (Linear	WF3 (Rate)	WF4 (Frequency	WF5 (Spare	WF6 (IB)	Overall
3AL 07011 BC	No	No	0.000000	No	65%	130	No
3AL 07011 EC	Yes	No	0.001235	No	109%	192	No
3AL 07013 BB	Yes	No	0.018457	No	30%	167	No
3AL 07013 EB	Yes	No	0.004080	Yes	19%	2556	No
3AL 07017 BA	No	No	0.000000	No	34%	259	No
3AL 07017 EA	No	No	0.000000	No	2%	58	No
3AL 07022 BC	No	No	0.000000	No	144%	18	No
3AL 07022 BD	Yes	No	0.215002	Yes	40%	88	Yes
3AL 07022 BZ	Yes	Yes	0.122222	No	15%	13	Yes
3AL 07023 BA	No	No	0.000000	No	157%	23	No
3AL 07023 EA	Yes	Yes	0.003145	No	66%	91	No
3AL 07024 BA	Yes	No	0.030623	No	83%	36	No
3AL 07225 BD	No	No	0.004762	No	0%	1	No
3AL 07385 BA	Yes	No	0.066195	Yes	7%	187	Yes
3AL 07385 EB	No	No	0.014952	Yes	35%	2695	No
3AL 07386 HB	Yes	No	0.315148	Yes	153%	40	Yes
3AL 07453 BA	No	No	0.000000	No	100%	23	No
3AL 07453 EA	Yes	No	0.006401	No	71%	89	No
3AL 07584 BB	Yes	No	0.068750	Yes	34%	132	Yes
3AL 07584 BC	Yes	No	0.157597	Yes	26%	96	Yes
3AL 07731 BA	No	No	0.000000	No	2%	60	No
3AL 07731 BC	No	No	0.000000	No	0%	60	No
3AL 07731 BD	No	No	0.001840	No	0%	60	No
3AL 07732 BA	No	No	0.000000	No	0%	704	No
3AL 07732 BC	No	No	0.000000	No	0%	58	No
3AL 07732 BD	No	No	0.001840	No	9%	58	No
3AL 07784 BC	Yes	No	0.023914	No	95%	111	No
3AL 07784 EC	Yes	No	0.000462	No	4%	3359	No
3AL 07784 ED	Yes	No	0.005223	Yes	6%	1590	No
3AL 07877 BA	Yes	Yes	0.003936	No	66%	211	No
3AL 07878 BB	No	No	0.000000	No	69%	52	No

- Consistent and proven technique to identify risk across <u>all cards</u> and enable clear, effective and transparent communication
- Algorithms and thresholds proactively identify high risk cards in advance
- Identifies and quantifies risk indicators in multiple dimensions.

ZT TECHNOLOGY SOLUTIONS