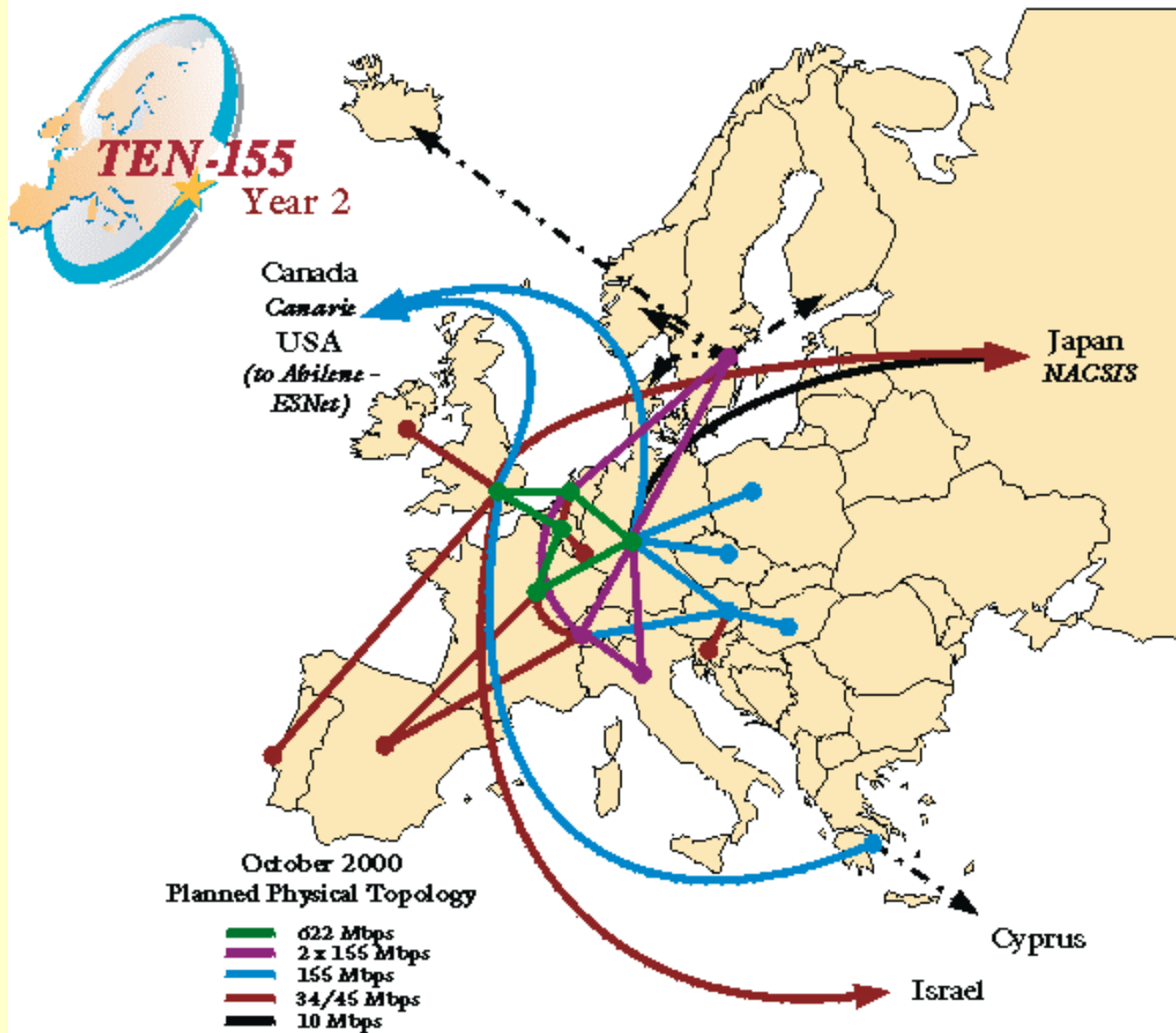
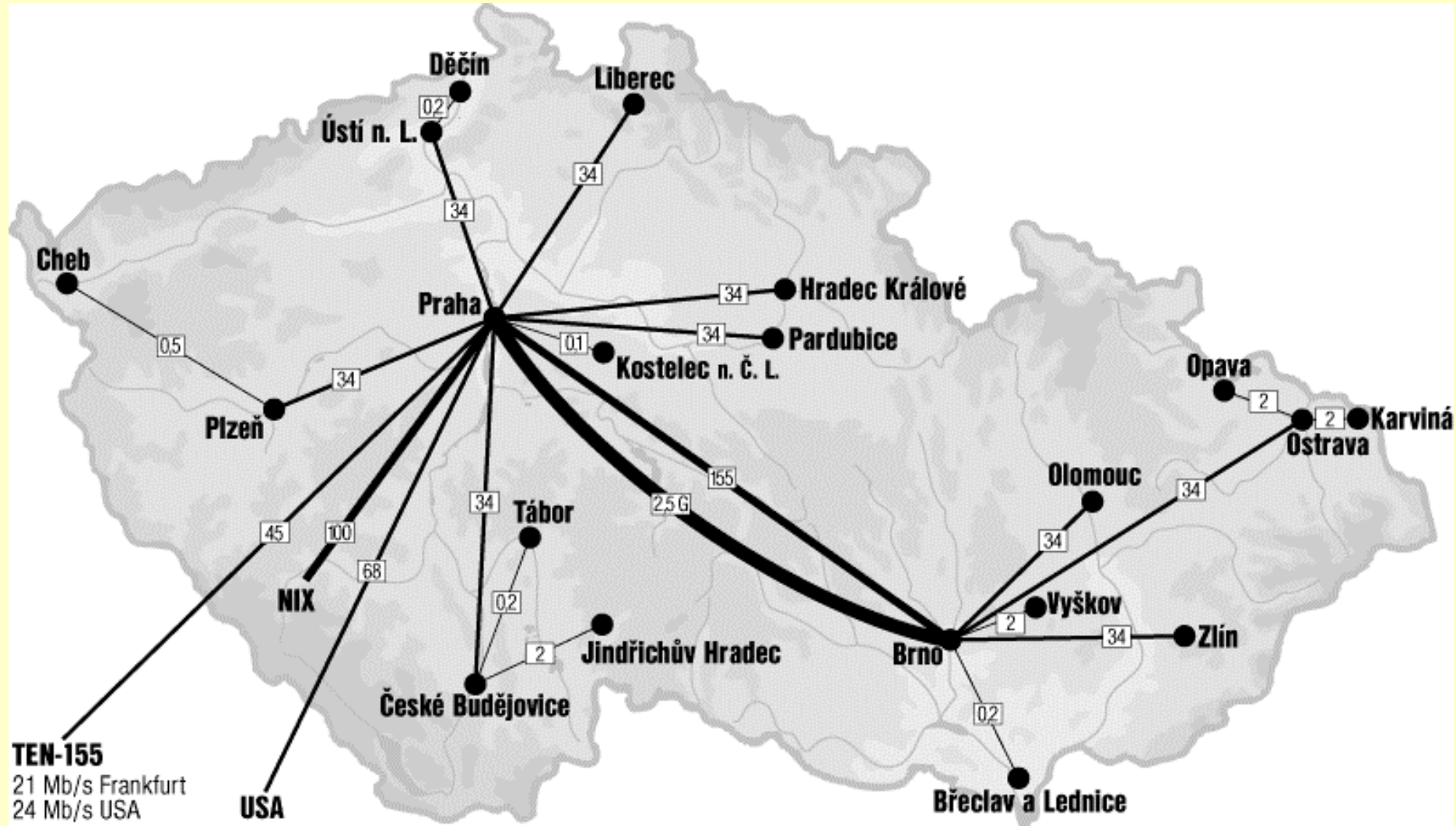


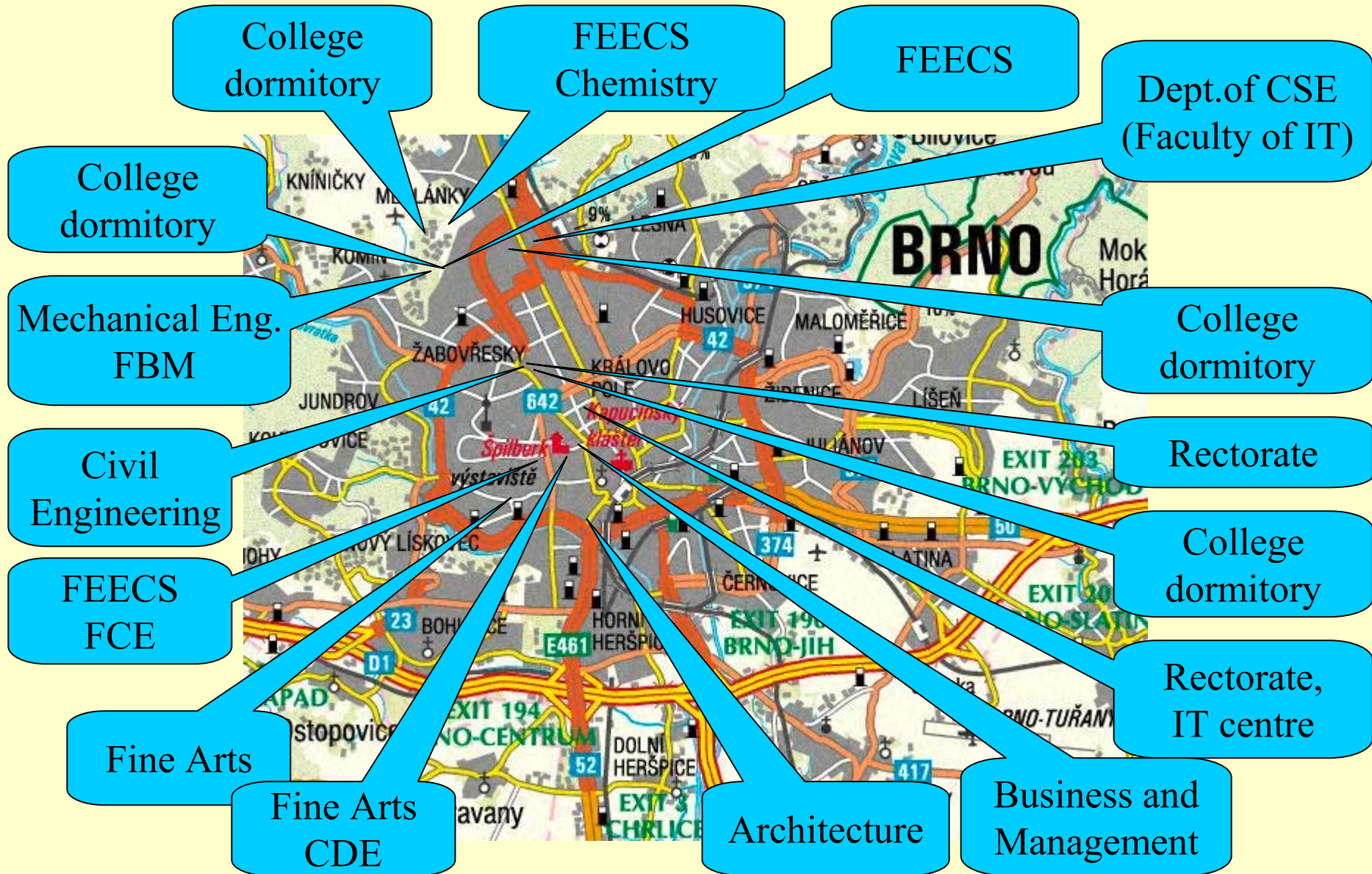
Europe



Academic network



City of Brno (1:200000)



Brno University of Technology

- **Faculties:** El. Engineering and CS, Mechanical Eng., Civil Engineering, Architecture, Business and Management, Chemistry, Fine Arts
- 12 000 students
- **Institutes:**
 - Computing and Informations Centre:
 - metropolitan network (with cooperation of Masaryk University)
 - supercomputer centre
 - Centre for Distance Education
 - Central Library
- **Location:** 16 campuses round the city
- ~ 5 000 computers

Project of FEECS backbone

- grant in 1998 (Ministry of Education)
- about 40000\$
- 4 distant large faculty campuses
- departments scattered through buildings
- no commercial routers (PCs + BSD)
- no switches (almost, 2 Catalysts 3000)
- high demands

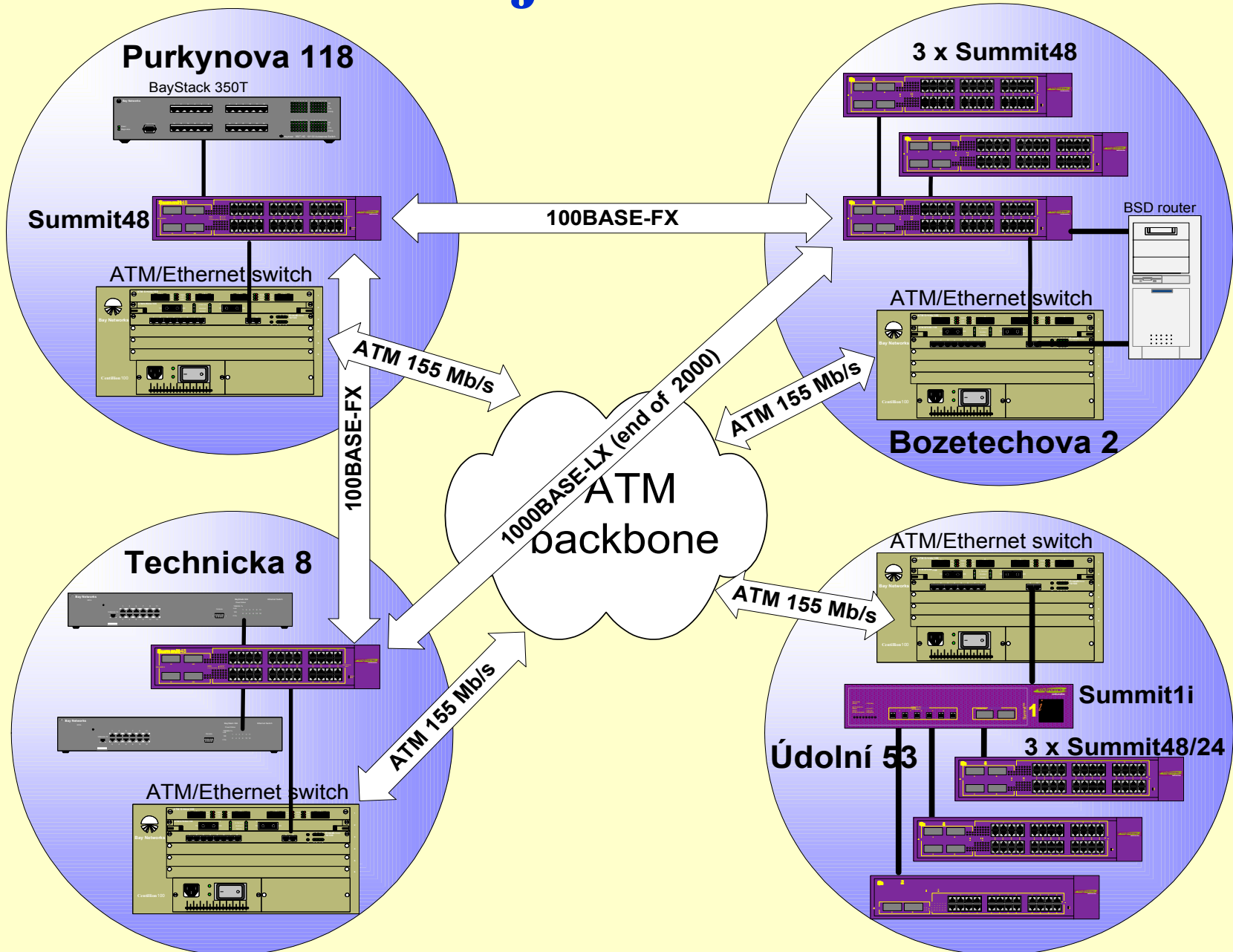
Expected solution

- Campus centre - Layer 3 switch (1998!)
- Building centre - Layer 2 switch
- Proposal (1997) - Catalyst 5000/2900
- Connection - n x 100 Mb/s (proposal)
1 Gb/s (solution)
- Choice: Cisco, Bay Networks/Nortel, 3Com, Cabletron, Extreme Networks

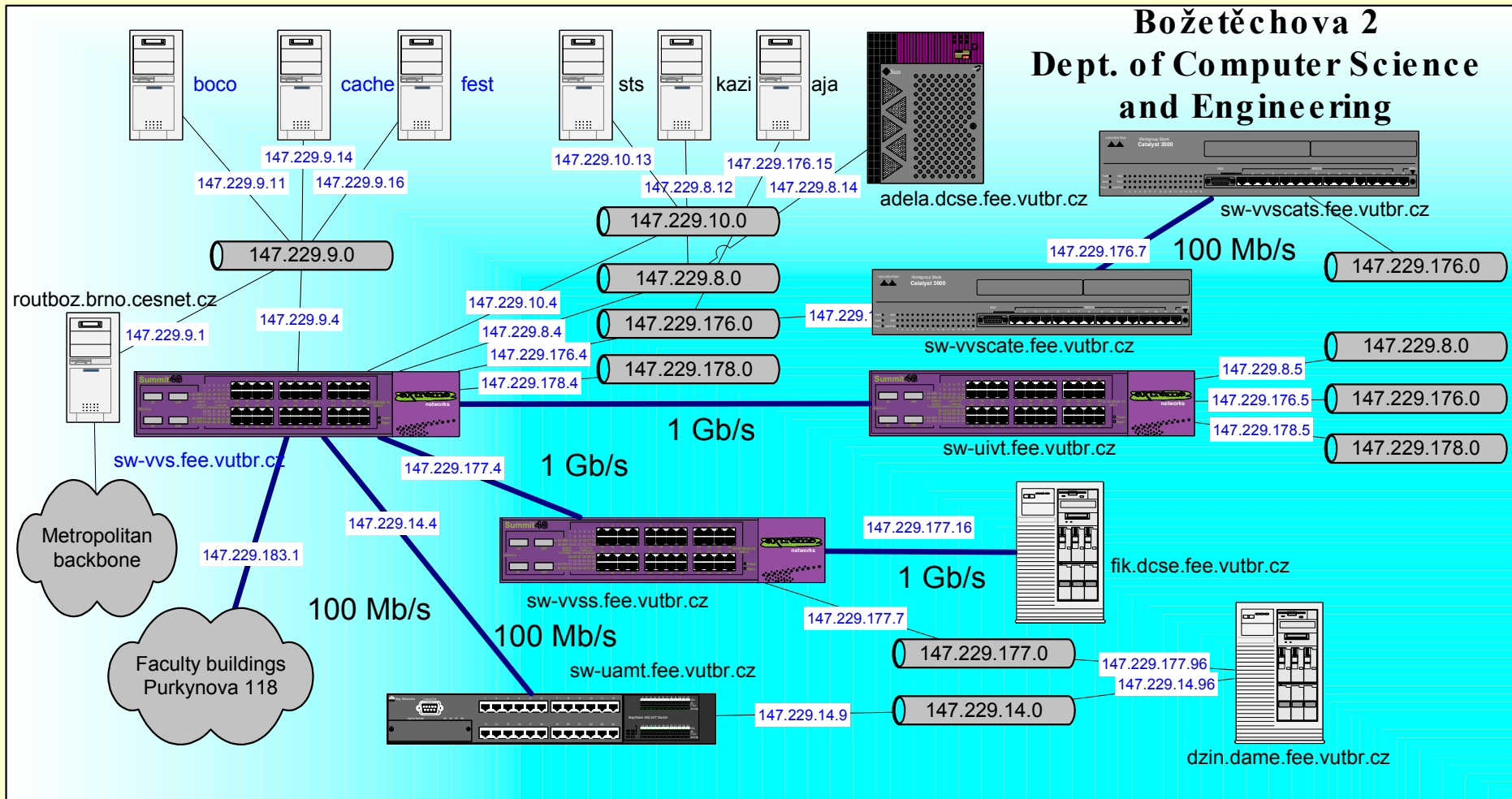
Why Summit 48?

- Architecture (both HW&SW)
- Common for Layer2 and 3 switch
- Range of products based on the same chipset and firmware (Summit 1)
- Relatively long-time on market (4/1997)
- Good tests results
- High port density
- Exceptional performance/price
- **No distributor in Central Europe**

Project success

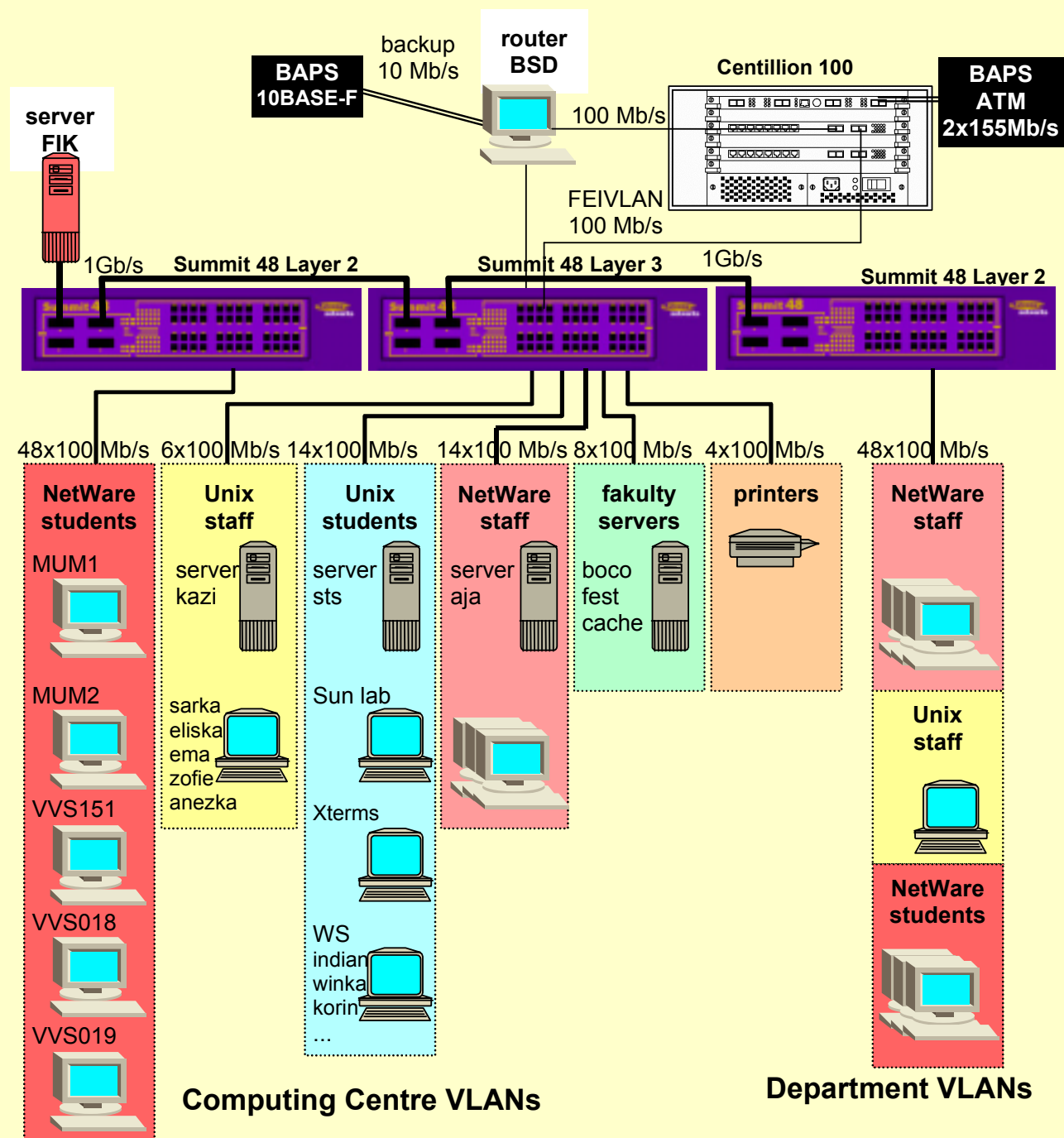


Bozetechova 2



~400 active nodes total, 12 servers, 20 workstations

VLANs



University buildings

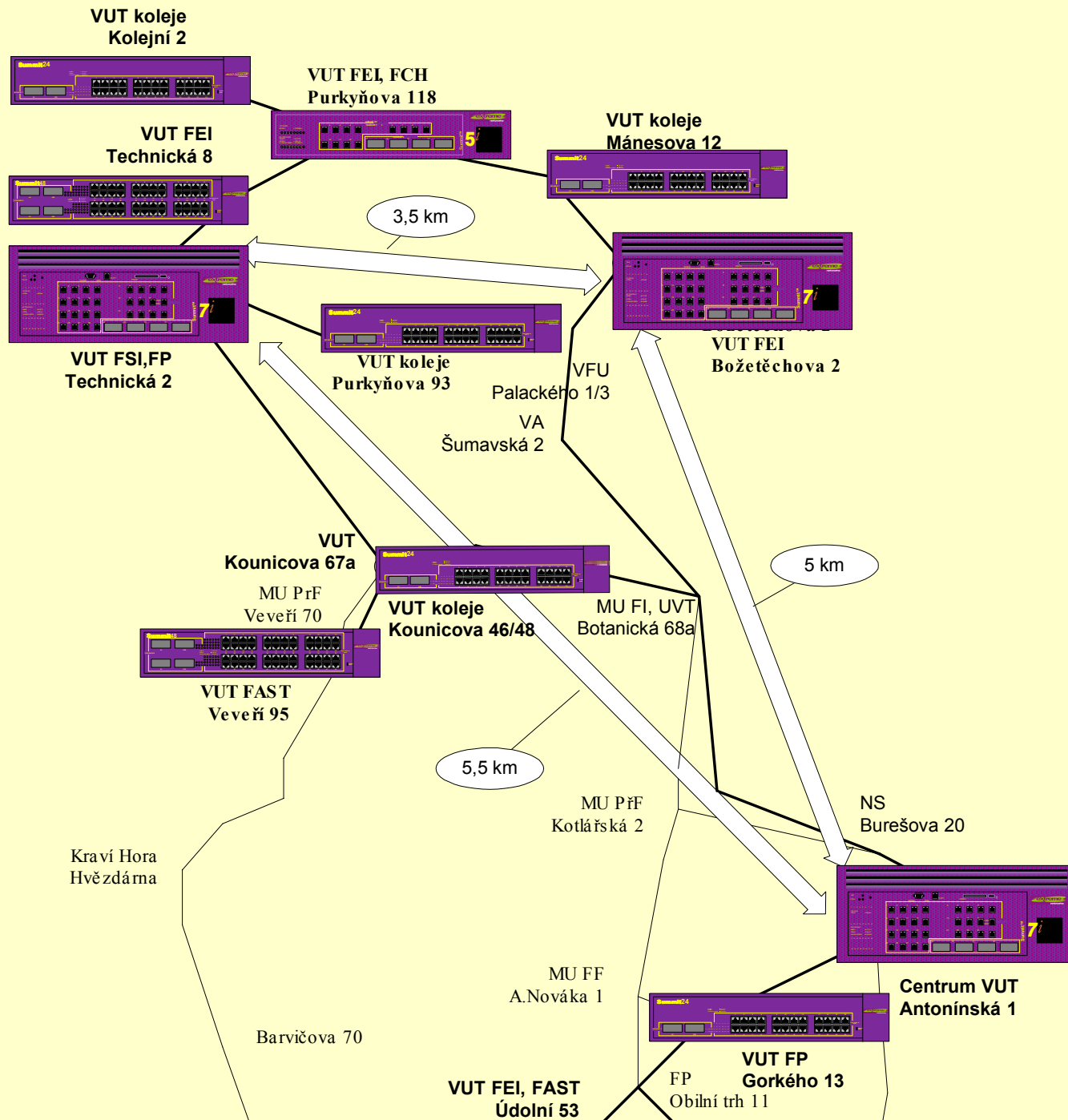
Name	Media/speed	Model	Faculty	
Antonínská 1	ATM	155 Mb/s	BH5000,S48	Rectorate, IT centre
Poříčí 5	ATM	155 Mb/s	C100	Architecture
Božetěchova 2	ATM	155 Mb/s	C100	El. Engineering and CS
Technická 8	ATM	155 Mb/s	C100	El. Engineering and CS
Purkyňova 118	ATM	155 Mb/s	C100	EECS, Chemistry
Údolní 53	ATM	155 Mb/s	C100	El. Engineering and CS
Gorkého 13	Ethernet	10 Mb/s	-	Business and Management
Veveří 95	ATM	155 Mb/s	C100	Civil Engineering
Technická 2	ATM	155 Mb/s	BH5000k,S1	Mechanical Engineering
			S5i (2000)	Business and Management
Rybářská 13/15	Ethernet	10 Mb/s	-	Fine Arts
Udolní 19	ATM	155 Mb/s	C100	Fine Arts
Kolejní 2	Ethernet	10 Mb/s	-	College dormitory
Mánesova 12	Ethernet	100 Mb/s	-	College dormitory
Kounicova 46	Ethernet	100 Mb/s	-	College dormitory
Purkyňova 93	Ethernet	10 Mb/s	-	College dormitory

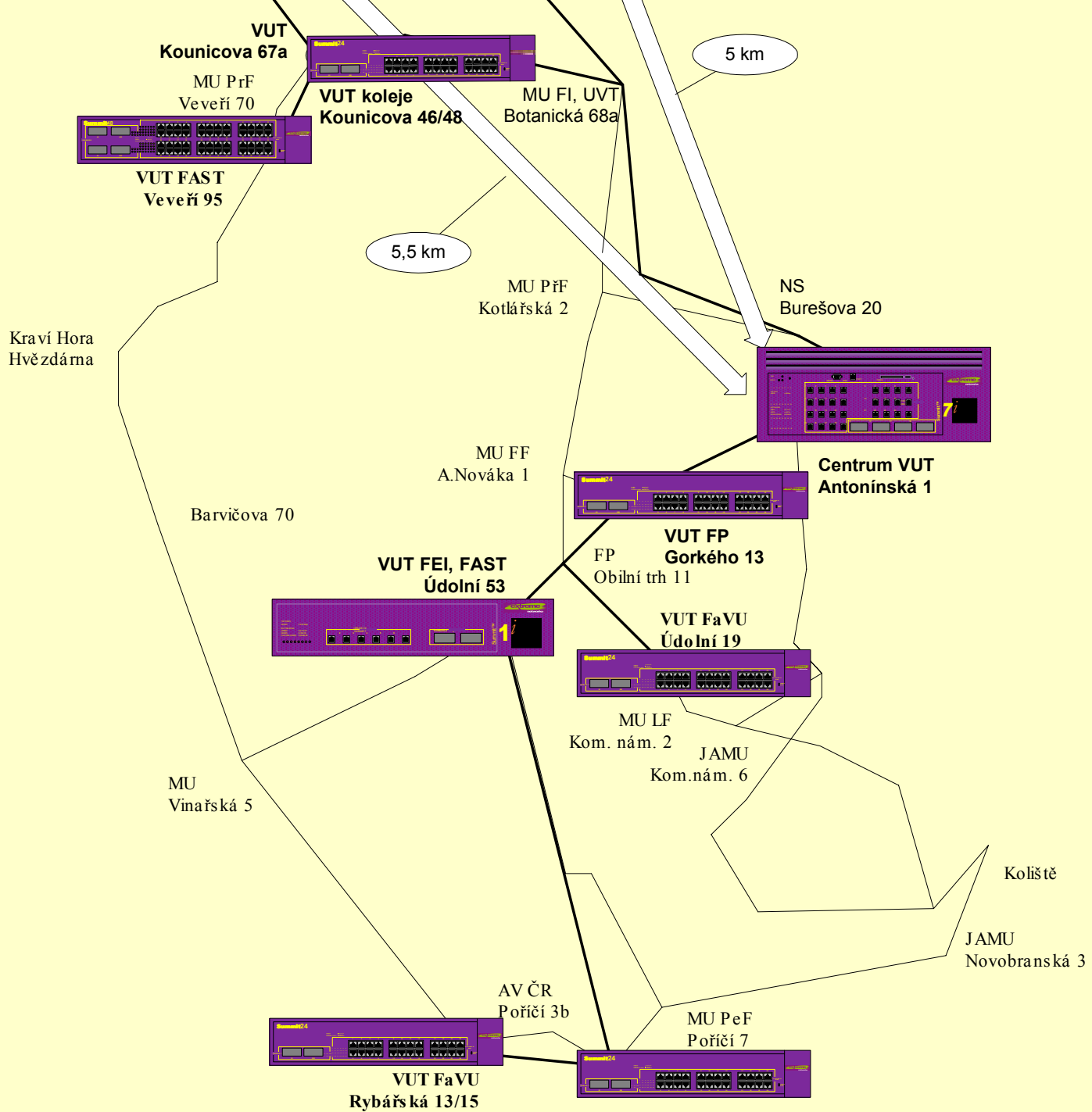
University Backbone

- Part of Metropolitan Network
 - common cables, dedicated fibers
- Ethernet 10 Mb/s (1992)
- ATM 155 Mb/s started at 1995 (no other technology available)
- 1999 - no further development of ATM, transition to Gigabit Ethernet:
 - single technology for LAN&MAN
 - integrated routing
 - simplicity, capacity, price
 - QoS not really used in MAN

Extreme Future

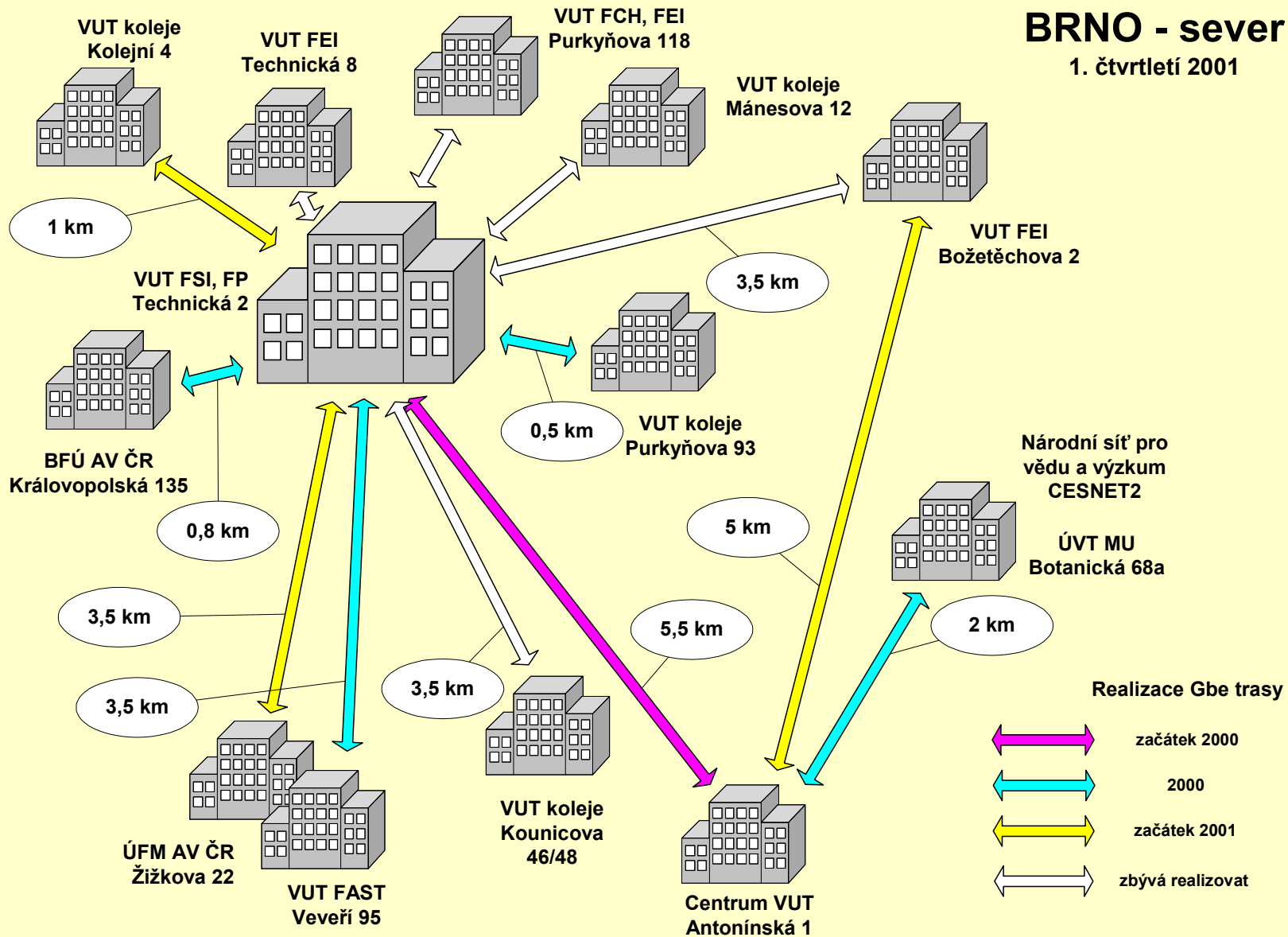
Name	Model now	Future	Faculty
Antonínská 1	5 x Summit 48	+Summit 5i	Rectorate, IT centre
Poříčí 5		Summit 48	Architecture
Božetěchova 2	3 x Summit 48	+Summit 7i	El. Engineering and CS
Technická 8	Summit 48		El. Engineering and CS
Purkyňova 118	Summit 48	Summit 5i	EECS, Chemistry
Údolní 53	3 x Summit 48,24,1i		El. Engineering and CS
Gorkého 13		Summit 24	Business and Management
Veverí 95	Summit 48	Summit 5i	Civil Engineering
Technická 2	Summit 1	+Summit5i,1i	Mechanical Engineering
	Summit 5i		Business and Management
Rybářská 13/15		Summit 48	Fine Arts
Udolní 19		Summit 48	Fine Arts
Kolejní 2	Summit 48	+Summit1i	College dormitory
Mánesova 12		Summit 24	College dormitory
Kounicova 46		Summit 48	College dormitory
Purkyňova 93	Summit 48	+Summit1i	College dormitory





BRNO - sever

1. čtvrtletí 2001



Protokoly a služby správy sítě

- Směrování paketů (unicast)
- Směrování paketů (multicast)
- Virtuální sítě
- Časová synchronizace
- Administrátorský přístup k prvkům sítě
- Zálohování konfigurace
- Monitorování sítě
- Filtrování paketů
- QoS, CoS
- Další služby

Zabezpečení sítě

Minimální požadavky na L3 přepínače:

- filtrování paketů v rychlosti média (packet filtering)
- zaznamenávání událostí (logování)
- zrcadlení portů (port mirroring)
- směrování paketů podle zdrojové adresy (source routing)
- bezpečný administrátorský přístup k zařízení