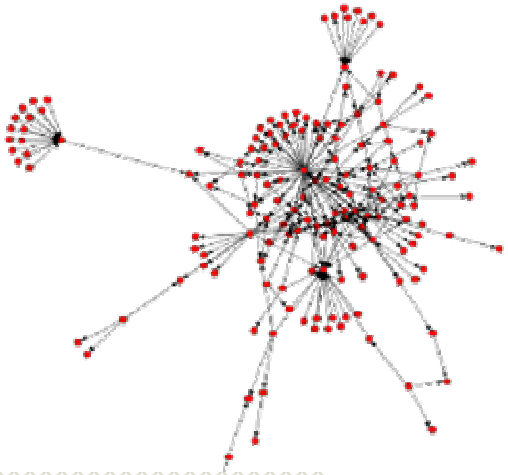
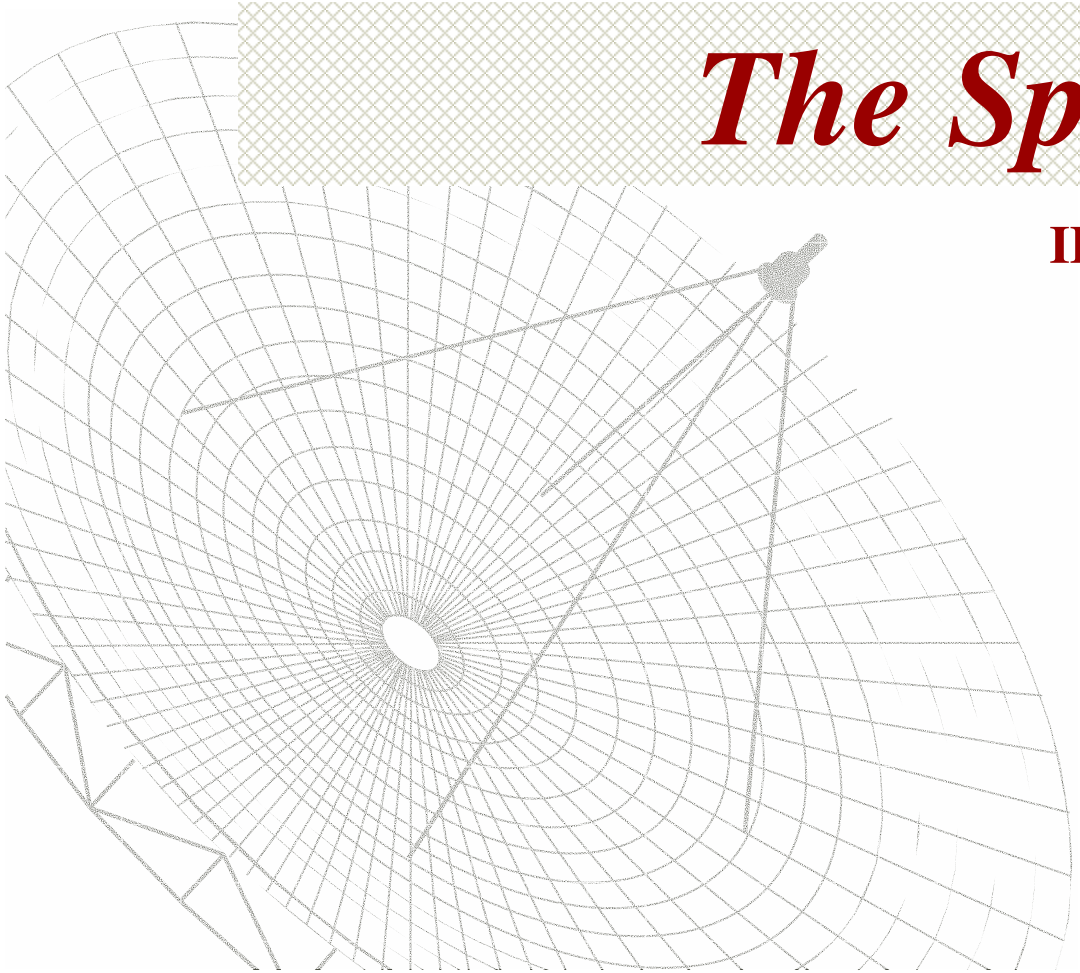
Mobile Voice Conference 2010



The Spoken Web



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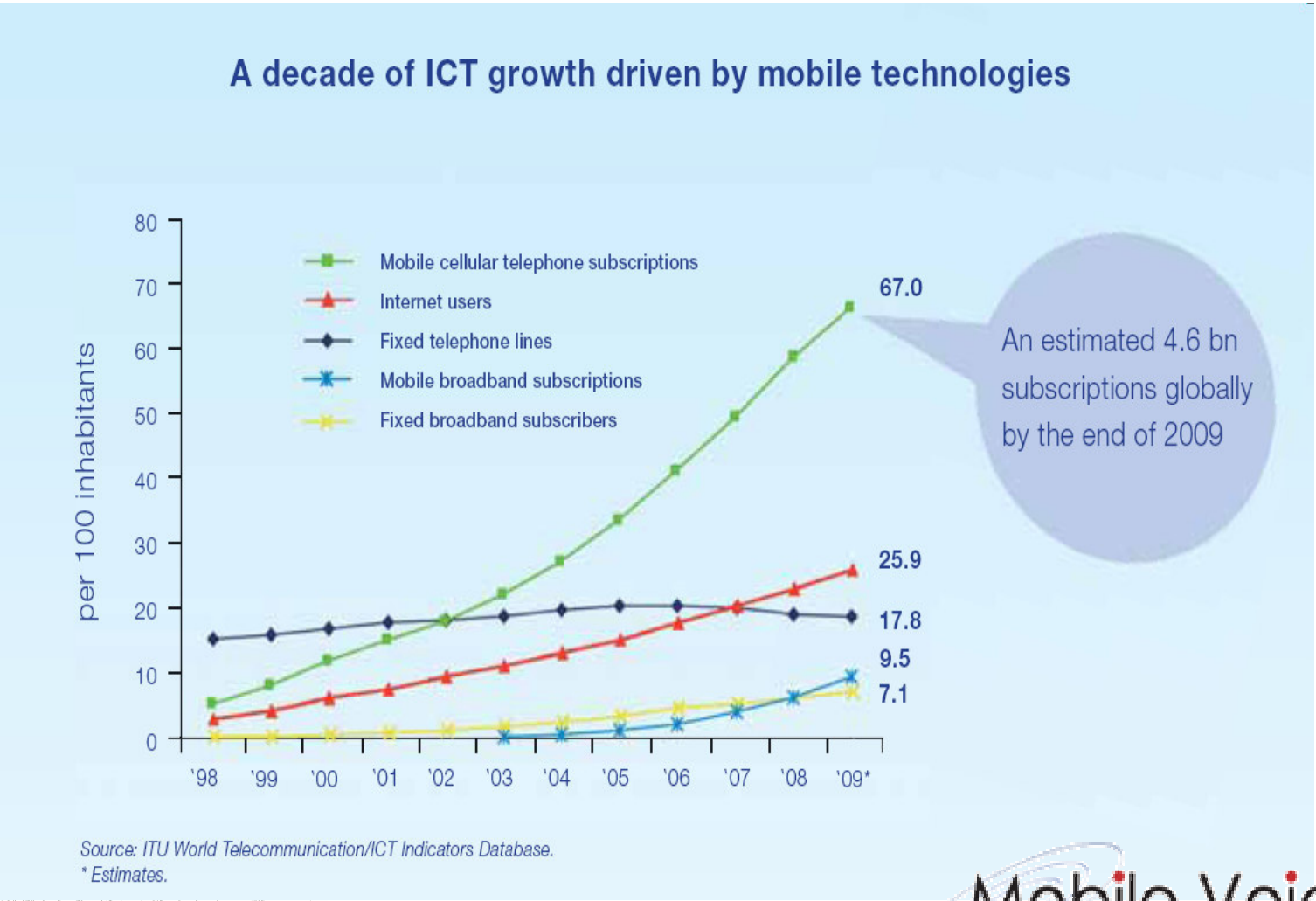
Outline

- **Background and Motivation**
- Introducing VoiceSites
- Our Vision: *The Spoken Web*
- Report from the field

Observations

- Impact of WWW is limited
  - Only a small percentage of human population
    - (~26 % of world's population has access to Internet [IWS])
- Why ?
  - Affordability
    - Of the other 74%, most of the population lives below USD 1.25 per day [WPDS]
  - Accessibility
    - A significant portion of the remaining population is semi-literate or illiterate
  - Relevance
    - Information/Services on WWW not relevant for this population

Phone penetration



"Mobile cellular has been the most rapidly adopted technology in history. Today it is the most popular and widespread personal technology on the planet, with an estimated 4.6 billion subscriptions globally by the end of 2009"

- ITU World Telecommunication

ICT Facts and Figures '2009

Our Axioms

Given the mobile penetration, the phone is a promising platform.

Given the literacy issues, speech is a compelling medium.

Introducing VoiceSites

- A VoiceSite is:
  - A voice application hosted in the telecom network and created by users themselves
  - Accessed by calling up a phone number from any regular phone and interacting with it through voice or keypad
  - Analogous to websites in the World Wide Web. Phone number is analogous to URL.

The Spoken Web

- *VoiceSites*
- *VoiLinks*
- *SurfLinks*
- *Browsing*
- *Search*
- *Transactions*

Phone call

Phone call

"Contextual Call Transfer"

Voice Site

Voice Site

Voice Site

Voice Site

VoiLink

Voice Site

4129 2265

"Back Button"

2226 6333

Voice Site

6875 4319

Voice Site

1256 484 437

Voice Site

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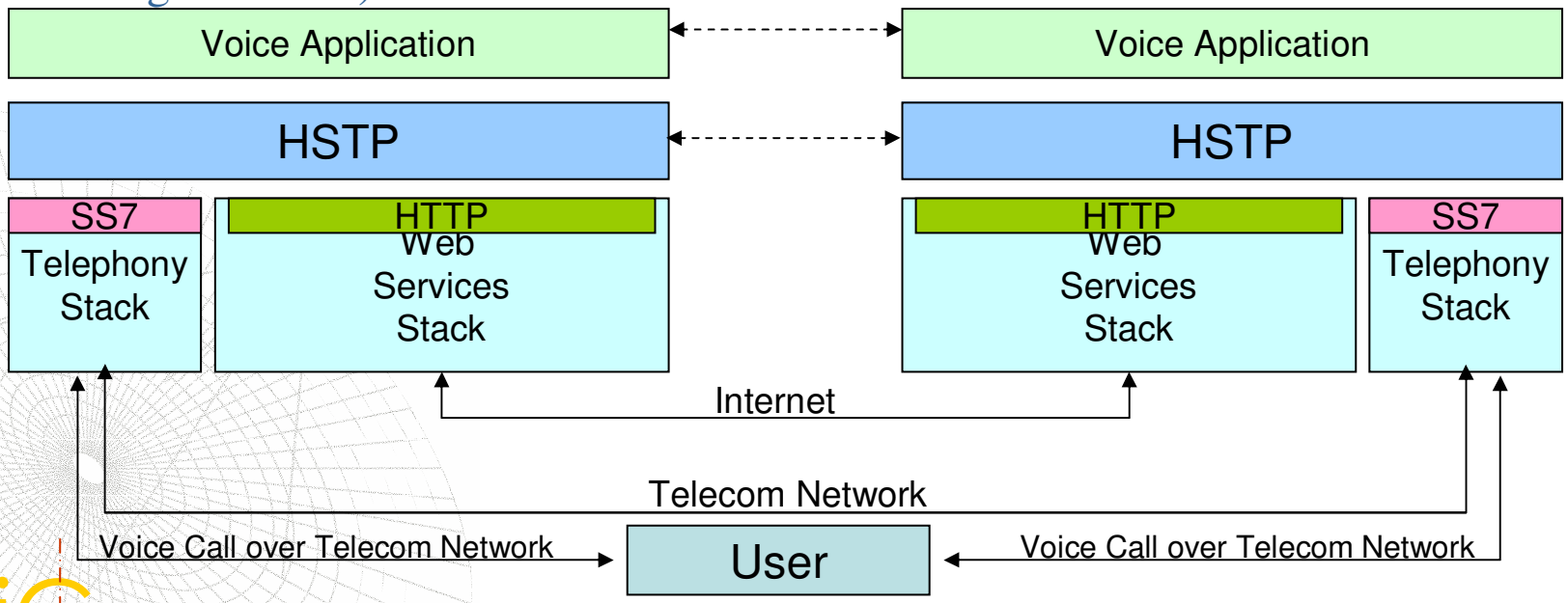
HSTP – HyperSpeech Transfer Protocol

- Hyperspeech
  - a voice fragment in a voice application that is a hyperlink to another voice fragment in another voice application
- Hyperspeech Transfer Protocol (HSTP)
  - a protocol to seamlessly connect telephony voice applications
  - supports browsing operations such as back and forward
  - supports transactional operations such as online payments (may span across organizations)



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What is the Spoken Web?

The Spoken Web is a world wide web in the *telecom network*, where people can host and browse VoiceSites, traverse VoiLinks, even conduct business transactions, all just by *talking* over the *existing* telephone network.

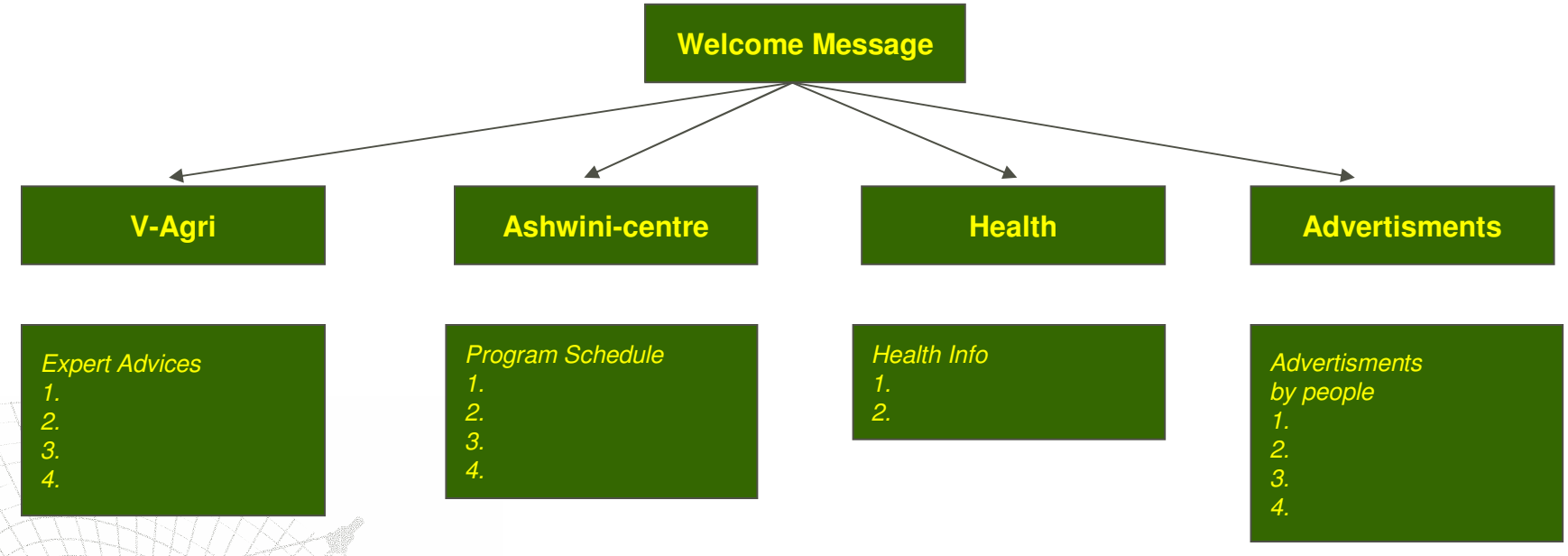
Spoken Web Elements

- Entities
  - VoiceSites
    - are voice applications analogous to “websites”
    - created through a voice interface over telephone (PSTN) or a web interface
    - are accessible over the telephone and hyperlinked to other VoiceSites via “VoiLinks”.
    - URL/Address equivalent is a Phone number.
  - VoiLinks
    - Hyperlinks that link one VoiceSite to another. May be static or dynamic.
  - SurfLinks
    - The link existing while a user is connected and interacting with a VoiceSite.
- Tools
  - T-Web Browser
    - A browser that lets you browse the Telecom Web.
  - T-Web Search Technology
    - Search on the T-Web.
- Enablers
  - VoiGen
    - The system that lets you create your own VoiceSite simply by talking to it (or through a Web Interface).
  - HSTP (Hyperspeech Transfer Protocol)
    - Analogous to HTTP
    - The technology that enables transactions, workflows and browsing on the Telecom Web.

Outline

- ★ Introduction and Background
- ★ Introducing VoiceSites
- ★ Our Vision: *The Spoken Web*
- ★ **Report from the field**

Andhra Pilot - The Village Portal



Villagers can access the voicesite from a public phone

Bike and Auto Mechanic uploading his advertisement on the VoiceSite

Pilot Statistics

- Pilot Launch: May 23, 2008
- Report Summary (ended on Jan 28, 2009)
  - Total number of calls received = 114782
  - Number of unique callers = 6509

  - Total time spent = 2135 hours
  - Average call time spent = 0 hours, 1 min, and 14 seconds.
  - Maximum call duration = 0 hours, 49 min, and 40 seconds.
  - Minimum call duration = 0 hours, 0 min, and 0 seconds.

  - Number of calls to Ashwini Center = 8399
  - Number of calls to Health Center = 14216
  - Number of calls to V-Agri = 13881
  - Number of calls to Professional Services = 37112

Avaaj Otalo: A Voice based Agriculture Information System

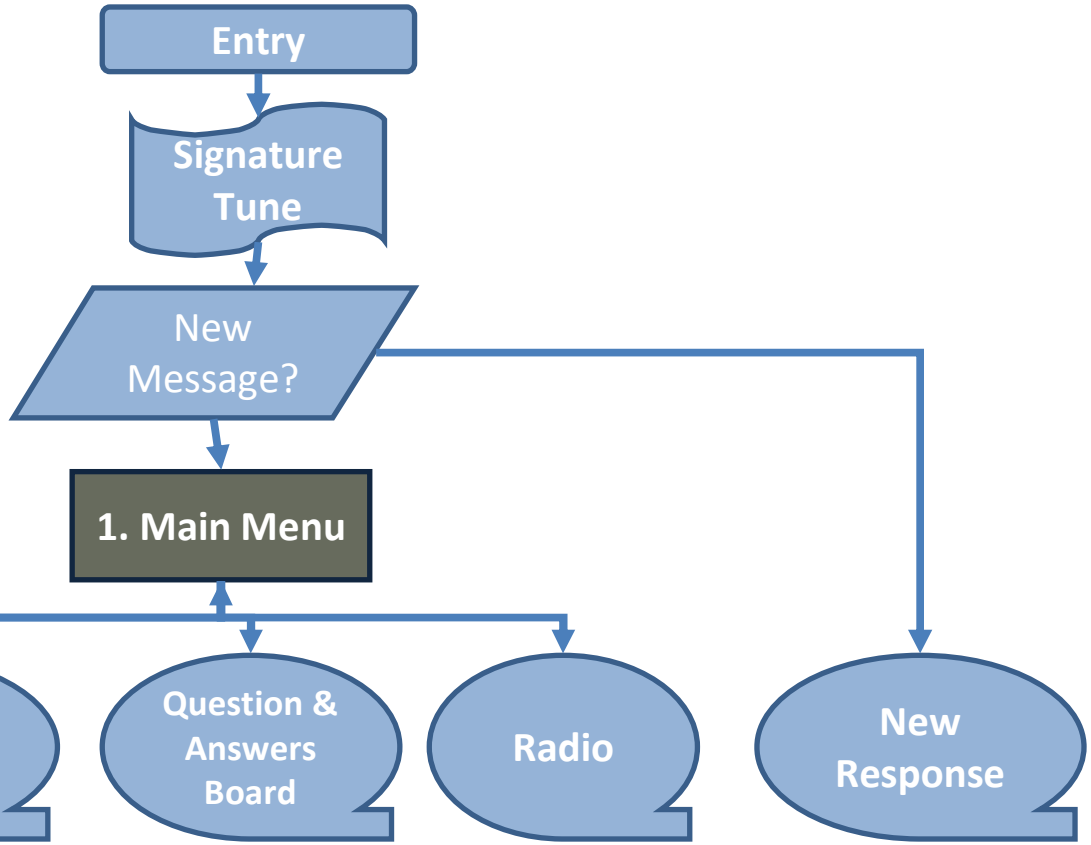
Online forum for agricultural advice and discussion for farmers in rural India

- Question- Answer forum
- Announcements
- Radio Archives

Avaaj Otalo

Villagers accessing the system using a cell phone

The Call Flow



Awards/Recognition

Awards

- **National Award** for technology innovation for the disabled - by the President of India
- **Manthan Award – South Asia** for the VoiKiosk solution

Research Papers:

- N. Patel, D. Chittamuru, A. Jain, P. Dave, and T. S. Parikh, "Avaaj Otalo: A Field Study of an Interactive Voice Forum for Small Farmers in Rural India," CHI 2010 **(best paper award)**
- S. Agarwal, A. Kumar, A. Nanavati, N. Rajput, "Content Creation and Dissemination by-and-for Users in Rural Areas," ICTD 2009.
- A. Kumar, N. Rajput, D. Chakraborty, S. Agarwal, and A. Nanavati, "WWTW: The World Wide Telecom Web," in SIGCOMM Workshop on Networked Systems for Developing Regions, Japan, Nov 2007.
- A. Kumar, N. Rajput, S. Agarwal, D. Chakraborty, and A. A. Nanavati, "Organizing the unorganized – employing it to empower the under-privileged," in Proceedings of the World Wide Web, April 2008.
- S. Agarwal, A. Kumar, A. A. Nanavati, and N. Rajput, "Voikiosk: Increasing reachability of kiosks in developing regions," in Proc. Intl. Conf. on World Wide Web (WWW), China, April 2008.
- N. Patel, S. Agarwal, N. Rajput, A. Nanavati, P. Dave, T. Parikh "A Comparative Study of Speech and Dialed Input Voice Interfaces in Rural India" In Proceedings of ACM Conference on Human Factors in Computing Systems (CHI 2009).
- S. Agarwal, D. Chakraborty, A. Kumar, A. Nanavati, N. Rajput, "HSTP: Hyperspeech Transfer Protocol" In Proceedings of the Eighteenth Conference on Hypertext and Hypermedia, Manchester, UK, 2007

Thanks!

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