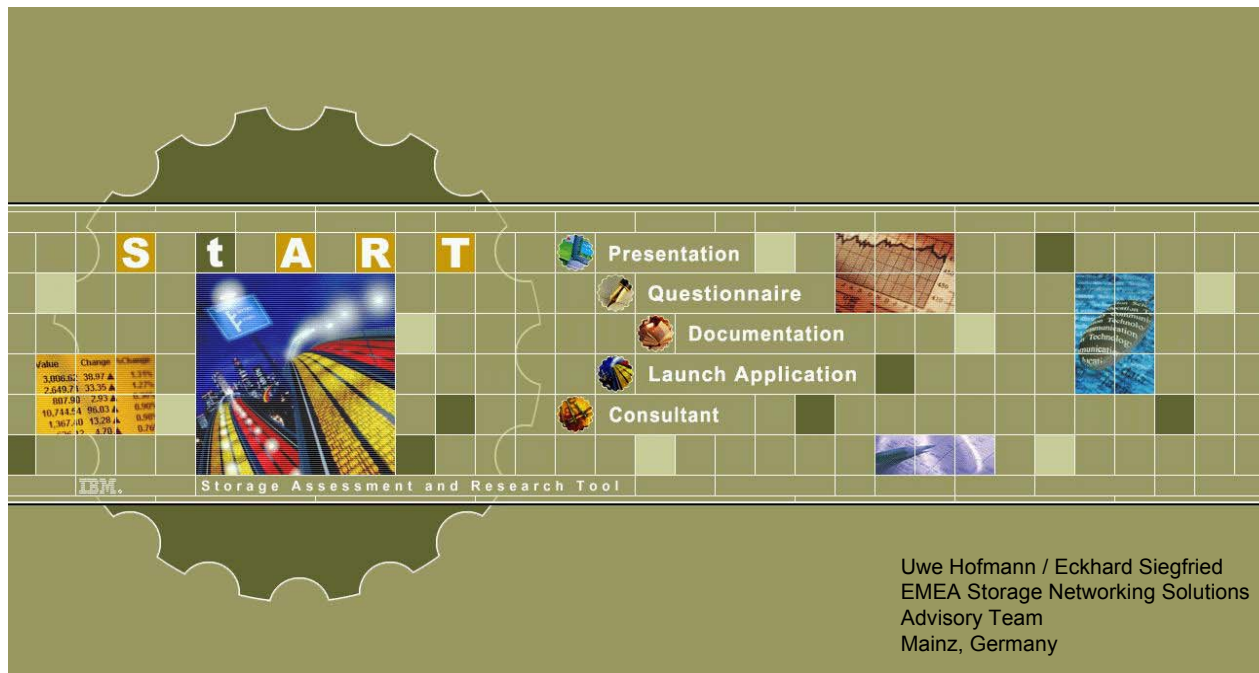


Storage Assessment and Research Tool (StART)



V 1.1.7 Collaterals

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Collateral: Supported Operating Systems



◆ Mainframe

- OS/390
- z-OS

◆ Unix

- AIX
- Sun Solaris
- HP UX
- Linux

◆ Windows

- Windows NT
- Windows 2000
- Windows XP

◆ Novell

- Novell Netware

◆ AS/400

- OS/400

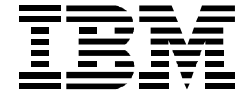
Collateral: Default Values (1)



- ◆ [1.6] Annual Price Reduction
 - 40% based on IBM internal data and by Gartner / IDC
- ◆ [1.7] Include IBM Global Financing
 - 8% additional savings (can be up to 13%) based on IGF experience
 - Percentage number is a changeable default value
- ◆ [4.4] Utilization
 - 80% for S/390 and AS/400 environment based on customer feedback
 - 60% for Unix based systems based on customer feedback
 - 50% for Windows based systems based on customer feedback
- ◆ [4.5] List Price Adjustments
 - 40% average value for IBM US/EMEA/AP
- ◆ [5.3] Purchase cost per MB
 - 0,11 \$/MB for S/390 and AS/400 systems based on IBM prices (z-Series, i-Series)
 - 0,08 \$/MB for Unix systems based on IBM prices for p-Series
 - 0,06 \$/MB for Windows / Novell systems based on x-Series
- ◆ [5.4] Aquisition Overhead
 - 5% used for administratiove efforts aquiring new storage hardware
- ◆ [7.2] Annual burdened cost per FTE
 - 100.000 \$ based on US and Europe numbers
- ◆ [7.5] Annual burdened cost increase
 - 5% based on industrial averages in US and Europe
- ◆ [7.7] Cost of Recrutement
 - 10.000 \$/FTE based on industrial averages in US and Europe



Collateral: Default Values (2)



- ◆ [7.8] Cost of Education
 - 10.000 \$/FTE approx. 10% of annual burdened cost for 2 weeks education
- ◆ [7.9] Annual Estimated Labor Turnover
 - 15% fluctuation based on customer feedback from US and Europe
- ◆ [7.10] Annual Education/Training Cost Increase
 - 5% based on industrial averages in US and Europe
- ◆ [10.2] Annual Burdened Cost User
 - 100.000 \$ same as for FTEs
- ◆ [10.5] Planned outages: Affected servers (factor)
 - The factor will be multiplied by the number of servers to get the total number of outage incidents
 - S/390 and AS/400 systems: Default factor is set to "1", i.e. at least every server is affected once a year by planned maintenance activities because of the larger storage directly attached
 - Unix / Windows / Novell systems: Default factor is set to "0.5", i.e. 50% of all servers are affected by planned maintenance activities
- ◆ [10.6] Planned outages: Avg. duration
 - 4 hours for shutting down the server, installing / replacing storage, configuration of storage, re-starting servers



Collateral: Outage Cost Calculation



Two major contributors to the Outage Costs:

- ◆ Loss in Productivity (\$/hour)
 - No access to storage is causing non-productivity period for all affected users
 - Contribution is related to number of users, their annual burdened cost per year and the productive period with 220 working days and 10 hours per day
- ◆ Loss in Revenue (\$/hour)
 - No access to storage is causing a loss in revenue.
 - Contribution is related to:
 - [10.1] Hourly Cost Outage in \$/hour (given by the customer) OR
 - Will be calculated from the Total Revenue ([1.4]) and the weighting factor derived from the Application Revenue Contribution Factor ([2.2])



Collateral: Business As Usual



◆ Hardware Costs

- The disk storage costs are calculated from the installed disk capacity, server and disk growth rates, purchase price, annual price reduction, and price adjustments

◆ Human Resource Costs

- The human resource costs are related to the number of FTEs, their burdened costs and the cost increase.
- The required number of FTEs are calculated using the installed disk capacity, server and disk growth rates and the factor for the “managed GB / FTE”, which is calculated by dividing the installed disk capacity with the number of FTEs in the current year.
- Based on industrial averages the following numbers should be seen (based on data from Gartner and IDC) :

■ S/390 and AS/400:	2 – 6 TB / FTE	(avg. 4 – 5 TB / FTE)
■ Unix:	600 GB – 4 TB / FTE	(avg. 1 – 1,5 TB / FTE)
■ Windows	300 GB – 1,5 TB / FTE	(avg. 700 – 800 GB / FTE)

◆ Outage Costs

- Base contributors
 - Loss in Productivity (\$/hour)
 - Loss in Revenue (\$/Hour)
- Unplanned Outages:
 - Number of incidents ([10.3]) multiplied by the average duration ([10.4])
- Planned Outage:
 - Number of incidents ([10.5]) multiplied by average duration ([10.6]),
 - Reduced by the number of hours, where this can be done in the non-productive period (only if not a 365x24 operation)
- Calculation of the “Outage Costs per GB”
 - Sum of loss productivity and revenue for unplanned and planned outages divided by the installed disk capacity
 - Extrapolation of outage costs using the installed capacity, server and disk growth rates, Outage Costs per GB, and a Outage Improvement factor for BAU (default is 25%).

◆ Miscellaneous Costs

- Environmental costs are calculated either by using [11.2] “Environmental Costs” given by the customer or are calculated using a percentage of the sum of Hardware, Human Resource and Outage costs
- The default percentage is 5% based on figures from IDC (4%) and Gartner (6%)



Collateral: Storage Consolidation Rules (1)

◆ NAS

- [1 A] NAS 200 / NAS 300 -> consolidate NAS 200 into NAS 300
 - Better scalability for NAS 300
- [1 B] NAS 200 / NAS 300G -> no further consolidation
 - Additional gateways may lead to a cost dis-advantage
- [1 C] NAS 300 / NAS 300G -> consolidate NAS 300 into NAS 300G
 - Better scalability for NAS300G
- [1 D] NAS 200 / NAS 300 / NAS 300G -> use [A] and [C]
 - Better scalability for NAS 300G, additional gateways may lead to a cost dis-advantage
- [2 A] NAS 200 / SAN -> no further consolidation
 - Additional gateways may lead to a cost dis-advantage
- [2 B] NAS 300 / SAN -> consolidate to NAS 300G
 - Consolidate into SAN because of existing SAN infrastructure with easier management and better scalability
- [2 C] NAS 300 / NAS 300G / SAN -> consolidate to NAS 300G
 - Consolidate into SAN because of existing SAN infrastructure with easier management and better scalability



Collateral: Storage Consolidation Rules (2)

◆ iSCSI

- [1 A] iSCSI 210 / Cisco 5420 -> consolidate into Cisco 5420
 - Consolidate into SAN because of existing SAN infrastructure with easier management and better scalability
- [2 A] iSCSI 210 / SAN -> no further consolidation
 - Consolidation into Cisco 5420 may lead to a cost dis-advantage
- [2 B] iSCSI 210 / Cisco 5420 / SAN -> consolidate into Cisco 5420
 - Consolidate into SAN because of existing SAN infrastructure with easier management and better scalability and existing Cisco 5420



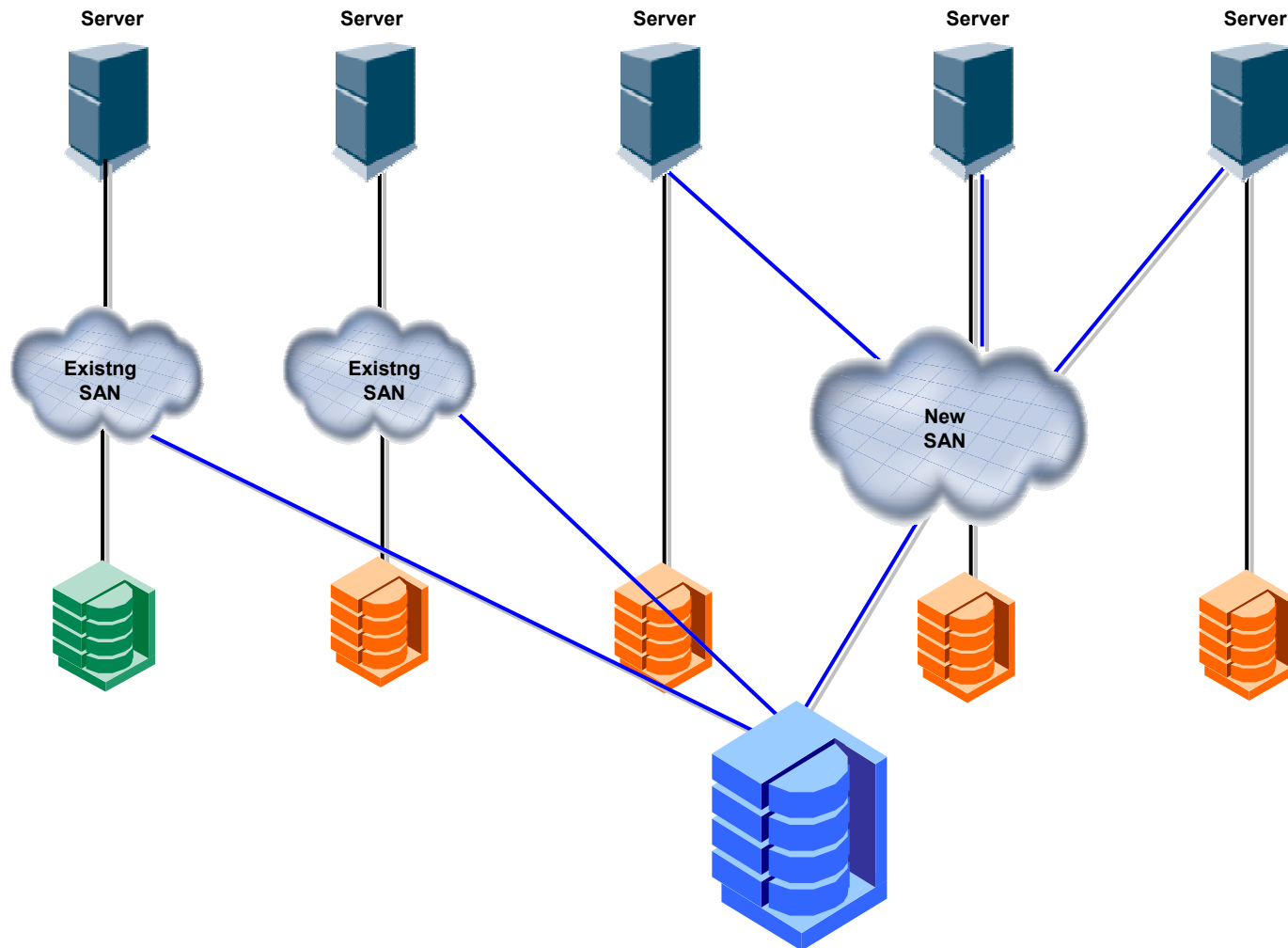
Collateral: Storage Consolidation Rules (3)

◆ SAN

- [1 A] T500 / T700 -> consolidate T500 into T700 only if capacity of server groups T700 is twice as high as capacity of server groups T500
 - Higher scalability for T700
- [1 B] T500 / ESS and/or ESS turbo -> no further consolidation
 - If mix of FAStT and ESS is recommended according StorSelect2 then no further consolidation is recommended
- [1 C] T700 / ESS and/or ESS turbo -> no further consolidation
 - If mix of FAStT and ESS is recommended according StorSelect2 then no further consolidation is recommended
- [1 D] T500 / T700 / ESS -> use [A]
 - Higher scalability for T700
- [1 E] ESS / ESS Turbo -> no further consolidation



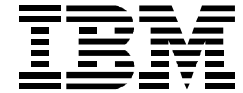
Collateral: SAN Design – General



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Collateral: SAN Design – RAID Level



- ◆ Input Field [4.2] RAID level controls re-utilization of existing storage hardware and the RAID level to be implemented

RAID Level Input [4.2]	Existing Storage	Type	RAID Level ESS	RAID Level FAStT	RAID Level IP Storage	Re-Utilization
0	Non-IBM, IBM RVA	RAID 0	5	5	5	NO
1	Non-IBM, IBM RVA	RAID 1	5	5	5	NO
-1	Non-IBM, IBM RVA	RAID 1	10	1	1	NO
5	Non-IBM, IBM RVA	RAID 5	5	5	5	NO
10	Non-IBM, IBM RVA	RAID 0	5	5	5	YES
11	Non-IBM, IBM RVA	RAID 1	5	5	5	YES
-11	Non-IBM, IBM RVA	RAID 1	10	1	1	YES
15	Non-IBM, IBM RVA	RAID 5	5	5	5	YES
50	FAStT 500	RAID 0	N.A.	5	N.A.	YES
51	FAStT 500	RAID 1	N.A.	1	N.A.	YES
55	FAStT 500	RAID 5	N.A.	5	N.A.	YES
70	FAStT 700	RAID 0	N.A.	5	N.A.	YES
71	FAStT 700	RAID 1	N.A.	1	N.A.	YES
75	FAStT 700	RAID 5	N.A.	5	N.A.	YES
90	ESS	RAID 0	5	N.A.	N.A.	YES
91	ESS, ESS turbo	RAID 10	10	N.A.	N.A.	YES
95	ESS, ESS turbo	RAID 5	5	N.A.	N.A.	YES



Collateral: Server to Storage Ratio



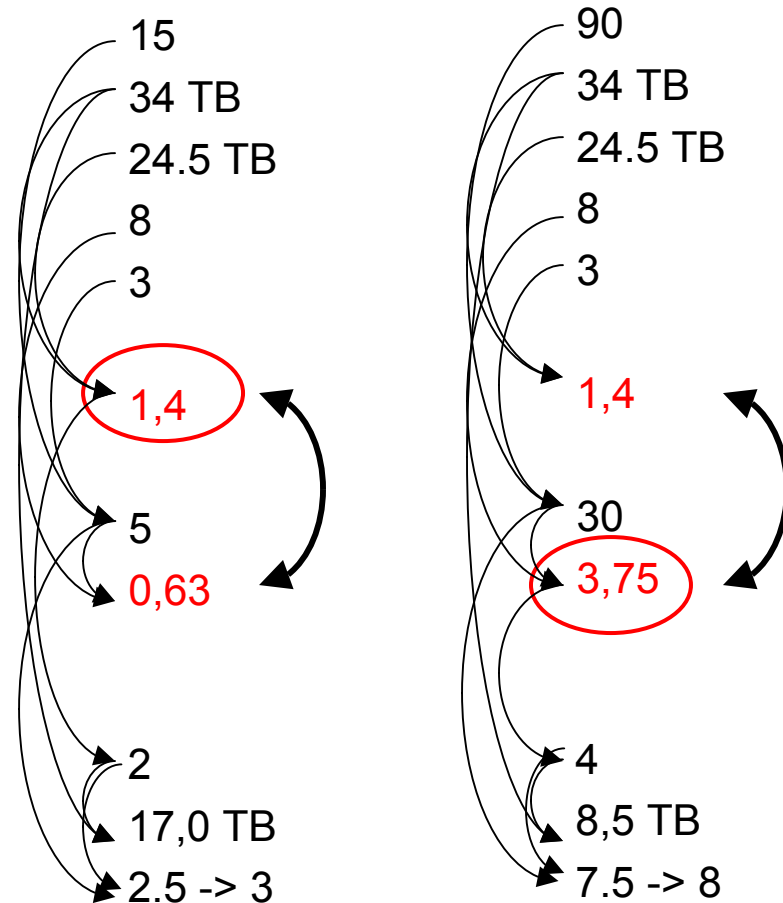
◆ Example

- No. of Servers
- Capacity
- Max. Cap. / ESS
- Max. HA / ESS
- Ratio

- #ESS Cap
- #HBAs
- #ESS HA

◆ ESS Design

- #ESS
- Avg. Cap / ESS
- #Avg. HAs / ESS



Collateral: SAN Design – ESS (1)



◆ ESS Storage Models

- Two models: „ESS“ and „ESS turbo“
 - ESS: no Turbo option, 72GB @ 10K rpm HDDs, 36GB @ 15K rpm HDDs, normal cache size selection
 - ESS turbo: Turbo option included, 36GB and 18GB @ 15K rpm HDDs, higher cache selection
- Use low cap. HDD if ESS capacity less than 16x 8-Pack = 1 frame @ low cap. HDDs for the first year and the capacity per ESS is less than the max capacity with low capacity HDDs for the 3rd year
 - Exception for performance class „Normal“: always use high capacity HDD

Performance Class	E S S		E S S T u r b o	
	Low cap. HDD	High Cap. HDD	Low cap. HDD	High Cap. HDD
Normal	72 GB @ 10K rpm	72 GB @ 10K rpm	18 GB @ 15K rpm (*)	36 GB @ 15K rpm (*)
High	36 GB @ 15K rpm	72 GB @ 10K rpm	18 GB @ 15K rpm	36 GB @ 15K rpm
Super	36 GB @ 15K rpm (*)	72 GB @ 10K rpm (*)	18 GB @ 15K rpm	36 GB @ 15K rpm

(*) only if storage model is enforced via [Q 2.7]

◆ ESS Capacity (Physical Capacity)

- Default RAID is RAID 5, existing RAID 1 can be enforced to be implemented as RAID10
- Maximum capacity 42x 8-Packs (6 loops)
 - 24.460 GB with 72 GB HDDs @ 10K rpm, 12.230 GB with 36 GB HDDs @ 15K rpm, 6.115 GB with 18 GB HDDs @ 15K rpm
- Minimum configuration 4x 8-Packs
 - 2.330 GB with 72GB HDDs, 1.165 GB with 36GB HDDs, 582 GB with 18GB HDDs
- Increments 2x 8-Packs
 - 1.165 GB with 72 GB HDDs, 582 GB with 36 GB HDDs, 291 GB with 18GB HDDs



Collateral: SAN Design – ESS (2)



◆ Flash Copy / XRC

- Not implemented

◆ PPRC

- Is included if Remote Copy is requested by input [9.2] „Availability Type future“
- Cost for 4x ESCON adaptaters per ESS is added
- If existing storage is ESS ([4.2] „RAID Level“ = 90 or 91 or 95) and no RC exists ([9.1] „Availability Type current“ < 2) the following rules apply:
 - Cost for PPRC solution on secondary site (only new ESS) doubled
 - PPRC solution for existing ESS hardware included in cost/GB
- If existing storage is ESS ([4.2] „RAID Level“ = 90 or 91 or 95) and RC exists ([9.1] „Availability Type current“ = 2) the following rules apply:
 - Cost for PPRC solution on primary and secondary site is additional costs (incremental) only
 - Cost may be under- or over-estimated due to missing ESS configuration information (not part of the model)

◆ Maximum number of host adapters (HA) : 8

- Default value is changeable

◆ Ratio

- Defaults are changeable

Performance Class	OS/390	Unix	Windows	Novell	AS/400
Normal	4	16	16	16	4
High	2	8	8	8	2
Super	1	6	6	6	1



Collateral: SAN Design – ESS (3)



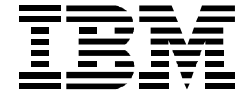
◆ RAID Overhead

- Utilization depending on RAID level (5 or 10) and HDD capacity
- Two spares per loop are required
 - If RAID 5 two 8-packs with spare are required
 - If RAID 10 one 8-pack with spares are required

Disk Size	8-Pack Name		Physical Capacity	RAID 5		RAID 10	
	10K rpm	15K rpm		6 + P + S	7 + P	3 x 2 + 2S	4 x 2
18.2 GB	N.A.	8P-05	145.6 GB	105.20 GB	122.74 GB	52.50 GB	70.00 GB
36.4 GB	N.A.	8P-15	291.2 GB	210.45 GB	245.53 GB	105.12 GB	140.16 GB
72.8 GB	8P-1	N.A.	582.4 GB	420.92 GB	491.08 GB	210.39 GB	280.52 GB



Collateral: SAN Design – ESS (4)



◆ ESS Cache Size

- Cost calculation on new ESS hardware only
- Existing ESS hardware upgrades not part of this model
- The cache size depends on
 - ESS model
 - Availability requirements
 - Performance Requirements (NP = Normal Perf., HP = High Perf., SP = Super Perf.)
 - Total installed capacity

Capacity	Cache Size E S S						Cache Size E S S t u r b o					
	NO Remote Copy			Remote Copy			NO Remote Copy			Remote Copy		
	NP	HP	SP	NP	HP	SP	NP	HP	SP	NP	HP	SP
2.329	8	8	8	8	8	16	16	16	16	16	16	24
4.659	8	8	16	8	16	24	16	16	24	16	24	32
6.988	8	8	16	16	24	32	16	24	32	24	32	64
9.318	8	16	16	16	24	32	16	24	32	24	64	64
11.648	16	16	24	24	32	64	16	32	64	32	64	64
12.230	16	16	24	24	32	64	16	32	64	32	64	64
13.977	16	24	24	24	32	64	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
16.307	24	24	32	32	64	64	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
18.636	24	32	32	32	64	64	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
>18.636	32	32	32	64	64	64	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.

Collateral: SAN Design – FAStT



◆ FAStT 500

- Fully configured base unit
 - 8 Mini Hubs with 8 GBICS (8x 1Gbit/s)
 - Additional 512MB cache (Total 1GB)
- Maximum number of Expansion Units is 10
 - Based on AIX, SUN, HP limitation (source: FAStT development group)
- Ratio Server to HA
 - All supported platforms: 3:1 (normal Perf.) / 2:1 (high Perf.)

◆ FAStT 700

- Fully configured base unit
 - 8 Mini Hubs with 8 GBICS (8x 2Gbit/s)
- Maximum number of Expansion Units is 11
 - Based on performance considerations (source: FAStT development group)
- Ratio Server to HA
 - All supported platforms: 4:1 (normal Perf.) / 3:1 (high Perf.)

◆ EXP 700

- Fully configured expansion unit
 - 3 GBICS included
- RAID Overhead
 - RAID1 Utilization = 50%, RAID 5 Utilization = 85%
 - Spare Disk are considered as part of this overhead
- Always use highest available HDD capacity



Collateral: SAN Design – Fabric



◆ Fabric

- Dual Pathing is mandatory for SAN implementation (redundant switch configuration)
 - Switch: Full redundant configuration (minimum 2 switches)
- Fabric Type
 - Either Switch (16 or 32 port) or Director (64 or 128 port) - depending on number of required ports
 - For S/390 always Director
 - For AS/400 always Switch
- 2 Inter Switch Link ports per Fabric Unit
- Additional 2 ISL ports if Remote Copy is requested
- Fabric Type selection depends on number of ports required (w/o ISL) for the first year:
 - < 64 ports 16-port Switch
 - < 128 ports 32-port Switch
 - < 256 ports 64-port Director
 - >= 256 ports 128-port Director



Collateral: IP Design



◆ Standard appliance configuration

- Ethernet Adapter
 - NAS 22x, iSCSI 210 : 1x Gbit Ethernet
 - NAS 32x : 1x Gbit Ethernet Adapter per engine
- Maximum cache
- RAID1 Utilization = 50%, RAID 5 Utilization = 85%
- Dual engines for NAS 32x
- No HDD capacity mix -> only max. HDD capacity (73.4 GB)
 - Increments of 1 HDD small enough for design

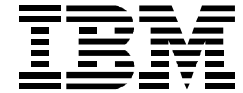
◆ Ratio

- based on information from IBM Storage Networking Division:

	Normal perf.	High perf.
- NAS 22x	7:1	3:1
- NAS 32x	11:1	5:1
- iSCSI 210i	5:1	2:1
- NAS 300G	13:1	6:1
- Cisco 5420	10:1	5:1



Collateral: SAN + IP Storage



◆ Hardware Costs

- The disk storage costs are calculated from the storage design, purchase price, annual price reduction, and price adjustments
- The storage design is determined by the Storage Selection Tool and the associated consolidation rules

◆ Human Resource Costs

- The human resource costs are related to the number of FTEs, their burdened costs and the cost increase.
- The required number of FTEs are calculated using the following table (changeable defaults):

	SAN ESS	SAN FAStT	IP Storage
S/390 and AS/400:	10 TB / FTE	N.A.	N.A.
Unix:	6 TB / FTE	5 TB / FTE	4 TB / FTE
Windows	6 TB / FTE	5 TB / FTE	4 TB / FTE

◆ Outage Costs

- Base contributors
 - Loss in Productivity (\$/hour)
 - Loss in Revenue (\$/hour)
 - Unplanned Outages:
 - Non-availability time calculated from the operation time ([9.3], [9.4]) and the availability classes for the individual components
- | ESS | FAStT | Switch | Director | IP Appliance | IP Gateway |
|------------|--------------|---------------|-----------------|---------------------|-------------------|
| 99.999% | 99.995% | 99.9% | 99.999% | 99.99% | 99.99% |
- Planned Outage:
 - Number of incidents (changeable model parameter x #servers) multiplied by average duration (changeable model parameters depending on remote copy implementation),
 - Reduced by the number of hours, where this can be done in the non-productive period (only if not a 365x24 operation)

◆ Miscellaneous Costs

- Environmental costs are calculated by using the results from BAU and the model parameter "Environmental Savings" with default SAN = 50%, IP = 25%, caused by consolidation effects.



Collaterals: Project / Depreciation Period (1)



- ◆ Projection Period: 5 years / Depreciation Period : 5 years

- ◆ Business As Usual projected



Year-4	Year-3	Year-2	Year-1	Current	Year+1	Year+2	Year+3	Year+4	Year+5
Invest Yr-4	Invest Yr-3	Invest Yr-2	Invest Yr-1	Invest Yr-0	Invest Yr+1	Invest Yr+2	Invest Yr+3	Invest Yr+4	Invest Yr+5
	Depr. Yr-4	Depr. Yr-3	Depr. Yr-2	Depr. Yr-1	Depr. Yr-0	Depr. Yr+1	Depr. Yr+2	Depr. Yr+3	Depr. Yr+4
		Depr. Yr-4	Depr. Yr-3	Depr. Yr-2	Depr. Yr-1	Depr. Yr-0	Depr. Yr+1	Depr. Yr+2	Depr. Yr+3
			Depr. Yr-4	Depr. Yr-3	Depr. Yr-2	Depr. Yr-1	Depr. Yr-0	Depr. Yr+1	Depr. Yr+2
				Depr. Yr-4	Depr. Yr-3	Depr. Yr-2	Depr. Yr-1	Depr. Yr-0	Depr. Yr+1

Today

- ◆ BAU – then SAN + IP

Year-4	Year-3	Year-2	Year-1	Current	Year+1	Year+2	Year+3	Year+4	Year+5
Invest Yr-4	Invest Yr-3	Invest Yr-2	Invest Yr-1	Invest Yr-0	Invest Yr+1	Invest Yr+2	Invest Yr+3	Invest Yr+4	Invest Yr+5
	Depr. Yr-4	Depr. Yr-3	Depr. Yr-2	Depr. Yr-1	Depr. Yr-0	Depr. Yr+1	Depr. Yr+2	Depr. Yr+3	Depr. Yr+4
		Depr. Yr-4	Depr. Yr-3	Depr. Yr-2	Depr. Yr-1	Depr. Yr-0	Depr. Yr+1	Depr. Yr+2	Depr. Yr+3
			Depr. Yr-4	Depr. Yr-3	Depr. Yr-2	Depr. Yr-1	Depr. Yr-0	Depr. Yr+1	Depr. Yr+2
				Depr. Yr-4	Depr. Yr-3	Depr. Yr-2	Depr. Yr-1	Depr. Yr-0	Depr. Yr+1

Today



Collaterals: Project / Depreciation Period (1a)



- ◆ Projection Period: 5 years / Depreciation Period : 5 years

- ◆ Business As Usual projected



Year-4	Year-3	Year-2	Year-1	Current	Year+1	Year+2	Year+3	Year+4	Year+5
Invest Yr-4	Invest Yr-3	Invest Yr-2	Invest Yr-1	Invest Yr-0	Invest Yr+1	Invest Yr+2	Invest Yr+3	Invest Yr+4	Invest Yr+5
	Depr. Yr-4	Depr. Yr-3	Depr. Yr-2	Depr. Yr-1	Depr. Yr-0	Depr. Yr+1	Depr. Yr+2	Depr. Yr+3	Depr. Yr+4
		Depr. Yr-4	Depr. Yr-3	Depr. Yr-2	Depr. Yr-1	Depr. Yr-0	Depr. Yr+1	Depr. Yr+2	Depr. Yr+3
			Depr. Yr-4	Depr. Yr-3	Depr. Yr-2	Depr. Yr-1	Depr. Yr-0	Depr. Yr+1	Depr. Yr+2
				Depr. Yr-4	Depr. Yr-3	Depr. Yr-2	Depr. Yr-1	Depr. Yr-0	Depr. Yr+1

Today

- ◆ BAU – then SAN + IP (without Re-Utilization)

Year-4	Year-3	Year-2	Year-1	Current	Year+1	Year+2	Year+3	Year+4	Year+5
Invest Yr-4	Invest Yr-3	Invest Yr-2	Invest Yr-1	Invest Yr-0	Invest Yr+1	Invest Yr+2	Invest Yr+3	Invest Yr+4	Invest Yr+5
	Depr. Yr-4	Depr. Yr-3	Depr. Yr-2	Depr. Yr-1		Depr. Yr+1	Depr. Yr+2	Depr. Yr+3	Depr. Yr+4
		Depr. Yr-4	Depr. Yr-3	Depr. Yr-2			Depr. Yr+1	Depr. Yr+2	Depr. Yr+3
			Depr. Yr-4	Depr. Yr-3				Depr. Yr+1	Depr. Yr+2
				Depr. Yr-4					Depr. Yr+1

Today



Collaterals: Project / Depreciation Period (2)



- ◆ Projection Period: 4 years / Depreciation Period : 2 years

- ◆ Business As Usual projected



Year-4	Year-3	Year-2	Year-1	Current	Year+1	Year+2	Year+3	Year+4	Year+5
			Invest Yr-1	Invest Yr-0	Invest Yr+1	Invest Yr+2	Invest Yr+3	Invest Yr+4	
				Depr. Yr-1	Depr. Yr-0	Depr. Yr+1	Depr. Yr+2	Depr. Yr+3	

Today

- ◆ BAU – then SAN + IP

Year-4	Year-3	Year-2	Year-1	Current	Year+1	Year+2	Year+3	Year+4	Year+5
			Invest Yr-1	Invest Yr-0	Invest Yr+1	Invest Yr+2	Invest Yr+3	Invest Yr+4	
				Depr. Yr-1	Depr. Yr-0	Depr. Yr+1	Depr. Yr+2	Depr. Yr+3	

Today



Collaterals: Project / Depreciation Period (2a)



- ◆ Projection Period: 4 years / Depreciation Period : 2 years

- ◆ Business As Usual projected



Year-4	Year-3	Year-2	Year-1	Current	Year+1	Year+2	Year+3	Year+4	Year+5
			Invest Yr-1	Invest Yr-0	Invest Yr+1	Invest Yr+2	Invest Yr+3	Invest Yr+4	
				Depr. Yr-1	Depr. Yr-0	Depr. Yr+1	Depr. Yr+2	Depr. Yr+3	

Today

- ◆ BAU – then SAN + IP (without Re-Utilization)

Year-4	Year-3	Year-2	Year-1	Current	Year+1	Year+2	Year+3	Year+4	Year+5
			Invest Yr-1	Invest Yr-0	Invest Yr+1	Invest Yr+2	Invest Yr+3	Invest Yr+4	
				Depr. Yr-1		Depr. Yr+1	Depr. Yr+2	Depr. Yr+3	

Today



Collaterals: Project / Depreciation Period (3)



- ◆ Projection Period: 3 years / Depreciation Period : 3 years

- ◆ Business As Usual projected



Year-4	Year-3	Year-2	Year-1	Current	Year+1	Year+2	Year+3	Year+4	Year+5
	Invest Yr-3	Invest Yr-2	Invest Yr-1	Invest Yr-0	Invest Yr+1	Invest Yr+2	Invest Yr+3		
		Depr. Yr-3	Depr. Yr-2	Depr. Yr-1	Depr. Yr-0	Depr. Yr+1	Depr. Yr+2		
			Depr. Yr-3	Depr. Yr-2	Depr. Yr-1	Depr. Yr-0	Depr. Yr+1		
				Depr. Yr-3	Depr. Yr-2	Depr. Yr-1	Depr. Yr-0		
					Depr. Yr-3	Depr. Yr-2	Depr. Yr-1		

Today

- ◆ BAU – then SAN + IP

Year-4	Year-3	Year-2	Year-1	Current	Year+1	Year+2	Year+3	Year+4	Year+5
	Invest Yr-3	Invest Yr-2	Invest Yr-1	Invest Yr-0	Invest Yr+1	Invest Yr+2	Invest Yr+3		
		Depr. Yr-3	Depr. Yr-2	Depr. Yr-1	Depr. Yr-0	Depr. Yr+1	Depr. Yr+2		
			Depr. Yr-3	Depr. Yr-2	Depr. Yr-1	Depr. Yr-0	Depr. Yr+1		
				Depr. Yr-3	Depr. Yr-2	Depr. Yr-1	Depr. Yr-0		
					Depr. Yr-3	Depr. Yr-2	Depr. Yr-1		

Today



Collaterals: Project / Depreciation Period (3a)



- ◆ Projection Period: 3 years / Depreciation Period : 3 years

- ◆ Business As Usual projected



Year-4	Year-3	Year-2	Year-1	Current	Year+1	Year+2	Year+3	Year+4	Year+5
	Invest Yr-3	Invest Yr-2	Invest Yr-1	Invest Yr-0	Invest Yr+1	Invest Yr+2	Invest Yr+3		
		Depr. Yr-3	Depr. Yr-2	Depr. Yr-1	Depr. Yr-0	Depr. Yr+1	Depr. Yr+2		
			Depr. Yr-3	Depr. Yr-2	Depr. Yr-1	Depr. Yr-0	Depr. Yr+1		
				Depr. Yr-3	Depr. Yr-2	Depr. Yr-1	Depr. Yr-0		
					Depr. Yr-3	Depr. Yr-2	Depr. Yr-1		

Today

- ◆ BAU – then SAN + IP (without Re-Utilization)

Year-4	Year-3	Year-2	Year-1	Current	Year+1	Year+2	Year+3	Year+4	Year+5
	Invest Yr-3	Invest Yr-2	Invest Yr-1	Invest Yr-0	Invest Yr+1	Invest Yr+2	Invest Yr+3		
		Depr. Yr-3	Depr. Yr-2	Depr. Yr-1		Depr. Yr+1	Depr. Yr+2		
			Depr. Yr-3	Depr. Yr-2			Depr. Yr+1		
				Depr. Yr-3					

Today

