MoCA Timeline

2010

September
> Verizon FiOS reaches 3.3 million subs

August
> Cincinnati Bell announces multiroom DVR with MoCA
> Comcast offering multiroom DVR with MoCA
> TiVo joins MoCA

July
> Verizon FiOS exceeds 3 million subs

June
> MoCA 2.0 ratified

May
> Cox Communications announces multiroom DVR with MoCA
> LibertyGlobal announces home gateway with MoCA

April
> More than 35 million nodes in the field
> Mid-RF Annex to MoCA 1.1

March
> Tech Summit at CableCongress and EU survey
> DIRECTV announces multiroom DVR with MoCA
> 70 certified products

January
> MoCA/HomePlug Powerline Alliance Liaison

U.S Television Households - 2009

MoCA TAM Potential

IPTV Growth - U.S. Households

Data Sources: 1 DirecTV Corporate Profile, 2 Dish Network Investor Relations Overview, 3 AT&T Inc. 2009 Annual Report, 4 Verizon 2009 Annual Report, 5 Parks Associates, 6 The Nielsen Company - NTI
Dear MoCA Members;

To say it was a busy year would understate the amazing accomplishments of the MoCA organization during the last year. In the last 12 months:

• Most major pay TV operators in the U.S. are committed to MoCA
• Comcast, Cox and DIRECTV announce multiroom DVR with MoCA
• More than a dozen U.S. cable MSOs are in trials
• More than 30 million nodes in the field
• More than 70 certified products
• Completion of mid-RF Annex to MoCA 1.1 specification
• Established liaison with HomePlug Powerline Alliance
• Tech Summit at CableCongress in Brussels instrumental in turning the tide for MoCA in Europe
• Survey of four EU countries found viable market for MoCA, with multiple coaxial outlets per home in more than 50 percent of those surveyed.
• A few cable MSOs in Europe to begin trials by end of 2010
• Liberty Global announces gateway integrating WiFi and MoCA
• Membership has stayed strong, committed and is growing internationally
• And the biggest one of all…MoCA 2.0 ratified!

Countless teleconferences and meetings brought the brilliant minds of our member companies together to achieve these accomplishments and I want to thank these companies and their participants for supporting MoCA so unselfishly. Special thanks to our work group leaders for herding the effort; John Card, EchoStar, chair of the Technical Working Group, Rob Gelphman, chair of the Marketing Work Group and his support team, Tom Leacock, Panasonic, chair of the Certification Work Group, Al Garrett, Cisco, chair of the Specification 2 Work Group responsible for development and finalization of MoCA 2.0, Yoav Hebron, Entropic Communications, chair of the Specification Work Group, and Paul Ritchie, Global Inventures and MoCA Executive Director and his staff supporting MoCA.

I also want to thank my fellow Board members and their commitment to making MoCA “The Standard for Home Entertainment Networking” I look forward to the continued success and growth as we take on the task and challenges ahead.

Charles Cerino
President, MoCA
**Board of Directors**

Rich Prodan, Ph.D.  
**VP & CTO, Broadband Communications Group, Broadcom Corporation**  
A member of Broadcom’s executive management team, Rich coordinates and promotes advanced developments of new technologies from advanced Physical Layer cable transmission technology to the integration of data, voice, and video applications and services. While CTO of CableLabs, Rich played an instrumental role establishing next generation DOCSIS 2.0 and 3.0 cable modem standards. He was also an eight-year advisor to the FCC Advisory Committee on Advanced Television Service testing and developing HDTV systems for the US.

Jon Cave  
**Senior Product Manager**  
**Service Provider Video Technology Group, Cisco Systems, Inc.**  
Jon is responsible for developing and driving business and product strategy for Cisco’s next generation gateways, including DOCSIS Residential Gateways, as well as advanced services platforms. Jon has more than 15 years experience in the telecommunications industry encompassing data, voice, and video networking products. Prior to joining Cisco, Jon worked at Intellon Corporation and Scientific Atlanta developing solutions for WiFi, VoIP, and mobile voice satellite communications systems.

Vince Groff  
**Executive Director, Corporate Development**  
**Cox Communications**  
Vince determines strategies and leading corporate development for Cox products and services. Key activities include establishing alliances and ventures within the industry as well as with key partners and suppliers. He is also Cox’s lead investigator of the business impact of emerging technologies and start-up companies, and works closely with the Venture Capital community. Previously, Vince led Cox’s interactive television product development effort and the OpenCable initiative. He is also involved in the Consumer Electronics plug-and-play project and other CableLabs standards efforts.

Charles Cerino  
**VP Comcast Center Technology**  
**Comcast Corporation**  
During Charlie’s tenure at Comcast, he has held system, region and corporate engineering positions. He has been active in the Delaware Valley Chapter of the SCTE serving as a Founder, Board member and President. Charlie also chaired the NCTA’s engineering sub-committee on CLI and FCC regulations. He has focused his career on exploring new technologies and was instrumental developing and launching cable modem service for Comcast.

Anton Monk, Ph.D.  
**VP of Technology & Co-Founder**  
**Entropic Communications, Inc.**  
Dr. Monk is responsible for new technology and standards activities at Entropic. Prior to co-founding Entropic, he led standards activities, physical layer system design and IC verification for several Conexant product lines, including cable modems and fixed wireless access. Before Conexant, he was involved in the development of cable and satellite ICs at Comstream Corporation and performed communication system research at the Jet Propulsion Laboratory, Pasadena, California.
Will Beals  
*Director of Hardware Systems Architecture*  
EchoStar Technologies L.L.C.  
Will has worked on EchoStar’s digital set-top box (STB) design and engineering for more than 20 years, primarily designing STBs for DISH Network. He is currently charged with investigating and developing new STB technologies for cable, satellite, telco and IPTV providers.

Ted Michaud  
*Distinguished Member of the Technical Staff*  
Motorola Broadband Communications Sector  
Motorola, Inc.  
Ted joined Motorola, then General Instrument Corporation, as a member of the engineering staff. A 26-year veteran of the CATV industry, he has served in various engineering positions for the company.

Sundeep Ahluwalia  
*Director of Product Marketing*  
NXP Semiconductors/Trident Microsystems  
Sundeep Ahluwalia has more than 12 years of experience in the STB and home networking industry. He is currently the Director of Product Marketing at NXP and is responsible for MPEG SoCs and Front-end products for the STB market. Prior to NXP, Sundeep was with Pulse-Link as their Director of Marketing for their UWB Chipset solutions for the home multimedia networking markets. Sundeep was also with Conexant for seven years in a Marketing role.

Ted Leacock  
*Engineer Manager, Panasonic Engineering Promotion Center of America, Panasonic*  
Tom has worked on the development of home networking and digital video processing for both displays and cameras for over twenty years. He is currently involved in the standardization of home networking via MoCA and its application to digital set-top boxes and displays.

Brian Whitton  
*Executive Director of Access Technologies*  
Verizon Communications  
Brian is responsible for directing the design and development efforts of next generation access network platforms. Prior to his current position, Brian was Assistant VP of technology development for GTE. He has also held positions in product development, business operations development, engineering, systems development, business planning and technology planning.
MoCA is the only home entertainment networking standard that appeals to all three pay TV segments—cable, satellite and IPTV. Recent announcements both confirm and drive that position. The best news — MoCA is evolving into and becoming recognized as a market rather than a feature or capability. We forecast that MoCA technology will be resident in more than nine out of ten of all pay TV households in the US. See chart on inside front cover.

But we are not sitting still. As organizations grow and evolve, so too must their marketing. No longer do we have the luxury of addressing a singular, amorphous market. We must tailor our efforts targeting specific segments. These include, but are not limited to, US operators consisting of Tier One and Tier N, home theatre installers and European operators. Each has their specific needs and challenges and ways of communicating and processing information.

In the US, we have been courting the larger MSOs, satellite and IPTV providers since our inception. While that will continue, we have recently begun to meet with a class of operators we refer to as Tier N. These are smaller operators who face the same competitive challenges as their larger counterparts. (See the report on Independent Operators.)

We are also leveraging the installer community through events and membership in CEDIA. This is becoming an even more important effort than we anticipated as these guys know everything, can add tremendous value and can effectively balance the requirements of the operator and the end consumer. See Mike Ehlenberger’s, chair of the Emerging Markets Task Force, report for more detail.

We are also pursuing Europe with a focus on pay TV operators there. We hosted a Tech Summit at Cable Congress this year and conducted a survey of coaxial penetration per household. Both had dramatic impact in swaying operators toward MoCA and we expect a few trials by the end of 2010. Europe is a long-term play, but there are more cable subscribers in Europe and lots more coax than people think. Alternatives such as wireless and powerline technologies have not proved as effective or reliable as coax and MoCA technologies. We do not expect all countries or operators to adopt MoCA, but we do expect to get our share.

I would also like to call out Roberta Silverstein, MoCA Director of Marketing Communications and Randall Hull, MoCA Creative Director and Brand Manager. Both have been instrumental and indispensable in producing and managing content and events. Please raise your glass and give them a toast.

I would also like to thank the members’ participation in the MWG. The excellent work produced is a direct result of your contributions.

It has been a pleasure and a privilege to serve the Board of Directors and the membership. On behalf of the MoCA marketing team, we thank you and look forward to a productive and successful year.

Rob Gelphman
Marketing Work Group Chair
Over the past year the Consumer Task Force has shifted its focus towards two very promising growth areas and reformatted itself as the Emerging Task Force (ETF): Tier N (rural and independent telco/cable operators) and custom electronics business (ESCs – electronic system contractors). Both of these channels show strong potential. In the rural/independent telco/cable space, IPTV is the important ‘killer app’.

We’ve made strides to integrate MoCA into the fabric of the Tier N channel by creating liaison relationships with important Tier N organizations including NCTC and OPASTCO. Our educational efforts to these providers via tradeshows, white papers and one on one visits both informs and demonstrates how MoCA works with their existing and expanding business compared to other technologies.

In the custom electronics business, retrofit technologies are the ‘killer apps’. For an industry that used to live off of new housing starts, finding ways to cost effectively integrate and install media, home theater, and home control solutions is clearly a top priority. MoCA technology has the potential to eliminate or greatly reduce the new ‘long cables’ aspects of integrations.

To further these efforts, MoCA has struck up a great relationship with CEDIA, the prominent organization for the custom electronics business. MoCA attended the CEDIA Management Conference, March 2010, in New Orleans and had a chance to meet with the top 100 Electronic Systems Contractors (ESCs) who recognized immediately that retrofit is key for their business growth. MoCA will be furthering efforts within this market via white papers, tradeshows and one on one visits.

Through these efforts, I believe MoCA will continue to drive its leadership position as “The Standard for Home Entertainment Networking” in the emerging markets space.

Mike Ehlenberger
Emerging Markets Task Force Chair
**Independent Operators**

Since its inception, MoCA has focused on the larger pay TV operators. Toward the end of 2009, MoCA initiated an outreach program as part of an overall strategy targeting the smaller, independent service providers referred to as Tier N operators. The main goal of this dedicated effort is to build awareness, instill recognition and credibility, and accelerate adoption of MoCA by the Tier N operators.

There are three main challenges confronting the Tier N providers. First, there is the continuous competitive threat from the top tier cable and telco service providers surrounding their footprints. Second, the Tier N operators have limitations on capital expenditures and do not have the access to financing like their larger counterparts. Third, their business model is changing. They are not bound by their traditional core businesses, i.e., cable or telco provider. Like their larger counterparts, they are evolving into integrated service providers offering a bundle of services including telephone, broadband and video. The cable companies are selling telephone services and the telephone companies are selling television. And the satellite operators are everywhere and omnipresent.

The only solution for Tier N operators is to become comprehensive purveyors of triple and quad play. They must offer bundled services — telephony, Internet access and television.

MoCA’s communications strategy for this segment is to demonstrate value in terms of technological superiority and reliability that translate into economic benefits such as use of already existing infrastructure and no new wiring, no additional truck rolls, and no interference with other services and devices already in use. In addition, as bandwidth and reliability demands and requirements continue unabated, MoCA can provide a roadmap with version 2.0 that is backward compatible with previous versions and thus will preserve their investment in current equipment.

Our tactical execution for this market is two-fold. One is to continue to use mass marketing techniques such as participation at tradeshows and conferences. In addition, we are members of OPASTCO, NCTA and NCTC, associations of the smaller operators and regularly attend and speak at their conferences. We also work with MTA and NCTA and attend their shows and conferences as well.

The second is to employ a direct contact model with regularly scheduled meetings and technology demonstrations. This heightened and focused activity has yielded a more rapid embrace of home entertainment networking and MoCA technology among Tier N operators.

Due to our efforts and the establishment of relationships, which will continue, we expect to see Tier N cable and IPTV operators in trials with MoCA technology in the next several months. In the MSO space, their familiarity with coax makes MoCA a natural choice, and the traditional telcos are coming to the same conclusion.

**Rob Gelphman**  
*Marketing Work Group Chair*
Greetings fellow MoCAphiles! The past year has seen an amazing amount of activity and accomplishments in all the MoCA work groups. We are all lucky to part of an organization that is so vibrant and dynamic. This reflects the exciting time we are experiencing, with virtually every major service provider in North America and even one in Europe rolling out multiroom DVR with MoCA technology.

In this report I want to focus on perhaps the most important accomplishment for MoCA since the release of the MoCA 1.0 specification — the highly anticipated ratification of MoCA 2.0.

The work on MoCA 2.0 began in earnest in June of 2008 when the Marketing Steering Committee kicked off an effort to define the market requirements for the new specification. This was a critical part of the spec development process as it ensured that inputs were received from all major service provider segments as well as OEM’s and silicon providers. January of 2009 saw the first proposals from various MoCA members and just a few short months later spec development was actively underway in the Spec 2 Working Group (S2WG), which is responsible for development of the MoCA 2.0 specification.

The S2WG has been meeting every week, and some twice a week, in a laudatory and herculean effort to complete this important new specification which offers significant performance improvements and feature enhancements to previous MoCA specifications.

MoCA 2.0 is far and away the performance leader in home entertainment networking which enables greater than 400 Mbps net throughput. The spec allows for channel bonding using 400 to 800 Mbps. The Turbo mode takes 400 to 500 Mbps and 800 to 1000 Mbps for point-to-point applications.

MoCA 2.0 also includes new energy savings features to significantly reduce power in standby and sleep modes. It also expands the frequency range (500 MHz to 1650 MHz) and allows for multiple simultaneous channels in a band. The spec includes improved packet error rate capabilities down to 1e-8 and lower average latency and optional retransmission in special cases.

Also of great importance, and like MoCA 1.1, the new specification is fully backwards interoperable with prior versions — a critical feature for service providers who are currently rolling out MoCA solutions.

The MoCA 2.0 Specification development team have been busy year-round with dedicated individuals from many companies. It is thanks to them that we continue to meet the needs of both MoCA and its market and member companies.

Anton Monk, PhD
Chief Technology Officer, MoCA
The Technical Work Group (TWG) was involved in a wide range of activities this year ranging from technology specific to new market evaluation. Below are some highlights:

- Development and support toward ratification of MoCA 2.0. This is a seminal achievement that is a direct result of cooperation by the members with an eye toward completion.
- Development and publication of the MoCA-specific portion of an SNMP MIB specification for interoperable remote management.
- Coordinating QoS submissions to the IEEE AVB effort.
- Definition of the mid-RF requirements document.
- Definition and creation of procedures to manage MoCA Working Groups and MoCA New Work Processes and Procedures.
- Creation and management of an FCC Task Force to coordinate a response to the recent FCC notice of inquiry and notice of proposed rule making.
- Management of liaison agreements and responses.
- Coordinating activities that cross multiple MoCA technical working groups.

John Card II
Technical Work Group Chair

The Certification Work Group (CWG) during the past year, the Certification Board granted certification to dozens of new products bringing the total to more than 70 certified devices. This list is growing and ongoing as operators and OEMs recognize the value of MoCA for distributing video content around the home.

This year, the CWG concentrated on gathering errata comments for the 1.1 Certification Test Plan (CTP). All this errata will be published in a new CTP in 2010. In addition a CWG procedure was developed for upgrade of SW or HW of the Golden Nodes at the MoCA certified test lab. This is crucial to ensure backward compatibility of the new HW or SW with the previous certifications.

The CWG also started the process of renewing the certification testing contract for the MoCA certified test lab. In the process we received proposals from three other test facilities in addition to NTS, the current test lab. We also debated the possibilities of non-exclusive contracts and of adding a second testing lab.

The final selection and contract negotiation will be completed in 2010.

An RFP for developing automated testing SW for MoCA 1.1 was sent to interested testing facilities. Quotes were received and examined. The decision of how MoCA or its members will fund this endeavor is under consideration and will be addressed in the coming year.

The CWG revised the portion of CWG Policies and Procedures containing the rules which determine the amount of re-testing needed for devices that have been modified after receiving certification. Some of these modifications are new cases which are not clear cut in the existing rules. These cases are reviewed and discussed until the group comes to a decision on the amount of additional testing, if any, that is needed. Any rule clarifications are then added to the Policies and Procedures.

Tom Leacock
Certification Work Group Chair

Broadcom BCM7420 Dual HD Multiformat STB SoC
Broadcom BCM7340 HD Satellite SoC
Broadcom BCM7125 Single-chip, Multi-format High Definition Cable STB SoC

Broadcom BCM6816 Single-chip GPON Gateway Processors
Broadcom BCM7408 Client High Definition STB SoC
Broadcom BCM7410 HD Multiformat STB SoC
The promise of multiroom digital video recording (DVR) as well as the ability to deliver commercial content to more devices within the home excites both consumers and service providers. Digital Living Network Alliance (DLNA) has developed a robust set of technical guidelines supporting high-quality streaming of multimedia content over wireless and wired connections between home entertainment and mobile devices. Service providers are now leveraging these features and infrastructure to enable delivery of multiple channels of HD content to set-top boxes (STBs), digital TVs, Blu-ray players, mobile handsets, personal media players, and other devices, thus increasing potential revenue opportunities by providing more entertainment options for consumers. There are now more than 8,000 DLNA-certified devices including 1,700 TVs, 100 Blu-ray players, 70 mobile phones and 50 STBs.

The DLNA guidelines enable robust interoperability and capabilities by outlining a set of standard technologies that devices can implement. With a specific set of standards and features, service providers can now begin to rely on the availability of retail devices that meet their stringent requirements for receiving commercial content.

The introduction of DLNA allows for a major shift in how the home entertainment network is architected. Traditionally, a set-top box is required for every device where a service provider wants to offer content (see Figure 1a), with a modern plus a router/gateway required to support Internet connectivity. This set-top box is necessary to manage conditional access content protection as well as implement advanced viewing modes. A network comprised of devices supporting DLNA, in contrast, allows a single set-top box or gateway per home to service multiple clients across the home entertainment network because content protection and advanced viewing modes can be distributed in a consistent and reliable way (see Figure 1b).

The primary benefits service providers gain from a more consistent and capable infrastructure is the eventual reduction of the set-top box required at every endpoint and the ability to deliver content to new endpoints such as mobile and portable devices. Service providers will also be able to consolidate content protection and storage to a single entry-point in the home entertainment network, which simplifies the implementation of multiroom DVR capabilities that allow content to be viewed in any room of the home. Together, all of these features improve the user viewing experience, increase the reliability and performance of content distribution, simplify installation and substantially lower system equipment cost.

The DLNA guidelines simplify the implementation and management of content protection across the entertainment network using DTCP-IP (Digital Transmission Content Protection). Service providers may still use their existing conditional access technology to protect content as it enters the home. However, rather than require every device in the home to support a service provider-specific conditional access standard, the DLNA guidelines allow consolidation of conditional access functionality into the gateway or primary STB. Under this topology, a CableCard or smart card is only required at the gateway. And, once content reaches the gateway, it is transferred securely throughout the home entertainment network using the single standard DTCP-IP. By facilitating content protection throughout the home with a single, non-proprietary standard, service providers, retailers and consumers all benefit since devices only need to support a single standard to display controlled content.

All of these advantages rely on the availability of a robust network with high throughput and quality of service (QoS) that MoCA provides.
MoCA at DIRECTV

DIRECTV, the world’s most popular video service with more than 25.6 million customers in U.S. and Latin America, has a long history of innovation, helping to launch the digital television revolution in the 1990’s and leading the HD revolution over the past decade. Its customers continue to expect DIRECTV to provide the best video experience with the latest technology and DIRECTV is meeting that demand with the recent launch of its Whole-Home DVR Service. MoCA is at the heart of that connected home solution.

In a DIRECTV connected home, customers can record their favorite programs in one room and view them on compatible set-top boxes in other rooms via a MoCA network. “By integrating MoCA technology into our STBs along with the existing deployment of the SWiM,” we are providing our customers with a true whole-home entertainment experience,” said Romulo Pontual, chief technology officer at DIRECTV. “Through our Whole-Home service, we strengthen our competitive advantage in the marketplace and further our overall strategy of simplifying the installation process and creating a reliable video distribution system for our customers who want to enjoy a connected home lifestyle.”

MoCA meets DIRECTV’s performance and bandwidth requirements for its connected home strategy. For DIRECTV, it is the most robust technology available that doesn’t require extensive recabling of customer homes. With compatible and cost-effective MoCA implementations available from a number of silicon suppliers, all of DIRECTV’s new HD STBs are being shipped with integrated MoCA.

“When DIRECTV decided in 2008 that it wanted to pursue a multimedia home networking strategy allowing DIRECTV STBs to share content, we looked at a number of technologies and MoCA was the clear winner,” said Henry Derovanessian, VP Set-top Box Engineering at DIRECTV. “It remains the clear winner today.” The DIRECTV implementation of MoCA uses “mid-RF” frequency bands in the 475MHz to 625MHz range. This frequency band was found to have the best compatibility with both DIRECTV’s current satellite signal distribution and other interference sources in the home.

Consumers now have an elegant video solution in the home that lets them watch what they want, where they want and when they want to watch it.
MoCA in the Verizon FiOS Home

Verizon was the first service provider to select MoCA technology and integrate it into the FiOS home network architecture. Verizon was also the first to launch multiroom DVR service using MoCA technology back in 2005. This allowed Verizon’s FiOS video customers to record shows on their Home Media DVR and watch them on any other FiOS compatible TV. Today, MoCA technology enables a rapidly growing list of innovative FiOS applications offered as Widgets, allowing customers to play music, view photo slideshows, watch internet videos, access social networking sites, and get live updates on news, weather and traffic while watching their favorite shows, directly on their TVs.

Over the last 5 years, and with more than 20 million nodes deployed in the Verizon FiOS network, MoCA has proven to be a highly robust and reliable home networking technology that provides high bandwidth and low latency consistent with Verizon’s high performance standards for a state-of-the-art fiber to the home network. Verizon is also integrating MoCA technology in the next generation of set-top boxes as part of a future migration to a new RVU based client/server home video distribution architecture.

Verizon has been fully engaged in defining MoCA 2.0 specifications, and is looking forward to enabling it on FiOS devices as soon as products become available. With support for up to 800 Mbps, MoCA 2.0 will allow Verizon to use existing coax cables in customers’ homes to provide an even more robust, superior FiOS experience. According to Brian Whitton, Executive Director–Technology at Verizon, “MoCA’s robust capabilities has allowed Verizon to introduce new advanced features to our customers in a seamless manner, while also reducing installation cost and complexity by transforming in home coax cabling into a true high capacity network.”
MoCA Technology Deployments and Adoptions

**Deployment:**
- Verizon
- Comcast Communications
- Cox Communications
- DirecTV

**Trial:**
- Time Warner Communications
- Buckeye
- Bright House Networks
- Insight
- Mediacom Communications
- RCN
- Sunflower

**Publicly acknowledging intent to use:**
- Cincinnati Bell
- HTC
- Rogers Communications

“Integrating MoCA into our products will enable service providers to offer a simple home-networking solution that offers unrivaled quality of service.”

Jim Denney  
Vice President and General Manager  
of Product Marketing, TiVo

When you think **coax**, think **MoCA**.

When you think **MoCA**, think **coax™**.
MoCA Members

**Promoters:**
- Broadcom
- Cisco
- Comcast
- Cox Communications
- EchoStar

**Contributors:**
- Alcatel-Lucent
- DIRECTV
- Intel
- ST Microelectronics

**Associates:**
- Actiontec
- Advanced Digital Broadcast
- Arris
- Bel Fuse
- Calix
- CommScope
- D-Link
- Funai
- Hitachi
- Holland Electronics
- Huawei
- Humax
- Infineon
- JDSU
- K-Micro
- Lantiq
- LG Electronics
- M/A-COM Tech
- Marvell

**Contributors:**
- Entropic Communications
- Motorola
- Trident
- Panasonic
- Verizon

**Associates:**
- Sigma Designs
- Time Warner Cable
- TiVo
- ViXS Systems

**Affiliates:**
- Cable Labs
- Korea Digital Cable Labs (KLabs)

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