15.905 Technology Strategy

Standards battles and wars

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Agenda for today, Wednesday 25 April 2007

~12:45 Standards battles and wars

~13:30 Questions?

- clarification of issues
- case studies
- concepts and frameworks
- assignments
- projects

High-tech businesses are built on systems, with *interfaces*, which may be *standards*

- Products part of larger and more complex systems

- Products are comprised of multiple (sub-)systems

- Systems are comprised of sub-systems and components
- Sub-systems and components are integrated, made compatible, through ***interfaces***
- Interfaces can be customized or standardized, as **compatibility standards**

ZigBee

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"…an association of companies working together…"

*"…to enable … products based on an **open** global standard…"*

*"…providing **interoperability** and conformance testing specifications…"*

http://www.zigbee.org/en/about/

Z-Wave Alliance

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*"…an open **consortium** of manufacturers…"*

"…who build products based on Z-Wave…"

*"…allow all products from all members to **interoperate** seamlessly…"*

*"…stringent conformance test to assure … complete **interoperability** with all other devies and controls…"*

http://www.z-wavealliance.org/modules/AboutUs/

ZigBee and Z-Wave are battling each other, albeit with different strategies…

ZigBee Alliance

- *"The ZigBee Alliance is a global **ecosystem** of companies **creating wireless solutions** for use in **residential, commercial and industrial** applications"*
- *"[It] comprises **technology providers and original equipment manufacturers worldwide**. Membership is **open to all**."*
- *"…the only wireless standards-based technology:*
  - *that addresses the unique needs of **remote monitoring & control**, and **sensory network applications***
  - *enables **broad-based deployment** of wireless networks with low cost, low power solutions*
  - *provides the ability to run for years on inexpensive primary batteries for a typical monitoring application"*
- *"Initial markets*
  - *Home Automation*
  - *Building Automation*
  - *Industrial Automation"*

Z-Wave Alliance

- *"The Z-Wave Alliance members lead the **home controls** market…"*
- *" …more than 125 companies are developing products that incorporate the Z-Wave technology."*
- *"…Zensys' Z-Wave technology is **the only technology** in the market with a **true ecosystem of interoperable products** that focuses on the home automation segment."*
- *"Unlike competing technologies, Z-Wave-enabled products are **readily available** from leading consumer brands, giving Z-Wave a significant **time-to-market** advantage*
- *"Recent findings…have confirmed existing doubts about the viability of wireless control products based on IEEE 802.1.5.4, such as those from the ZigBee community… [and] clearly demonstrated that… products using 15.4 technology are seriously compromised and often inoperable even within the most basic residential"*

[Compatibility] standards have been around a long while: railroad gauges in the 19th century

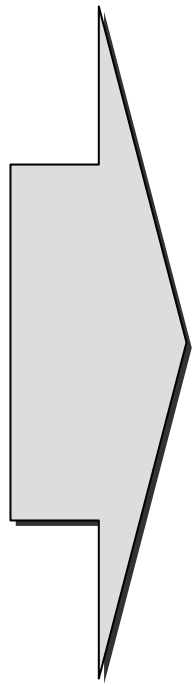
- Standard gauge 4’ 8½”
  - George Stephenson
  - built the Stockton & Darlington Railway
  - the Rocket
- broad gauge 5’0”
  - American South
  - Finland
- broader gauge 7’0¼”
  - Great Western Railway

Standards battles have been going on for a long while

• Electric Power	• DC (Edison) vs AC (Westinghouse)
• Roads	• *Width, side of the road, signage*
• Color Television	• Mechanical (CBS) vs electronic (RCA)
• Air travel	• *Door on front left, jetways/airbridges, taxi ways*
• Video cassettes	• Betamax (Sony) vs VHS (Matsushita+)
• Cellphones (1)	• *Several co-existing standards*
• Personal computers	• Windows vs MacOS
• 56k modems	• K56flex (Rockwell/Lucent) vs x2 (US Robotics/3Com) vs v.90
• Cellphones (2)	• TDMA (Ericsson/AT&T) vs CDMA (Qualcomm) vs GSM (EU+) vs PHS
• Documents	• PDF (Adobe) vs Reader/ (Microsoft)

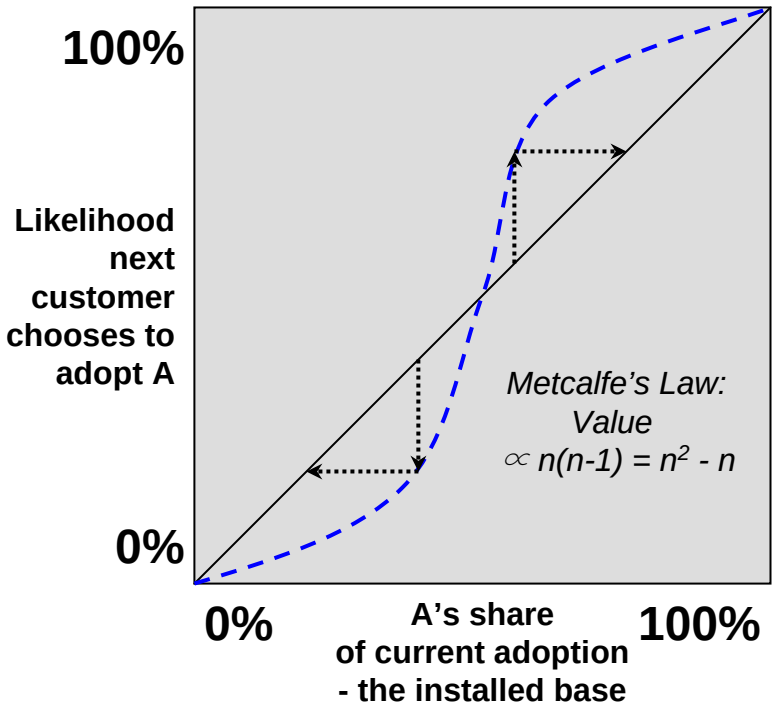
What triggers standards battles, and what are the outcomes?

- How important are *network effects*, how much consumers value broad compatibility
- Two (or more) businesses or business ecosystems vying for dominance



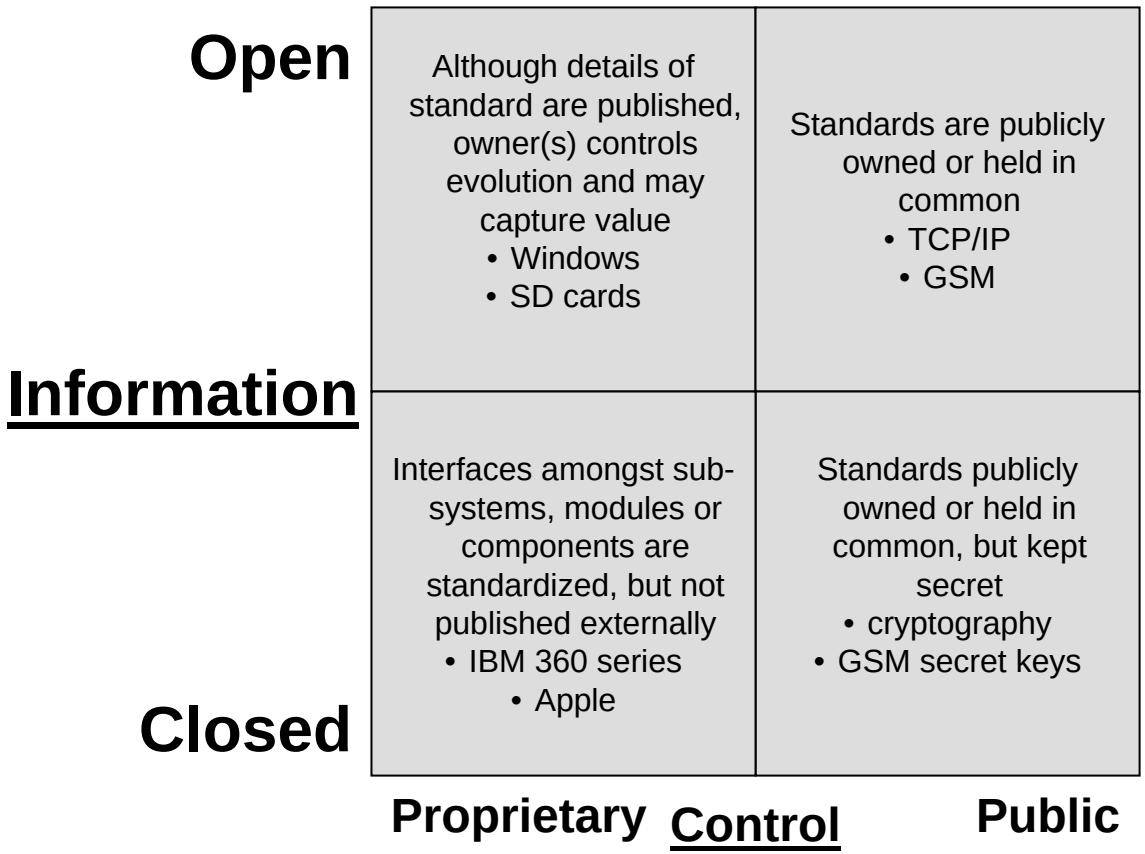
- Tipping
  - "fight to the death"
- Truce
  - convergence
  - comprise
- Two (or more)
  - no tipping
  - duopoly or oligopoly

If network effects, so-called network externalities, are important, adoption may tip

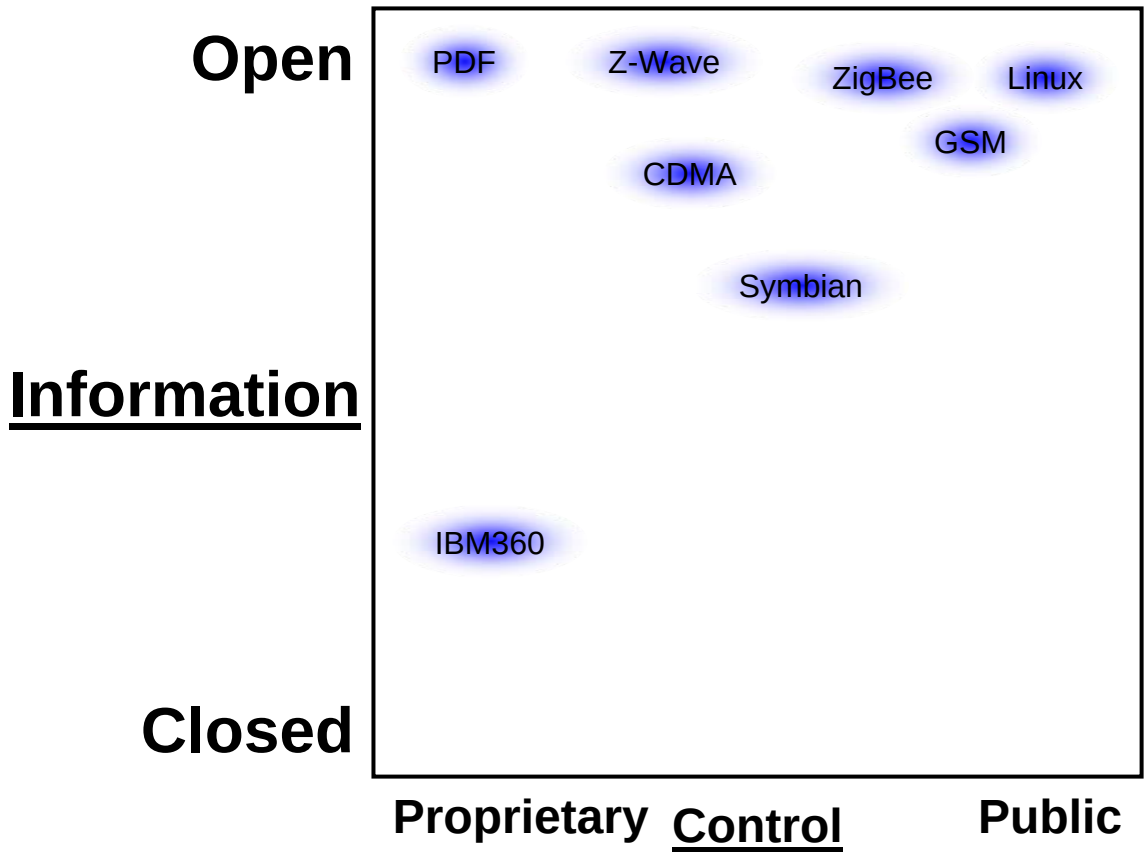


- Direct or real networks
  - people I can talk to
  - content I can use
  - places I can go
- Indirect or virtual networks
  - software and hardware
  - development communities
  - complements

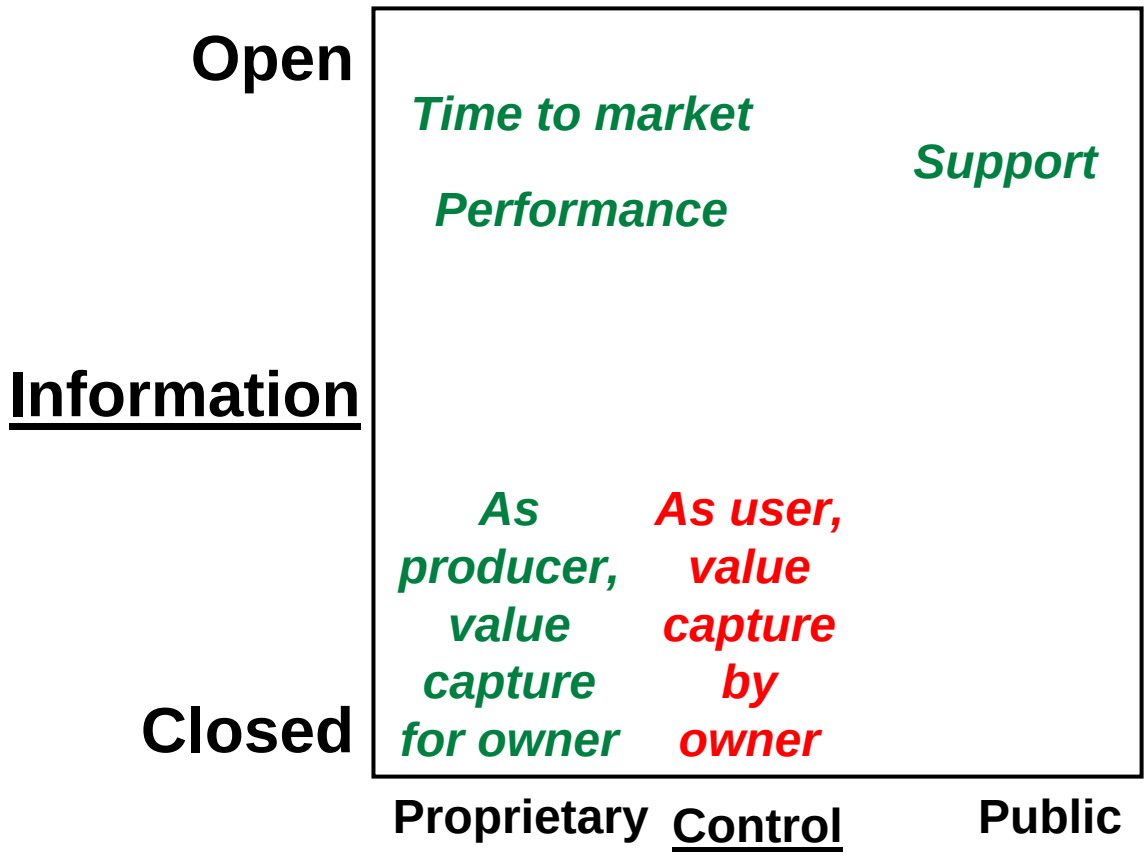
Types of compatibility standards



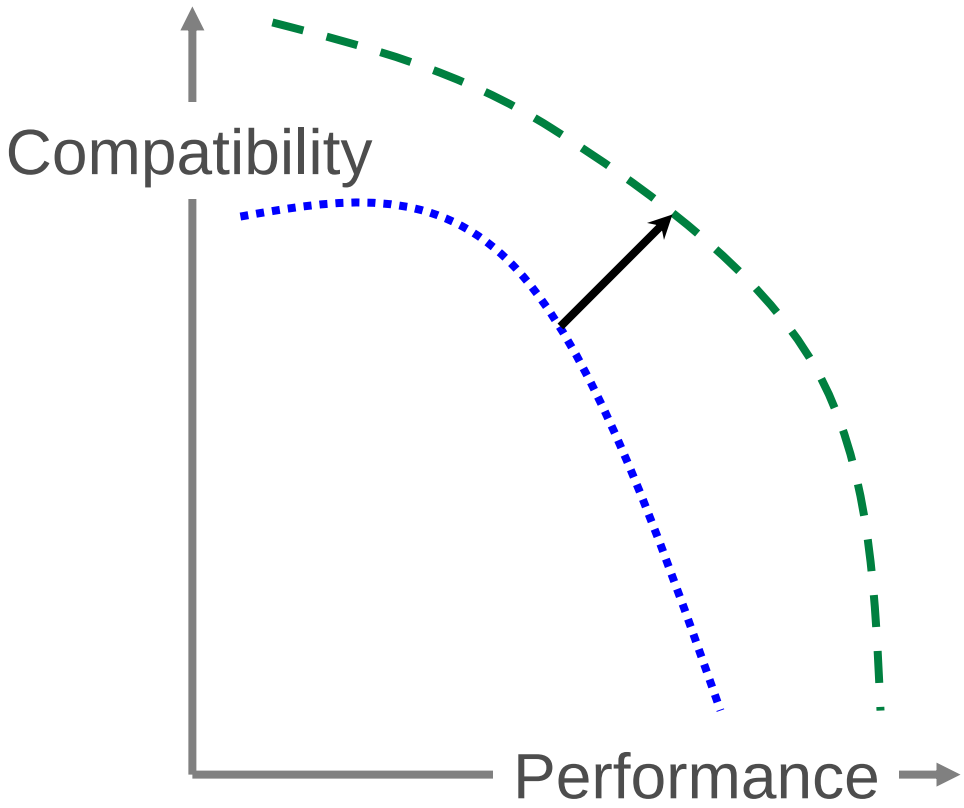
In practice, the extent of control and the availability of information are both a continuum



And each type of standard has distinct advantages and disadvantages

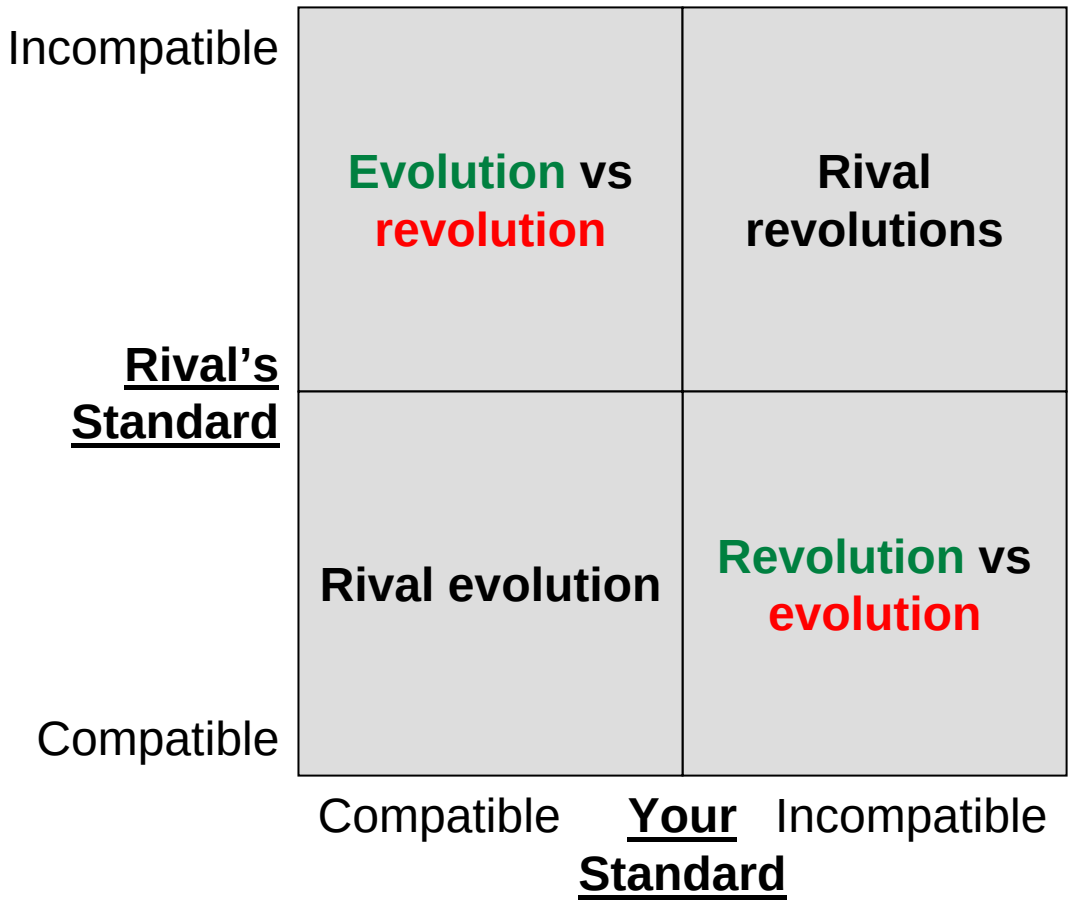


Technology envelopes and trade-offs



- Adopters face a trade-off between better performance and the payoff from network effects

Types of standards battles



Key assets in standards battles

- Prior adoption
  - installed based from previous era
  - helpful with evolution strategy
- Technological innovation
  - deliver superior performance
  - helpful with revolution strategy
- Timing, being first-to-market
  - get there early, establish momentum, learn
- Intellectual property rights
  - Qualcomm's patents for CDMA
- Strength in complements
  - influence overall system level performance
- Reputation
  - credibility, players expectations are that you will win… so you are more likely to

Two key strategems for standards battles

- Pioneering - pre-emption
  - just do it
  - pioneer an early lead so that positive feedback works for you
  - early entry - with associated trade-offs and risks
  - penetration pricing - which needs to be re-couped
- Prosletizing - expectations management
  - convince players that you will win
  - vaporware
  - “predatory product pre-announcements”
  - assembling alliances, announcing adoption
  - fear, uncertainty and doubt - FUD

Standards forums - let's go shopping!

- What are the costs involved in participation?
- Who are the participants?
  - incumbents or insurgents
  - customers or producers
- What is the intellectual property regime?
  - disclosure and licensing - what is "reasonable"
  - **rights held by non-participants**
- What is the process by which decisions are made?
  - consensus
  - voting
- How is compliance enforced?

Interesting standards battles going on today

• Low-power wireless	• ZigBee vs Z-Wave (Zensys) vs ISA-SP100
• Mobile OSs	• Symbian (Nokia and others) vs Windows Mobile (Microsoft) vs Linux
• Mobile TV	• MediaFlo (Qualcomm) vs DVB-H vs DMB
• Web content	• Flash (Adobe) vs Silverlight (Microsoft)
• High definition content	• Blu-Ray (Sony) vs HD-DVD (Microsoft)
• Documents	• OpenDocument vs OpenOffice XML (Microsoft)
• Mobile broadband	• WiMAX vs IEEE 802.20(?) vs LTE

It can get ugly… and expensive (particularly once the lawyers or the government get into it)

- **Qualcomm**'s tactics in mobile broadband
  - August 2005 pays $818 million for Flarion
  - September 2005 revives 802.20, proposes OFDM-based technologies
  - June 2006, IEEE suspends 802.20 at Intel and Motorola's instigation
  - Chairman had not disclosed that he is a consultant for Qualcomm
  - ~20 paid consultants voting as a bloc
- **Qualcomm** in deathmatch over 3G
  - royalties of ~5% on its CDMA, with >80% of the patents, generating ~$2.5 billion per year
  - wants ~5% on W-CDMA (vs ~3% incumbents pay), <20% of patents
  - in litigation with Broadcom and Nokia
- **Rambus** found by FTC to have deceived JEDEC about its patents
  - amended its patent applications to extend their scope
  - tried to charge a royalty rate of 3.5%
- **Microsoft** in a stand off with EU
  - unreasonably high prices for Windows Server Protocol Program
  - threatened with "structural separation", fines of €3 million **per day**

Standards battles in high-tech seem to be getting more contentious

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http://techon.nikkeibp.co.jp/article/HONSHI/20070328/129634

802.20 typically <10 people, then Qualcomm buys Flarion and commits aggressively

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