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Appendix 1: Strategies, policies, and regulations used to develop Korea’s broadband ecosystem

Segment	Promotion	Oversight	Universalization
Ecosystem definition and strategy	 <p>First National Informatization Promotion Plan Cyber Korea 21 u-Korea Master Plan IT839 Strategy, including Broadband convergence Network (BcN)</p>	<p>University of Moratuwa, Sri Lanka. Electronic Theses & Dissertations www.lib.mrt.ac.lk</p> <p>Framework Act on Telecommunications Telecommunications Business Act Fair Trading Act</p>	<p>First and Second Plans for Closing the Digital Divide e-Korea Vision 2006 Broadband IT Korea Vision 2007</p>
Networks	<p>Korea Information Infrastructure: early focus on backbone Broadband technological standards Cyber building certification Promotion of technology standardization Ultra Broadband convergence Network (UBcN)</p>	<p>Government ownership of KT until 2002</p>	<p>Korea Information Infrastructure: later focus on rural connectivity Low-interest loans for network rollout in rural areas</p>

Services	<p>Broadband as a value added service</p> <p>Quality monitoring system and service level agreements</p>	<p>Broadband as a facilities based service</p> <p>Network access regulations</p> <p>ISP peering regulation</p> <p>Local loop unbundling (LLU)</p> <p>Significant Market Power regulation (ex ante pricing and service restrictions)</p> <p>Bundling regulation</p> <p>Number portability for VOIP</p>	<p>Subsidized services for poor citizens</p>
Applications	 <p>Content promotion frameworks</p> <p>Informatization promotion funds</p> <p>Industrial initiatives such as tax reductions for emerging Internet sectors, R&D and technology transfer promotion, and promotion of information technology in traditional industries</p> <p>Promotion of demand for broadband services through e-government, ecommerce, and e-learning initiatives</p>	<p>Intellectual property rights protection</p> <p>Strengthening of cyber trust and security systems (such as antivirus software promotion)</p>	<p>Promotions of applications accessible to people with disabilities</p>
Users	<p>Subsidies for computer purchases by low-income households</p> <p>10 million people Internet education program</p>	<p>Information use ethics</p>	<p>Free Internet access centers in remote areas</p> <p>Broadband access in all schools</p>

Appendix 2: Policies and initiatives, categorized under four aspects of eco-system model which can be used in Sri Lankan broadband context

	Initiative No	Recommendation	Source which was taken	Issue addressed
Infrastructure Development	1	Encourage operators by provide incentives and tax benefits to Broadband operators especially who covers underserved areas	Section 2.4.1 page 12	RF 6.1 and RF 8
	2	QoS benchmarking initiatives helps to maintain a good broadband service	Interview with TRCSL	RF 6.4
	3	Standardize broadband speed. TRCSL has given standardize broadband speed as follows; 30% of the advertised speed for Mobile broadband 70% of the advertised speed for fixed broadband	Interview with TRCSL	
	4	Investments are made in private and public approach for broadband infrastructure development	Section 2.4.2.1 and section 2.4.6	R.F 6.1 and RF 8

Content and services	5	National fiber network. This is already implemented in certain areas of the country via SLT fiber network	Interview with TRCSL	RF 6.7 and RF 1
	6	E-education and e-commerce based policies	Korean case 2.4.1	
	7	E government policies and projects such as LGN and GIS	Interview with ICTA	
	8	Providing key public services online and encouraging the development of applications	Korean case Section 2.4.1.5	
	9	Policy implementation of cyber security	Nigerian case section 2.4.5.4	
Users	10	Per MB price reduction	Interview with TRCSL	RF 6.6
	11	Reduce tax for communication devices such as mobile phones, tablets and laptops	Interview with TRCSL	RF 6.6
Skills	12	Training and education to use or exploit Internet and related data services.	Indian Case section 2.4.6 and Korean Case study strategies in Appendix 1	RF 6.8 and RF 9
	13	Policies to raise awareness among general public regarding broadband based applications and services.	Korean case 2.4.1 and Nigerian case section 2.4.5.6	RF 6.5

Appendix 3: Responses for the questionnaire



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Objective

Objective of this questionnaire is to obtain a clearer insight on broadband initiatives that have taken by telecom operators

Name:M.J.M.

Fawaz.....

Designation: ...Manager – VAS &

OSS.....

Company : ...Mobitel PVT

Ltd.....

Questionnaire

1. Mention the percentage of geographical distribution that has been covered by your broadband service

2G – 90%

3G – 75%

2. What are the initiatives that your company has taken to improve the broadband coverage?
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- Introduce 3G technology in 2G coverage area
- Introduce LTE urban area
- Add new sites in congested and no coverage area

3. What are the initiatives that your company has taken to improve broadband QoS (Quality of Service) in Sri Lanka?

- Increase site capacity and transmission capacity
- Increase core node capacity
- Routine speed test in different area & optimizing system/ sites
- System performance monitoring

4. What are the initiatives that your company has taken to improve online based applications and services such as e-commerce, e-learning and e-government?

- Has launched successfully mLearning projects with different institutes
- Online payment system for bills

- Supported immigration to launch web portal with notification capabilities
 - Introduced Online games, online feature activation self care portals
 - Smart phone applications for selfcare, mCash services
5. What are the initiatives taken by your company for cyber security?
- Regular port scanning by third party for vulnerabilities
 - Use HTTPS for external and internal interfaces
 - Enable virus protections for relevant systems and phones if customer required
 - Use VPN for remote access and external connectivity to internal systems
 - Close unnecessary ports opened to internet
 - Achievement for ISO certification for security
 -
6. Are there any practical difficulties your company encounters when you are implementing the above mentioned initiatives?
7. If yes, what are they?
- Not supporting HTTPS by some products
 - Limitations in the existing products
 - Difficulty in maintaining continuous constant throughput for a user
 - Difficulty in providing continuous coverage due to terrains and buildings
 - Poor indoor coverage and throughput
 - Congestion issues
 - Internet bandwidth issues
 - Difficulty in proving similar experience for all users
 - Due to interrelated issues for proper broadband service, more time consuming in locating the issues
 - Occurrence of one time issue or single user issues which will not be able to regenerate in order to troubleshoot or solve the issues
 - Difficulty in matching other operator performance and features due to technical limitations

Objective

Objective of this questionnaire is to obtain a clearer insight on broadband initiatives that have taken by telecom operators

Name: Buddhi Hettiarachchi.....

Designation: Senior

Engineer.....

Company : ...Mobitel PVt

Ltd.....

Questionnaire

1. Mention the percentage of geographical distribution that has been covered by your broadband service

75%

2. What are the initiatives that your company has taken to improve the broadband coverage?

Company has increased 3G and 4G footprint gradually during past 8 years via major network expansion rollouts.

3. What are the initiatives that your company has taken to improve broadband QoS (Quality of Service) in Sri Lanka?

Company has monitored broadband usage patterns and accordingly increased backhauling and ISP capacity to guarantee high data rates. Quality degradations in the network monitored continuously and taken prompt actions to rectify issues. QoS configurations used in the network side to prioritize high priority services over low priority services.

4. What are the initiatives that your company has taken to improve online based applications and services such as e-commerce, e-learning and e-government?

Company has launched a comprehensive mobile money platform called “M-Cash” to fulfill demanding e-commerce requirements of the country. “M-learning” is an e-learning platform launched by Mobitel with the partnership with University of Colombo, which facilitate to follow online degree and diploma certifications.

5. What are the initiatives taken by your company for cyber security?
Company has secured its core network from unauthorized access from access network side via implementation of firewalls.
6. Are there any practical difficulties your company encounters when you are implementing the above mentioned initiatives?
Yes
7. If yes, what are they?
It is challenging for the employees to cope up with rapid changes in technologies.
Customer knowledge of IT



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Objective

Objective of this questionnaire is to obtain a clearer insight on broadband initiatives that have taken by telecom operators

Name: Duleep Thilakarathne

Designation: Manager Packet Core

Company : ...Mobitel PVT

Ltd.....

Questionnaire

1. Mention the percentage of geographical distribution that has been covered by your broadband service

50%

2. What are the initiatives that your company has taken to improve the broadband coverage?

Invest for infrastructure phase by phase.



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3. What are the initiatives that your company has taken to improve broadband QoS (Quality of Service) in Sri Lanka?

Introduce latest technology such as 4G.

Collect broadband speed statistics randomly island wide

Introduced low cost high capable devices

Optimize ISP latency

Maintain IP path capacity 70%

4. What are the initiatives that your company has taken to improve online based applications and services such as e-commerce, e-learning and e-government?

Launch online based applications

Introduce promotions to encourage online applications

Provide infrastructure to corporate customers

5. What are the initiatives taken by your company for cyber security?

Introduce IPS, IDS

Introduce Antivirus software to end users with reasonable price

6. Are there any practical difficulties your company encounters when you are implementing the above mentioned initiatives?

Yes

7. If yes, what are they?

High cost

Service quality degrade



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Objective

Objective of this questionnaire is to obtain a clearer insight on broadband initiatives that have taken by telecom operators

Name: Gayan Dissanayake

Designation: Supervisory Engineer

Company : ...Mobitel PVt

Ltd.....

Questionnaire

1. Mention the percentage of geographical distribution that has been covered by your broadband service

Not sure .Please refer coverage map in cooperate website

2. What are the initiatives that your company has taken to improve the broadband coverage?

Get frequent marketing servey information and customer feedback in monthly review meetings

3. What are the initiatives that your company has taken to improve broadband QoS (Quality of Service) in Sri Lanka?

4. Introduce new Customer Premises Equipment .introduce DC and HSDPA + and other improvements to 3.5G

5. Introduce 4G LTE

6. What are the initiatives that your company has taken to improve online based applications and services such as e-commerce, e-learning and e-government?

Mobitel acquire few e commerce sites like mydeals.lk

Form new division to empower emerging OTT players

7. What are the initiatives taken by your company for cyber security?

Conduct frequent network audit by trusted third parties

8. Are there any practical difficulties your company encounters when you are implementing the above mentioned initiatives?

Return on investment is low due to limited customer base

Customer awareness is very low in new products

Customer purchasing power is low compared to developed countries

Backhaul capacity constraints

9. If yes, what are they?



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Objective

Objective of this questionnaire is to obtain a clearer insight on broadband initiatives that have taken by telecom operators

Name: ...Isuru

Heendeniya.....

.....

Designation:senior engineer-switching.....

Company : ...Etisalat Pvt

Ltd.....

Questionnaire

1. Mention the percentage of geographical distribution that has been covered by your broadband service area wise 1/3 of the country population wise 50%
2. What are the initiatives that your company has taken to improve the broadband coverage?

Focused on covering more urban areas in-building solutions



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3. What are the initiatives that your company has taken to improve broadband QoS (Quality of Service) in Sri Lanka?
drive test, fluent customer complain handling system .frequently checking the speed through employee loctions,provide QOS to TRC
4. What are the initiatives that your company has taken to improve online based applications and services such as e-commerce, e-learning and e-government?
Implement lot of e commerce solution(web patashala,e channealing,online solutions location based services.
USSD menus
Implineted OTT solutions
5. What are the initiatives taken by your company for cyber security?
Firewalls are implemented before every gateway

6. Are there any practical difficulties your company encounters when you are implementing the above mentioned initiatives?because low data rates revenue is low compared to investment than voice .
7. If yes, what are they?

Focus on more OTT solutions

Customer knowledge



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Objective

Objective of this questionnaire is to obtain a clearer insight on broadband initiatives that have taken by telecom operators

Name: Lasitha P. Jayasiri

Designation: Assistance Manager

Company : ...Dialog Axiata.....

Questionnaire

1. Mention the percentage of geographical distribution that has been covered by your broadband service
Not sure
2. What are the initiatives that your company has taken to improve the broadband coverage?
New sites
Fiber connection to sites
3. What are the initiatives that your company has taken to improve broadband QoS (Quality of Service) in Sri Lanka?
Fiber connection to sites
4. What are the initiatives that your company has taken to improve online based applications and services such as e-commerce, e-learning and e-government?
Self-care app and dialog online
5. What are the initiatives taken by your company for cyber security?
ISO certification
6. Are there any practical difficulties your company encounters when you are implementing the above mentioned initiatives?
Yes
7. If yes, what are they?
Cost and moving subscribers (Home to office)

Objective

Objective of this questionnaire is to obtain a clearer insight on broadband initiatives that have taken by telecom operators

Name: Madusanka Sampath

Designation: Engineer, Intelligent Network

Company : ...Mobitel PVT

Ltd.....

Questionnaire

8. Mention the percentage of geographical distribution that has been covered by your broadband service

60%

9. What are the initiatives that your company has taken to improve the broadband coverage?

- Increase number of nodeBs and eNodeBs
- Radio network optimization

10. What are the initiatives that your company has taken to improve broadband QoS (Quality of Service) in Sri Lanka?

- Introducing new radio access network technologies such as HSDPA, DC HSPA+, 4G, Wifi
- Introducing user equipment supporting latest access technologies which results in high penetration of new devices
- Coverage optimization, radio quality optimization

11. What are the initiatives that your company has taken to improve online based applications and services such as e-commerce, e-learning and e-government?

- i. Introducing new online VAS services
- ii. Introducing promotional packages related to e-services

12. What are the initiatives taken by your company for cyber security?

- a. Introducing child protection scheme
- b. Improving core network security

13. Are there any practical difficulties your company encounters when you are implementing the above mentioned initiatives?

a. Yes

14. If yes, what are they?

a. Legal and regulatory barriers

b. Lack of knowledge of customers

c. UE compatibility issues



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Objective

Objective of this questionnaire is to obtain a clearer insight on broadband initiatives that have taken by telecom operators

Name: Uditha Chandrasena

Designation: Senior Engineer

Company : ...Mobitel PVt

Ltd.....

Questionnaire

1. Mention the percentage of geographical distribution that has been covered by your broadband service

Follow the coverage Map

2. What are the initiatives that your company has taken to improve the broadband coverage?

Deploy more and more broadband sites

Existing site capacity Upgrades

New technology initiatives (eg- 4G)

3. What are the initiatives that your company has taken to improve broadband QoS (Quality of Service) in Sri Lanka?

Network Capacity Upgrades

All IP Conversion

4. What are the initiatives that your company has taken to improve online based applications and services such as e-commerce, e-learning and e-government?

Introduction of mcash, mlearning, mtaxi, mticketing

5. What are the initiatives taken by your company for cyber security?

URL Filtering, Network Security audits and take remedial actions (eg –

Firewall Policy changes)

6. Are there any practical difficulties your company encounters when you are implementing the above mentioned initiatives?

Yes

7. If yes, what are they?

Additional CAPEX requirements

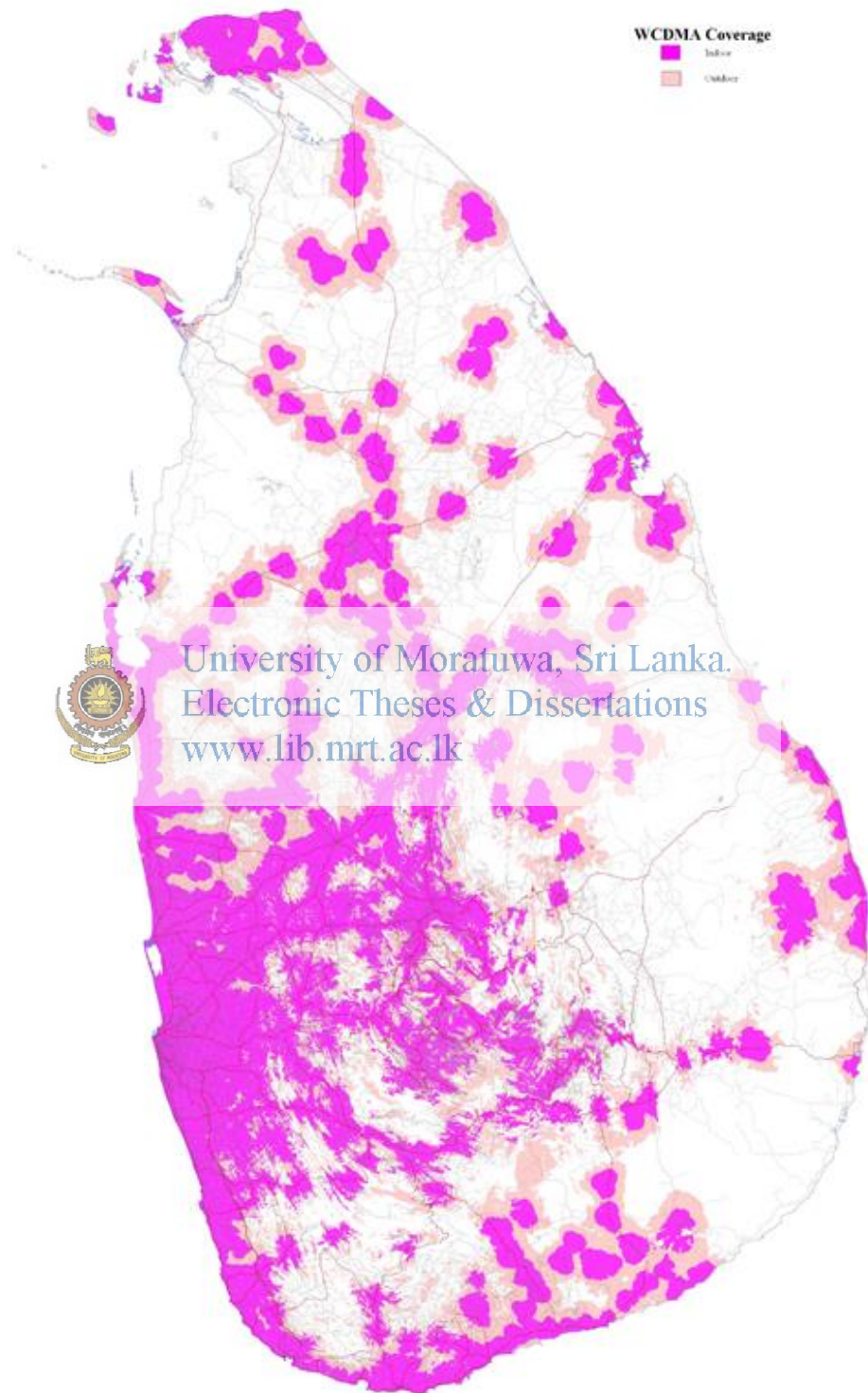
Environmental factors for fiber laying and tower building



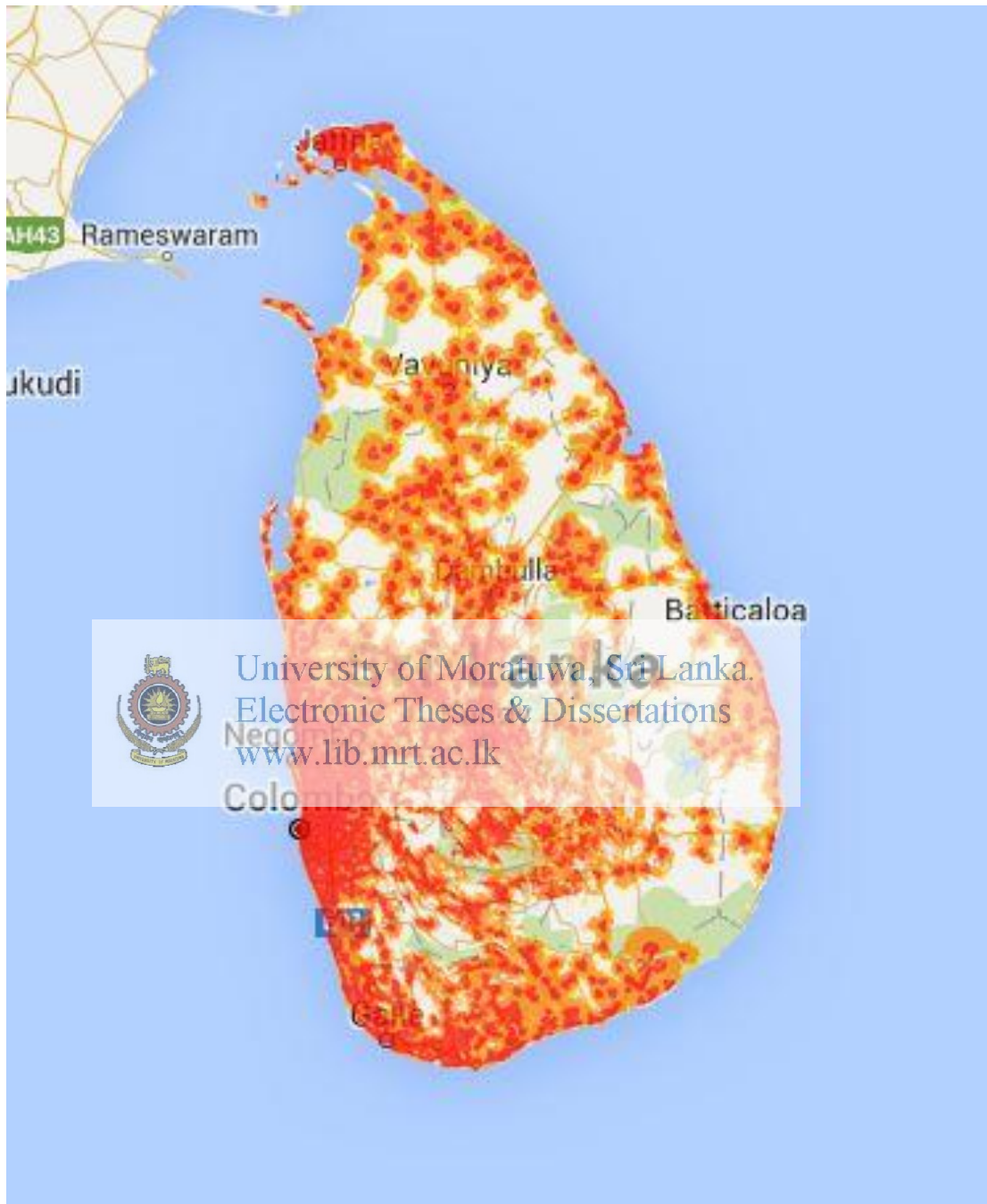
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Appendix 4: Broadband coverage maps of operators

WCDMA coverage of Mobitel Pvt Ltd



WCDMA coverage of Dialog



2G and 3G coverage maps of Etisalat Pvt Ltd



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