

TECHNOLOGY

BOVESPA E CBLC

JULY/ 2005



BOVESPA
A Bolsa do Brasil

BOVESPA - BRASIL

BOVESPA

Sao Paulo Stock Exchange

- **Stablished in 1890**
- **2000 – Stock Exchanges in Brazil – from 9 to 1 = Bovespa**
- **Daily average - US\$ 700 millions**
- **92 brokerage houses**

MEGABOLSA

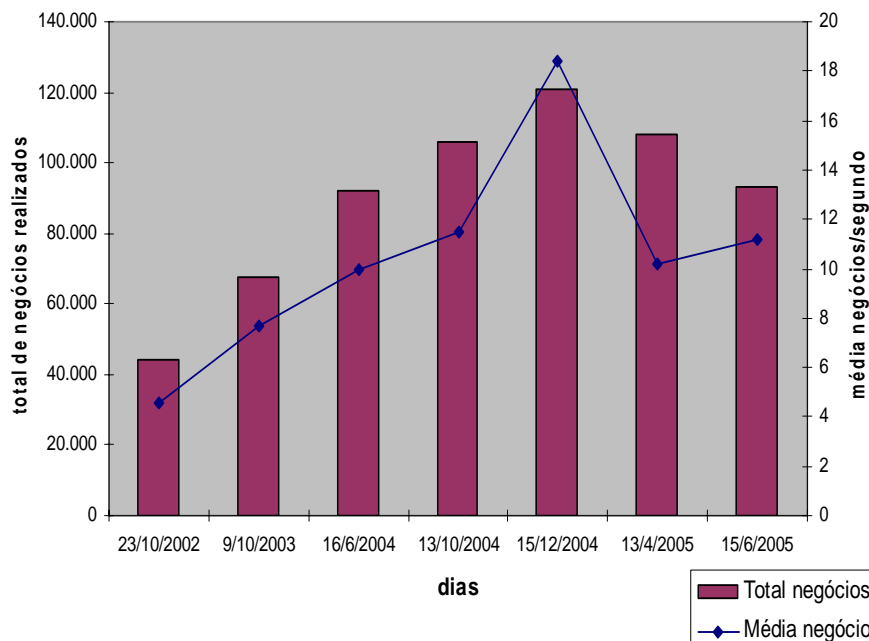
- **Bovespa's Trading System**
- **Controls trading floor and electronic trading**
- **Cash, options, forward and future markets**

MEGABOLSA

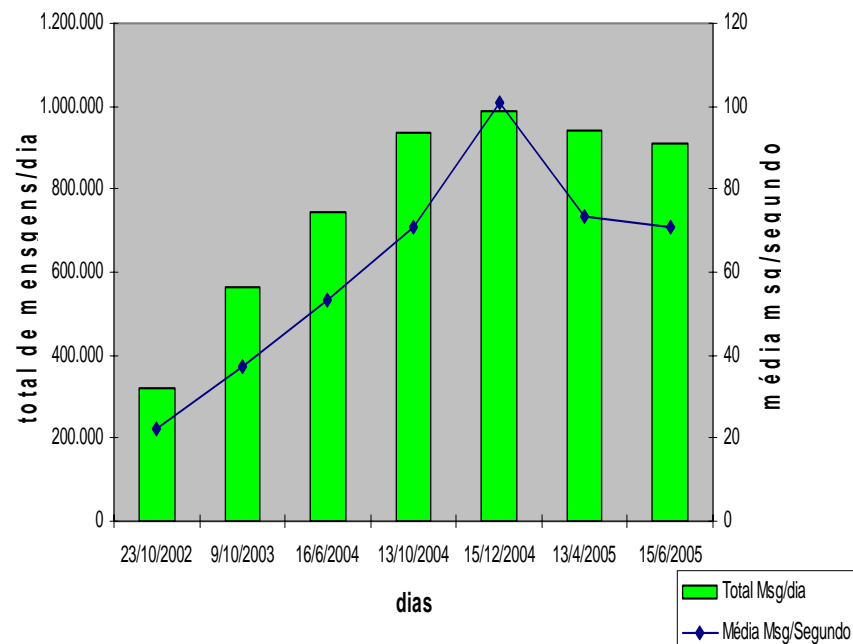
- **Participants = 92 brokers, Brazil main cities, 150 points**
- **Traders workstations = 1.000**
- **Queries workstations = 3.000**
- **Messages to 50 vendors**
- **Order routing - home broker and institutionals**

Trades and messages

Evolução quantidade de negócios/dia



Evolução do volume de mensagens de difusão



Daily pics	2004	2005 (preview)
Trades	120,000	200,000
Messages/ broker	1,000,000	1,600,000
Total messages	150,000,000	240,000,000

MEGABOLSA - MODULES

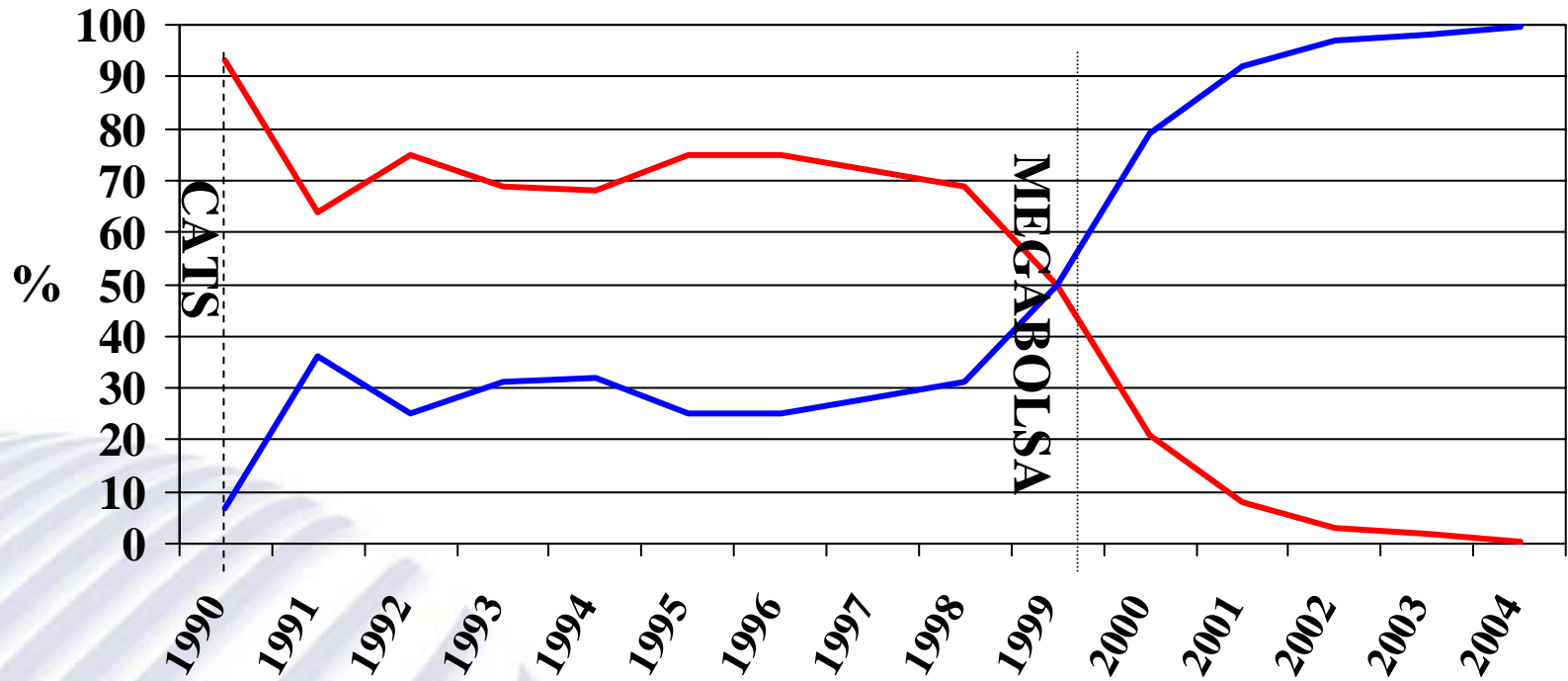
- **NSC – central control**
- **HUB - messages**
- **TCS - forward**
- **PFI - indexes**
- **SLC – queries server**
- **SLE – trades server**
- **GLWIN – trading and queries workstation**

MEGABOLSA - MODULES

- **NSC - HP HIMALAYA**
- **HUB - HP ALPHA/ HP XP**
- **TCS - IBM AIX**
- **PFI - IBM AIX**
- **SLC - SUN BLADE/ SOLARIS**
- **SLE - SUN BLADE/ SOLARIS**
- **Total over 200 servers at Bovespa and brokers**
- **GLWIN - WINDOWS**

TRADES

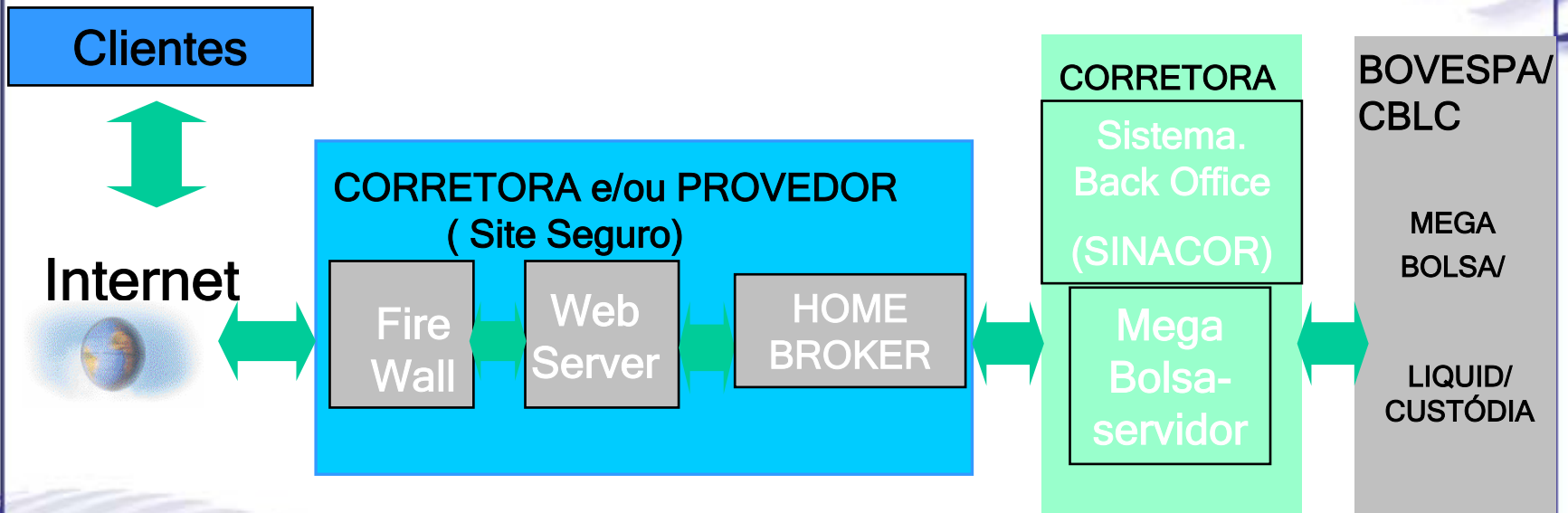
— FLOOR — ELETRONICO



HOME BROKER

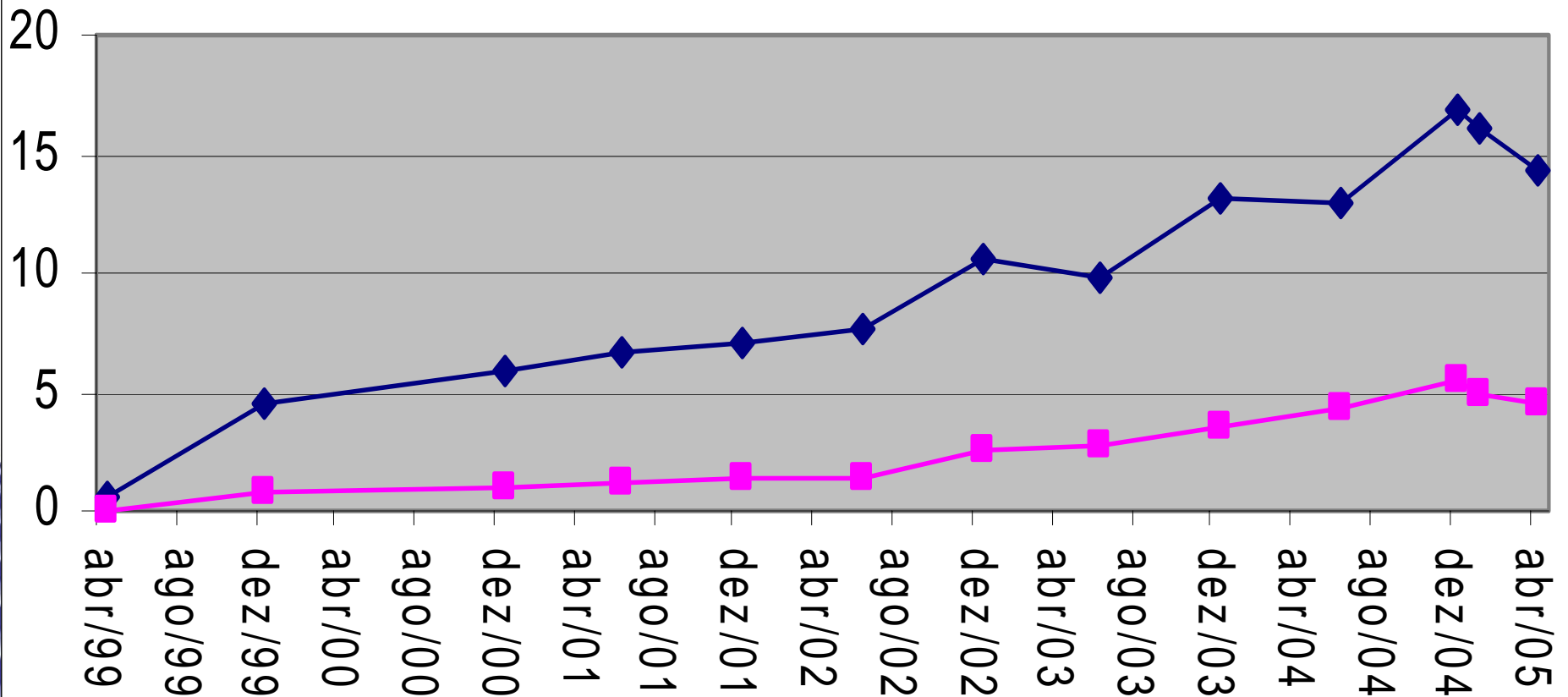
- **Sites at Internet, developed by each brokerage house – dedicated to individuals investors**
- **Quotations and prices**
- **Clients training**
- **Collected orders; trade confirmation in real time**
- **Current figures - 15% trades, 5% volume**

HOME BROKER



HOME BROKER

◆ % NEGÓCIOS ■ % VOLUME

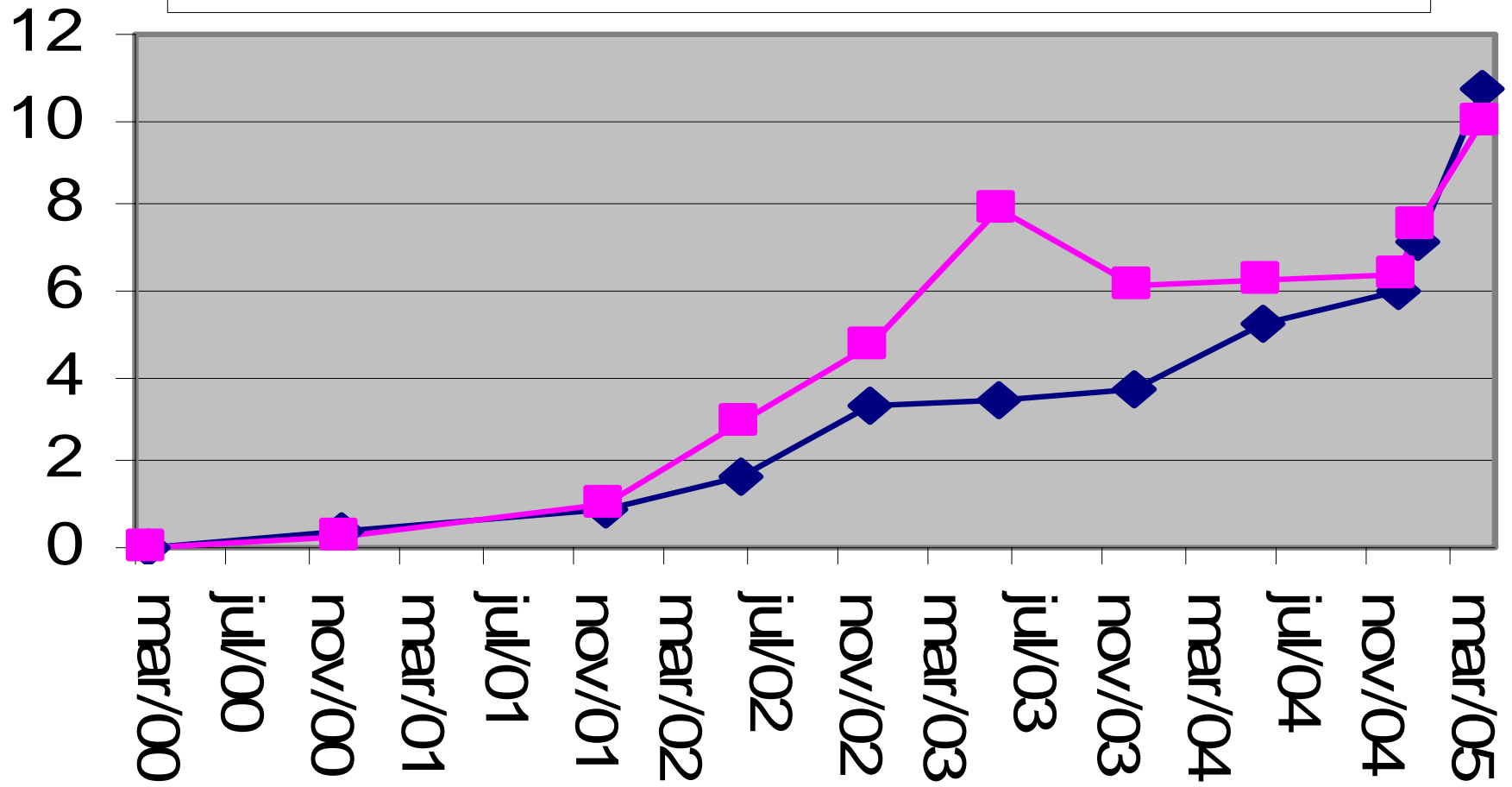


ORDER ROUTING – INSTITUTIONAL CLIENTS

- **Order routing; trade confirmation in real time**
- **Current figures - 11% trades, 10% volume**

ORDER ROUTING – INSTITUTIONAL CLIENTS

◆ % NEGÓCIOS ■ % VOLUME



SINACOR

- **Front and Back Office systems for brokers**
– developed by Bovespa – 12 modules
(master files, markets = Bovespa/ CBLC/
BM&F)
- **External information – files and real-time
messages – with Bovespa and CBLC**
- **Oracle**
- **Servers and PCs – broker's responsibility**

CBLC

Companhia Brasileira de Liquidação e Custódia

- **Created in 1997 – formerly part of Bovespa**
- **2000 – incorporate CLC - CÂMARA DE LIQUIDAÇÃO E CUSTÓDIA DO RIO DE JANEIRO**
- **members = banks, brokers**

CBLC

- **Position control – options, forward and future markets**
- **Share loan**
- **Risk control**
- **Clearing and settlement – center counterparty**

CBLC

- **Depository – shares and fixed income**
 - **U\$ 165 billions**
 - **12 trillions shares**

CBLC - TECHNOLOGY

- **Legacy systems – mainframe IBM/ CICS/ DB2/COBOL**
- **New systems**
 - **HP PROLIANT and INTEGRITY/ W2K/ SQL/ COM+/ BIZTALK/ COMTI/ APP CENTER/ MQ/ OLEDB/ APP MANAGER NETIQ**
 - **SUN/ ALGORITHMICS**
- **Bovespa/ CBLC NETWORK**

INFRASTRUCTURE AND CONTINGENCY

- **Complex environment – differentiated contingency process**
- **Communication links and network**
- **UEC External Contingency Unity**
- **Central Computers - nonstop, clusters, real time data replication**
- **SLE servers (centralized)**

INFRASTRUCTURE AND CONTINGENCY

- **SLC servers (centralized or at the broker)**
 - **Partial contingency SLC - 12 stations**
- **Additional SLCs - optional – brokers decision**
- **Broker's network**
- **Traders' workstation**

EXTERNAL CONTINGENCY UNIT

- **Disaster recovery**
- **Hardware/ software and procedures in order to process Bovespa's and CBLC's systems, according to the criticality defined for each product, in case of disaster.**

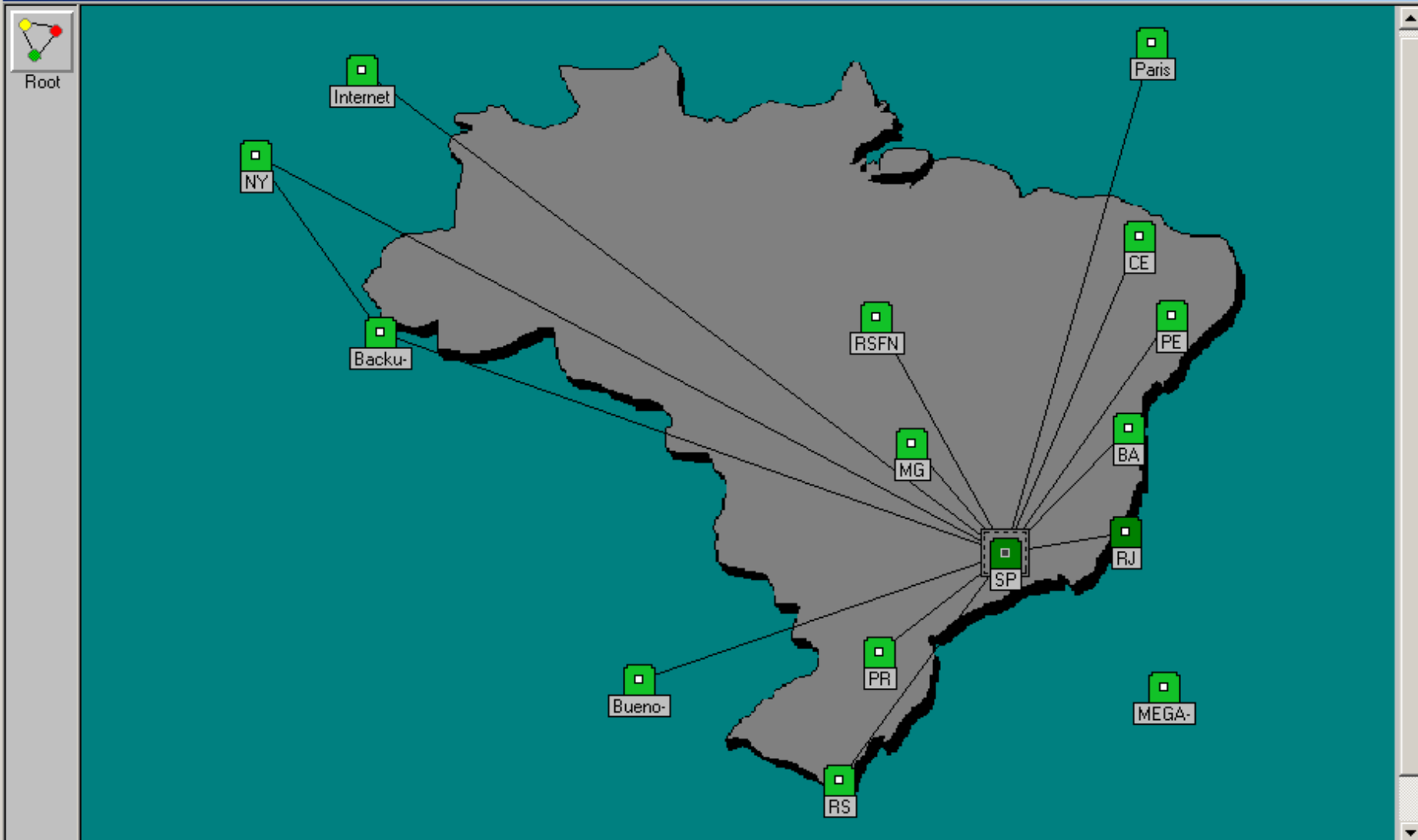
CARACTERISTICS

- **Data replication in real time. Storage EMC/DMX e HP/XP**
- **Servers and mainframes in cluster/ duplicateds - HP Himalaya, HP Alpha, Intel/ Risc servers**
- **ABC network – different providers**
- **No breaks and power generators – 2 in each site**

BOVESPA'S NETWORK

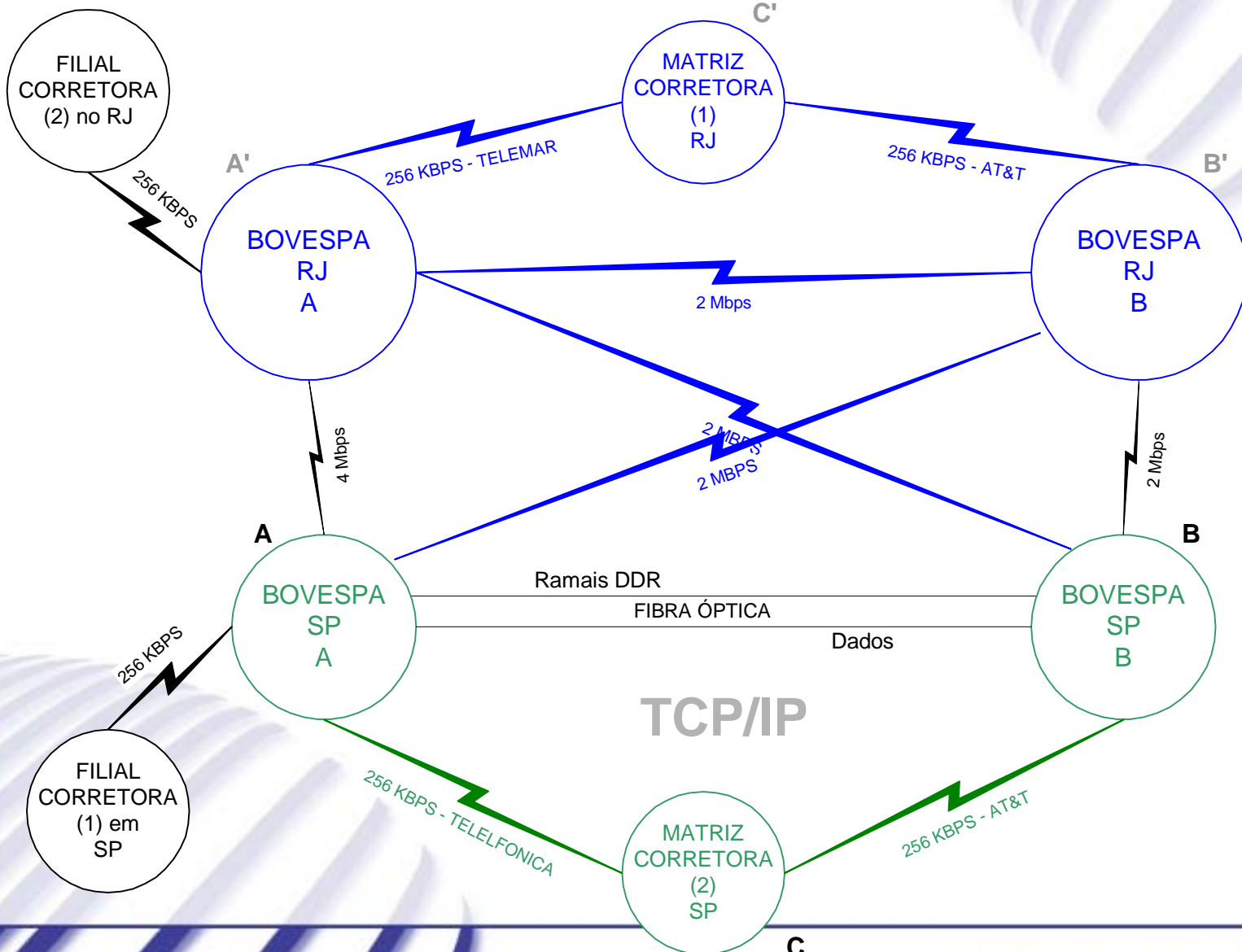
- **Private and dedicated network**
- **Star model, centralized in Sao Paulo, points in each city**
- **Local connections for each user (brokers, banks, assets,...)**
- **Automatic contingency – two providers**

IP Internet [Hidden: 2]



IP Inte- [Icons for CE, PR, NY, SP, SP to -, RJ, RS, Internet, RSFN, MG, PE, MEGA-, SP to -, BA, Paris, SP to -, RJ to -, SP to -]

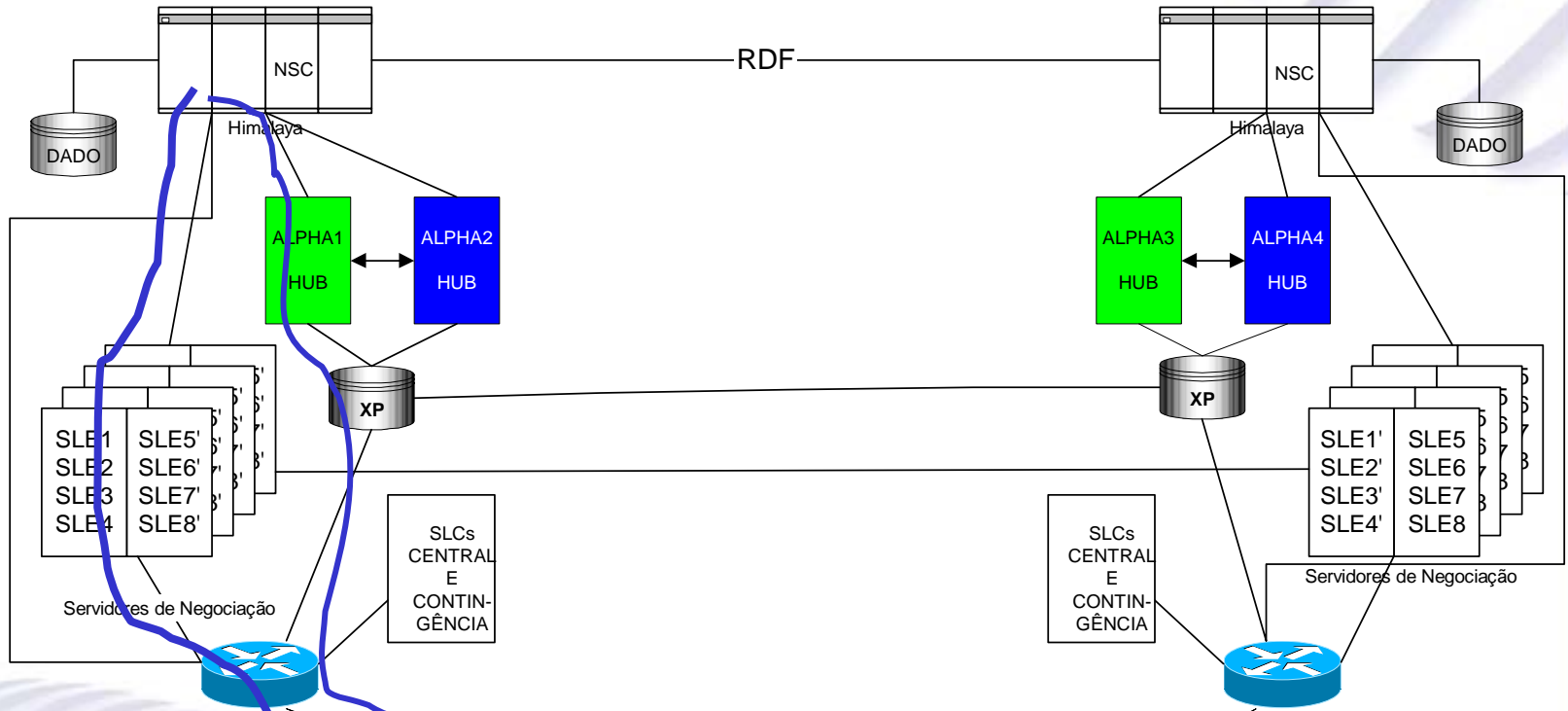
ABC NETWORK



MEGABOLSA

SITE PRINCIPAL

SITE BACKUP



Queries
Order/ Trade















MEGABOLSA - MONITORING

- **Physical availability – links and equipments**
- **Data link – POP/ brokers**
- **Communication equipments and servers**
- **Aplications running (SLC and SLE)**
- **Response time for traders at brokers' site**

PROCESS - SLC/ SLE (Appmanager - NetIQ)

- **Availability of SLE and SLC in each brokers' site, with correct information**
- **Green/ red indicators**
- **Contingency - automatic (SLE/SLC) or manual (central SLC)**

Megabolsa - Monitoração SLC

 43254 - (001) - Magliano	 43254 - (002) - Souza Barros	 43254 - (004) - Alfa	 43254 - (005) - Isoldi	 43254 - (006) - ABN AMRO Securities	 43254 - (009) - Deutsche Bank	 43254 - (010) - Spinelli	 43254 - (013) - Merrill Lynch	 43254 - (014) - Cruzeiro do Sul	 43254 - (015) - Indusval
 43254 - (018) - BBM	 43254 - (023) - Concordia	 43254 - (027) - Banespa	 43254 - (030) - Sudameris	 43254 - (032) - DC	 43254 - (033) - Escritorio Lerosa	 43254 - (034) - Schahin	 43254 - (037) - Umuarama	 43254 - (039) - Agora-Senior {...}	 43254 - (039) - Agora-Senior {RJ}
 43254 - (040) - Morgan Stanley	 43254 - (041) - ING	 43254 - (045) - CSFB	 43254 - (046) - UBS Warburg	 43254 - (047) - Solidez	 43254 - (051) - Citibank	 43254 - (054) - BES Securities	 43254 - (055) - BankBoston	 43254 - (057) - Brascan	 43254 - (058) - Socopa
 43254 - (061) - Santos	 43254 - (063) - Novinvest	 43254 - (066) - Unibanco	 43254 - (070) - HSBC	 43254 - (071) - Sao Paulo	 43254 - (072) - Bradesco	 43254 - (074) - Coinvalores	 43254 - (075) - Talarico	 43254 - (076) - Finabank	 43254 - (077) - Intra
 43254 - (081) - RMC	 43254 - (082) - TOV	 43254 - (086) - Walpires	 43254 - (090) - Titulo	 43254 - (095) - Hedging-Griffo	 43254 - (099) - Tendencia	 43254 - (102) - Banif Primus	 43254 - (106) - Mercantil do Brasil	 43254 - (109) - BBV	 43254 - (110) - SLW
 43254 - (114) - Itau	 43254 - (129) - Planner	 43254 - (130) - Theca	 43254 - (131) - Fator Doria	 43254 - (131) - Fator Doria {RJ}	 43254 - (147) - Ativa	 43254 - (159) - Egide	 43254 - (173) - Geracao Futuro	 43254 - (174) - Elite	 43254 - (227) - Gradual
 43254 - (239) - Interfloat	 5690 - 125.255.16.53	 43254 - Corretora Piloto	 43254 - GERAFEED1	 43254 - GERAFEED2	 SLC - AST	 43254 - SLC - CONTING1	 43254 - SLC - FLOOR1	 43254 - SLC - FLOOR2	 43254 - SLC - FLOOR3
 43254 - SLC - FLOOR5	 43254 - SLC - FLOOR6	 43254 - SLC - GOP1	 0 - SLC - GOP2	 43254 - SLC - POOLF S2	 43254 - SLC - POOLF S3	 43254 - SLC - POOLMG1	 43254 - SLC - POOLPR1	 43254 - SLC - POOLRJ1	 43254 - SLC - POOLRJ2
 43254 - SLC - POOLRS1	 43254 - SLC - POOLRS2	 43254 - SLC - POSLESP1	 43254 - SLC - POSLESP2	 43254 - SLC - POSLESP3	 43254 - SLC - SLCEXT1	 43254 - SLC - SLCEXT2	 43254 - SLC - SLCINT1	 43254 - SLC - SLCINT2	 43254 - SLC - SLEU01
 43254 - SLC - SLEU02	 43254 - SLC - SLEU04	 43254 - SLC - SLEU05	 43254 - SLC - SLEU06	 43254 - SLC - SLEU07	 43254 - SLC - SLEU08	 43254 - SLC - SLEU09	 43254 - SLC - SLEU10	 43254 - SLC - SLEU11	 43254 - SLC - SLEU12



Megabolsa - Monitoração SLE

(001) - Magliano	(002) - Souza Barros	(003) - Americainvest	(004) - Alfa	(005) - Isoldi	(006) - ABN AMRO Securities	(008) - Deutsche Bank	(010) - Spinelli	(013) - Merrill Lynch	(014) - Cruzeiro do Sul
(016) - J.P. Morgan	(018) - BBM	(023) - Concordia	(024) - MBM	(027) - Banespa	(029) - Uniletra	(030) - Sudameris	(032) - DC	(033) - Escritorio Lerosa	(034) - Schahin
(037) - Umuarama	(038) - Corval	(039) - Agora-Senior	(040) - Morgan Stanley	(041) - ING	(045) - CSFB	(046) - UBS Warburg	(047) - Solidez	(051) - Citibank	(054) - BES Securities
(057) - Brascan	(058) - Socopa	(059) - Safra	(061) - Santos	(063) - Novinvest	(066) - Unibanco	(070) - HSBC	(071) - Sao Paulo	(072) - Bradesco	(074) - Coinvalores
(076) - Finabank	(077) - Intra	(078) - Santander Brasil	(081) - RMC	(082) - TOV	(085) - Pactual	(086) - Walpires	(090) - Titulo	(095) - Hedging-Griffo	(098) - Apes
(102) - Banif Primus	(106) - Mercantil do Brasil	(109) - BBV	(110) - SLW	(111) - BBA	(114) - Itau	(129) - Planner	(130) - Theca	(131) - Fator Doria	(140) - Diferencial
(150) - Prosper	(151) - Bank of America	(158) - Emblema	(159) - Egide	(180) - Fair	(182) - Bittencourt	(172) - Banrisul	(173) - Geracao Futuro	(174) - Elite	(175) - Omar Camargo
(181) - Mundinvest	(186) - Geral	(187) - Sita	(189) - Prime	(190) - Pilla	(191) - Senso	(194) - Rural	(196) - Aureum	(197) - Ipanema	(204) - Spirit
(219) - Manchester	(226) - Amarel Franklin	(227) - Gradual	(228) - Investshop	(232) - H.H.Plochioni	(234) - Codepe	(239) - Interfloat	CARD READER 1	CARD READER 2	Corretora 100
DIFF MULTIVENDOR	ECO - PRODUCAO	NSC	PFI - PRODUCAO	SPI - BACKUP	SPI - PRODUCAO	TCS - PRODUCAO			

RESPONSE TIME

- Measured at the trader workstation – from order entry to answer at the trader's screen

Tempos de Resposta	<= 1 seg.	> 1 seg. <= 2seg.	> 2seg. < 5 seg.	>= 5 seg.	Tempo Médio
Setembro/2004	-	85,36%	11,50%	3,14%	-
Dezembro/2004	95,51%	2,57%	1,10%	0,82%	0,62 seg.
Junho/2005	94,16%	4,20%	1,28%	0,36%	0,63 seg.

- Data collection in different points, until the traders' workstation
- Alerts in case of response time bigger than 5 seconds

RESPONSE TIME

- **It's a combination of:**
 - **normal order treatment – queue by each title, B/S, price, time stamp when reach the central computer**
 - **equipaments at Bovespa**
 - **Telecommunication network**
 - **Broker's local network**
 - **Trader's PC**
 - **Software in use at the workstation**

RESPONSE TIME

- **Total time divided by segment, in order to better identify the problem**
- **Solution using Vantage (Compuware) and Bovespa's development to collect information at trader's workstation**



Painel de monitoração Performance MEGA380

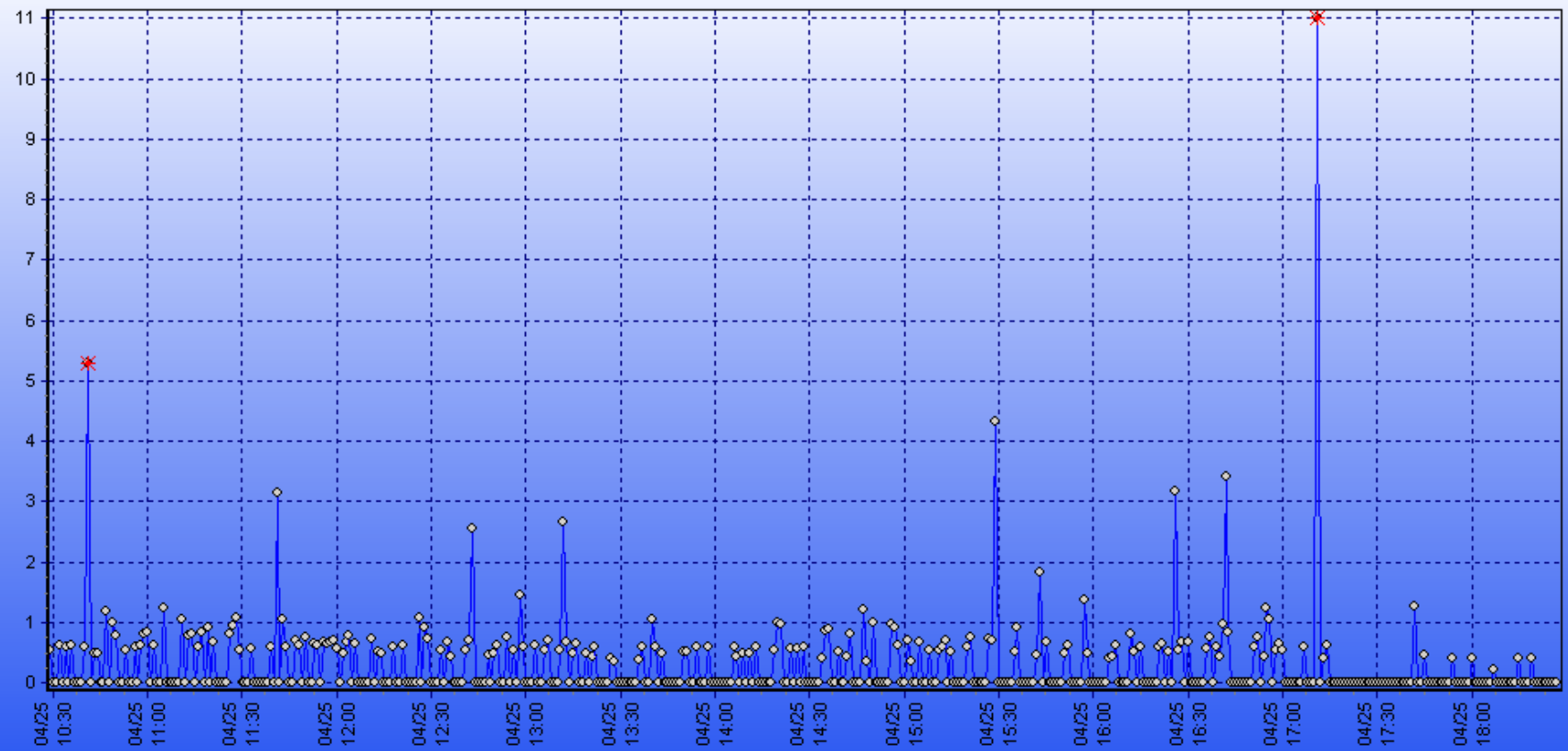


Edit Date/Time Filters

Refresh Alarm Status

Help

██████████ CORRETORA ██████████



◆ MegaBolsa Estatisticas(Corretora: "██████████", Path: "c:\estatistica")

monitoring view: /personal/monitoring views/mega bols.██████████-corretora ██████████ (dynamic chart)

Selected View Data Point

Server: [REDACTED]
 Counter: **MegaBolsa Estatisticas(Corretora: "[REDACTED]", Path: "c:\estatistica")**
 Task:
 Category:
 Task Collection Frequency:

Time 4/25/2005 5:11:03 PM

Value 11.01

Description

Data : 25/04/05 17:10 CORRETORA => [REDACTED]

Maior : 11,01s Operador : 300
 Menor : 0,17s Operador : 301

Ordens Lidas : 17
 Ordens Acumuladas : 1597

 Operador : 104 IP : 125 [REDACTED] GL : 4.98c2 S.O : Windows 2000/NT

17:04:29 - 0,40s - CMIG4

Operador : 300 IP : GL : S.O :

16:55:19 - 0,69s - CMET4F		16:58:57 - 0,34s - TNLPE42
16:55:34 - 0,20s - TNLPE42		17:00:09 - 11,01s - EBTPE45
16:56:13 - 0,22s - TNLPE42		17:00:11 - 9,56s - CMET4F
16:57:57 - 0,45s - CESP4F		17:00:39 - 0,19s - TNLPE44
16:58:53 - 0,19s - TNLPE42		

Operador : 301 IP : 125 [REDACTED] GL : GTW-1 S.O : 2

16:56:35 - 0,31s - PMAM4		16:57:24 - 0,19s - CMETE11
16:56:37 - 0,24s - TNLPE40		16:58:32 - 0,17s - TNLPE40
16:56:55 - 0,52s - CMETE12		16:58:33 - 0,56s - TNLPE40
16:57:12 - 0,20s - CMETE11		

Event Bovespa Custom Counters.MegaBolsa Estatisticas(Corretora: [REDACTED], Path: "c:\estatistica") > 5.000 Val: 11.010;

[Event Log](#) [Click here for Additional Alert Information](#)

Current Position : 403 Total : 480

HP AT BOVESPA

- **Trading system**
 - **2 HP HIMALAYA S86004**
 - **4 HP ALPHA ES47 M4 (2 CPUs EV7)**
 - **2 HP ALPHA DS20 (2 CPUs)**
 - **2 HP XP 512 (3 TB each)**

HP AT CBLC

- 21 SERVERS DL580 (4 CPUs)
- 131 SERVERS DL/ ML 3xx (1/ 2 CPUs)
- 2 HP INTEGRITY RX8620 (8 CPUs ITANIUM 2)
with SQL 2005
- 1 HP INTEGRITY RX2620 (2 CPUs ITANIUM 2)