

Q2

2017

QUARTERLY
MOBILE INDEX

PubMatic's Quarterly Mobile Index (QMI) report was created to provide both publishers and advertisers with key insights into the mobile advertising industry.

ABOUT PUBMATIC'S QUARTERLY MOBILE INDEX

By analyzing the billions of digital impressions that flow each day through PubMatic's platform, SEVEN, we can observe real-time developments in the mobile space that may allude to broader digital industry trends. We can then compare this information to other published data to further understand changes in the mobile landscape. We are committed to providing best-in-class mobile tools and services, and we believe that information sharing is crucial in aligning the digital industry towards best practices and, ultimately, growth in mobile advertising.

Note that directional data might not be comparable with prior reports.

QMI METHODOLOGY

PubMatic's yield and data analytics team analyzes billions of impressions on a daily basis, utilizing the company's best-in-class analytics capabilities. The Q2 2017 QMI incorporates impressions, revenue and eCPM data from these daily reports to provide a high-level glimpse of key trends within the mobile advertising industry. Data is from the second quarter of 2017 (April 1, 2017 through June 30, 2017) as well as corresponding prior year periods. "Monetized impressions" or "paid impressions" are defined as impressions that were sold through the PubMatic platform, and "eCPM" is defined as the cost per one thousand impressions.

IN Q2 2017, THE FOLLOWING SIX KEY TRENDS EMERGED:

KEY TREND

01

Header bidding continued to thrive in mobile channels as the format's monetized impression volume grew at more than twice the rate of desktop YOY in Q2, while mobile web header bidding eCPMs improved nearly 150 percent YOY.

KEY TREND

02

Emerging programmatic formats, including video and native, started to take hold with distinct platform and regional footprints.

KEY TREND

03

Monetized mobile PMP impression volume and eCPMs increased 73 percent and 23 percent YOY in Q2 2017, respectively.

KEY TREND

04

Mobile app monetized impression volume more than doubled YOY in Q2 2017, while mobile web eCPMs proved resilient with double-digit growth YOY across all geographical regions during the same period.

KEY TREND

05

Android consolidated its position as the driver of mobile app opportunity with more than eight out of 10 monetized app impressions served to Android-powered devices in Q2, while iOS eCPMs remained higher.

KEY TREND

06

Mobile opportunities grew worldwide, though EMEA remains the engine powering the recent expansion as the region's share of monetized mobile impressions nearly tripled YOY in Q2.

WHAT DOES THIS MEAN FOR PUBLISHERS AND ADVERTISERS?

1

Header bidding is becoming synonymous with programmatic advertising in 2017.

Beyond the buzz surrounding the term this year, header bidding is affecting digital advertising monetization as the benefits of the tactic span across verticals and regions worldwide. The volume of impressions transacted through this tactic continued to rise at triple-digit rates or greater in each geographical region, boosting eCPMs at a similar clip. Supporting this expansion has been the recent evolution of technology that includes both client- and server-side integrations across all formats and devices, including the recently announced OpenWrap solution by PubMatic. We expect holistic header bidding solutions to be increasingly important to publishers seeking to take back control over their inventory and determine fair market prices for those impressions.

2

Programmatic video is perhaps the most talked about and sought after format of 2017, and for good reason.

Video advertising is increasingly transacted programmatically as major markets boast mass digital video viewer bases. In the United States alone, some 169 million consumers watched video content via smartphones and 117 million did so over desktops in Q1 2017.¹ Expanding the programmatic video opportunity beyond in-stream assets (e.g., pre-roll, mid-roll) are subset formats such as out-stream, interstitial and others that can be deployed without the need of actual video content. Advertisers and agencies have taken a keen interest in programmatic video advertising and are embracing the branding power delivered by the format. This vision could drive programmatic video opportunities for the rest of the year, shifting more brand ad spend to automated channels.

3

Native provides a cohesive integration with content that enables consumer engagement and branding efforts, all with a solid mobile footing.

Within programmatic, native ads remain a bit of a novelty, but one that brands and agencies view as highly conducive for consumer engagement and branding opportunities. The fragmented nature of the format is challenging for both publishers and buyers, but as the experimentation phase concludes, mobile is expected to remain a key foundation of the programmatic native opportunity. Already, the vast majority of native ads transacted programmatically is served to mobile devices, so mobile publishers and the buyers of that inventory are taking steps to ensure that they have the technology and partnerships in place to take full advantage of this growing monetization opportunity.

4

Mobile private marketplaces enable greater control and transparency.

Publishers seeking to regain control over their digital assets and advertisers hunting for brand-safe, quality inventory may benefit from an increasing focus on private marketplaces (PMPs) and other programmatic direct channels. Leveraging the tactic to monetize mobile inventory, a channel trailing only TV in daily time spent with media,² offers both parties scalability with great efficacy and efficiency. While mobile PMP has benefited from the overarching trend in spending toward mobile platforms, buyers have also sought closer partnerships with publishers to enhance their ability to purchase and optimize premium inventory across mobile devices and beyond. Publishers offering high-value inventory through private setups should be well-positioned to capture a share of any increased spending in direct channels.

KEY TREND

01

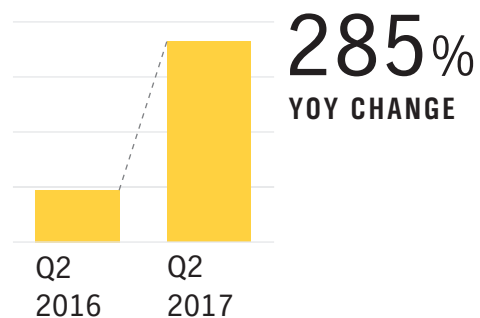
Header bidding continued to thrive in mobile channels as the format's monetized impression volume grew at more than twice the rate of desktop YOY in Q2, while mobile web header bidding eCPMs improved nearly 150 percent YOY.

Header bidding is becoming synonymous with programmatic advertising in 2017. It's not only the buzz surrounding the term, but the actual transformation in the make up of digital advertising inventories. Monetized header bidding impressions processed through our platform rose 149% YOY in Q2. In May 2017, over 80% of global publisher impressions processed through our platform used header bidding technology.

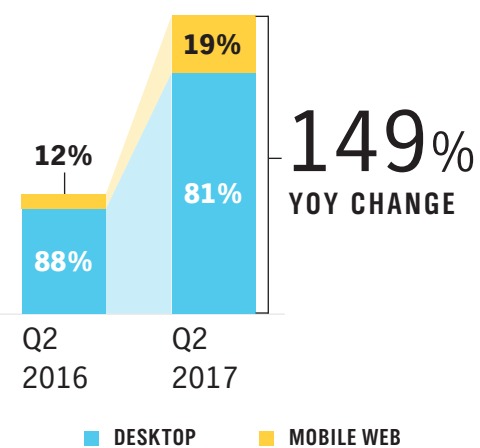
Desktops retained a dominant share of monetized header bidding impressions even as growth rates for the tactic via mobile remained significantly higher. Monetized mobile header bidding impression volume improved 285% YOY in Q2 2017, more than doubling the robust 130% YOY gain in desktop header bidding impression volume. The growth rate gap between the two platforms was the narrowest on record as mobile header bidding impression volume moves past the early adoption stage.

Mobile header bidding impression growth was evident across verticals, but rose the most among news publishers, which accounted for some three-quarters of the YOY improvement in Q2. Header bidding inventory shown on mobile represented nearly one-fifth of the total, up from a 12% share in Q2 2016.

Monetized Mobile Web Header Bidding Impression Volume



Monetized Header Bidding Impression Volume & Platform Share

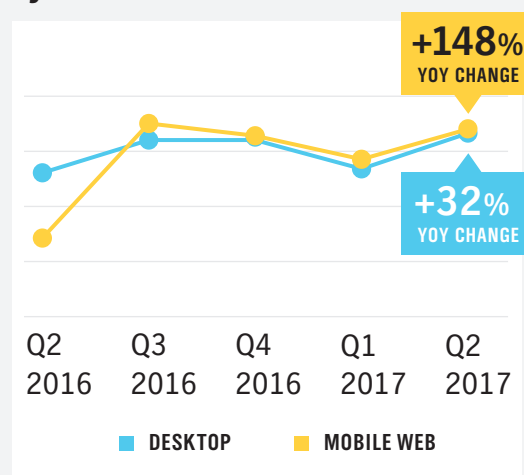


KEY TREND #1 CONT.

Monetized mobile web header bidding impression volume expanded the most in APAC, growing nearly 10X, albeit coming from a small base. The fast expansion lifted the region's share of the tactic worldwide from 2% to 4% between Q2 2016 and Q2 2017. The Americas and EMEA each experienced YOY volume growth of over 250%. The Americas remained the largest region by monetized mobile web header bidding impressions worldwide, with 84% of the total.

Mobile web header bidding eCPMs rose nearly 150% YOY in Q2 2017, delivering eCPMs nearly equal to desktop header bidding impressions, a signal of the increasing maturity of mobile header bidding.

Average Header Bidding eCPMs, by Platform



KEY TREND

02

Emerging programmatic formats, including video and native, started to take hold with distinct platform and regional footprints.

Native is loosely defined as paid ads that are so cohesive with the page content, assimilated into the design, and consistent with the platform behavior that the viewer simply feels that they belong.³ The format is primarily leveraged for consumer engagement and branding purposes according to US agencies and brands.⁴

While native ads are deeply associated with social media, non-social native spending has been growing faster and is on pace to increase by over 50% this year compared to 2016. Broken down by device, mobile is far and away the primary recipient of native display ad spending with an 88% share of the total in 2017.⁵

According to PubMatic platform data, mobile devices represented 67% of monetized native impressions in Q2 2017. Within the mobile native subset during that period, a 75%-25% split for monetized impressions favored the mobile web over apps. We expect mobile native impression volume to continue in the upswing throughout 2017 as publisher interest in the format expands and content is redesigned to a more feed-based experience keen on improving consumer engagement.⁶

Share of Monetized Mobile Impressions, by Platform, Q2 2017

DISPLAY

64%

36%

VIDEO

32%

68%

NATIVE

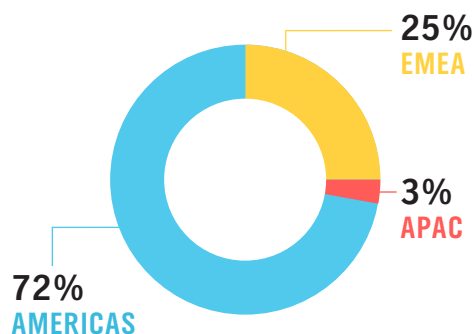
25%

75%

■ APP

■ MOBILE WEB

Share of Monetized Video Ad Impressions, by Region, Q2 2017



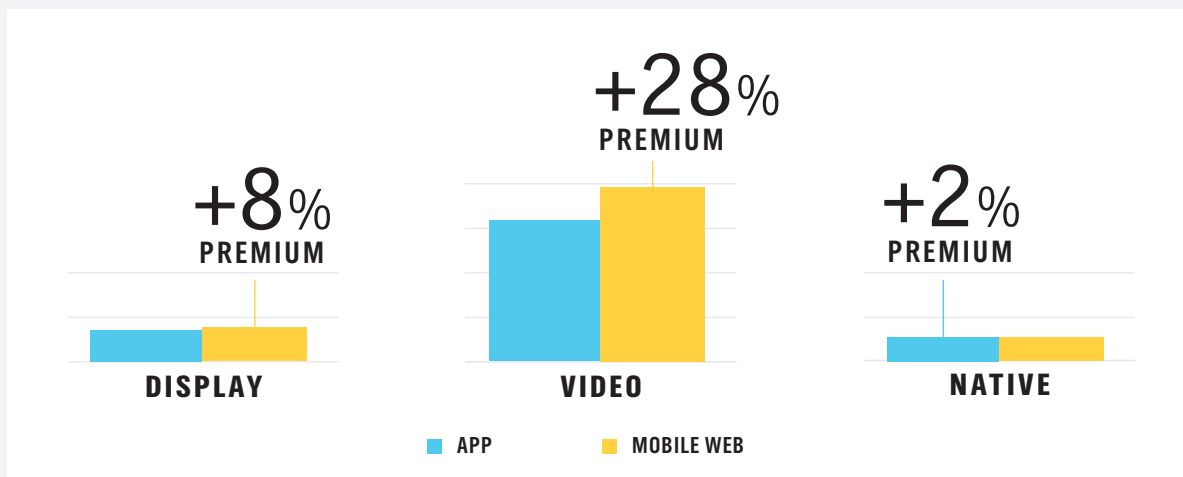
KEY TREND #2 CONT.

Among video ad formats, mobile represented nearly one-fifth of monetized impressions in Q2 2017. Approximately one-third (32%) of monetized mobile video impressions were shown within app environments, with the remaining portion served through the mobile web. From a global standpoint, the Americas loomed large in the overall video advertising market, as nearly three-quarters (72%) of video ad impressions monetized through our platform were served in that region in Q2. EMEA reached a sizeable video impression volume too, representing some 25% of the worldwide total with APAC accounting for the remaining 3% during the same period.

Branding remains a primary goal when purchasing video ads programmatically according to US agencies and brands,⁷ and that vision could drive programmatic video opportunities for the rest of the year, with more brands continuing to shift ad spend to automated channels.

Already, video impressions garner the highest eCPMs of all ad formats served through mobile channels, including a 28% premium paid for mobile web video impressions over app. Alternatively, across native formats, mobile apps received a marginal 2% premium in eCPMs during that period.

Average eCPMs, by Format & Platform, Q2 2017



KEY TREND

03

Monetized mobile PMP impression volume and eCPMs up 73 percent and 23 percent YOY in Q2 2017, respectively.

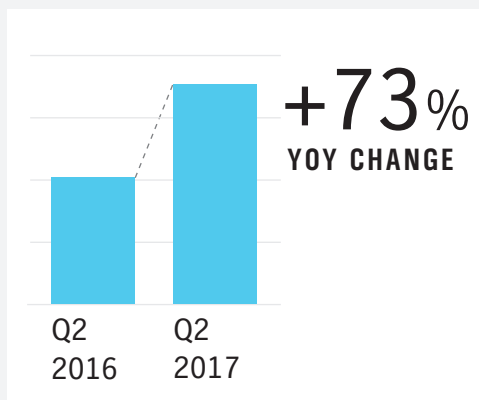
Advertiser appetite for high value inventory featuring enhanced ad quality and viewability is fueling interest in programmatic direct channels with one-to-one deal uptake being especially swift on mobile,⁸ an unsurprising dynamic given the ever growing amount of time consumers spend with mobile apps and browsers, estimated at 164 minutes per day in the United States this year (compared with 49 minutes for desktops).⁹

Advertiser and consumer trends indicate that PMP is growing aggressively in mobile. Monetized mobile PMP impression volume rose for the sixth quarter in a row, adding a robust 73% YOY in Q2 2017, and was 5X higher than in Q2 2015. The persistently sharp mobile PMP expansion meant that at the mid-year point, monetized mobile PMP volume and spend have nearly matched the levels

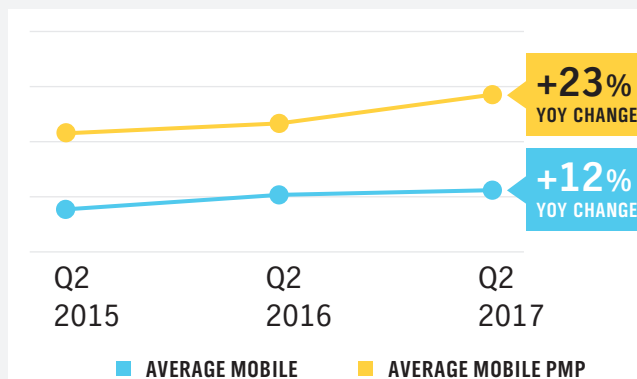
observed in Q4 2016, a period supercharged by the holiday shopping season worldwide and a presidential election in the United States. We foresee the upward trend in mobile PMP volume to continue, driven by demand for programmatic direct targeting mobile users and the upcoming back-to-school and holiday seasons.

Likewise, mobile PMP eCPMs have been on a rising streak, registering a similar string of six uninterrupted quarters with YOY growth, five of them in solid double-digit territory. Despite the aggressive volume expansion, mobile PMP eCPMs improved 23% YOY in Q2, nearly double the 12% YOY growth rate in overall mobile eCPMs during the period. This pricing dynamic resulted in a 1.5X eCPM premium earned through mobile PMP vs. mobile overall.

**Monetized Mobile PMP
Impression Volume**



**Average eCPMs, Mobile PMP
vs. Total Mobile**



KEY TREND

04

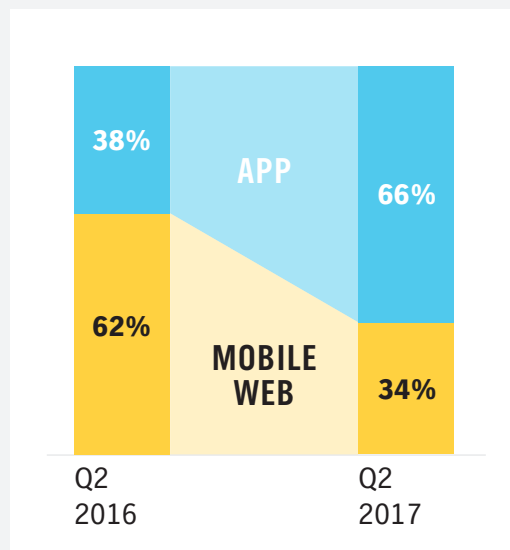
Mobile app monetized impression volume more than doubled YOY in Q2 2017, while mobile web eCPMs proved resilient with double-digit growth YOY across all geographical regions during the same period.

Mobile programmatic opportunity continues to gain momentum in 2017, with mobile programmatic display ad spend increasingly outpacing non-programmatic.

Much of that opportunity is already focusing on apps, and for good reason. Consumers spend far more time using mobile apps—compared with mobile browsers—and thus programmatic advertising budgets and attention have decidedly shifted to this channel. Highlighting this transition, the volume of mobile app impressions transacted through the PubMatic platform more than doubled, growing 107% YOY in Q2 2017. The volume of monetized impressions served via the mobile web declined 35% YOY during the same period.

Over the course of just one year, the app impression volume expansion inverted the volume gap with the mobile web. Apps' share jumped from 38% to 66% of monetized mobile impressions between Q2 2016 and Q2 2017. We expect that mobile web impression volume will stabilize once it reaches a share commensurate with the relatively steady 15% portion of time consumers are predicted to spend with the channel on a daily basis in the foreseeable future.¹⁰

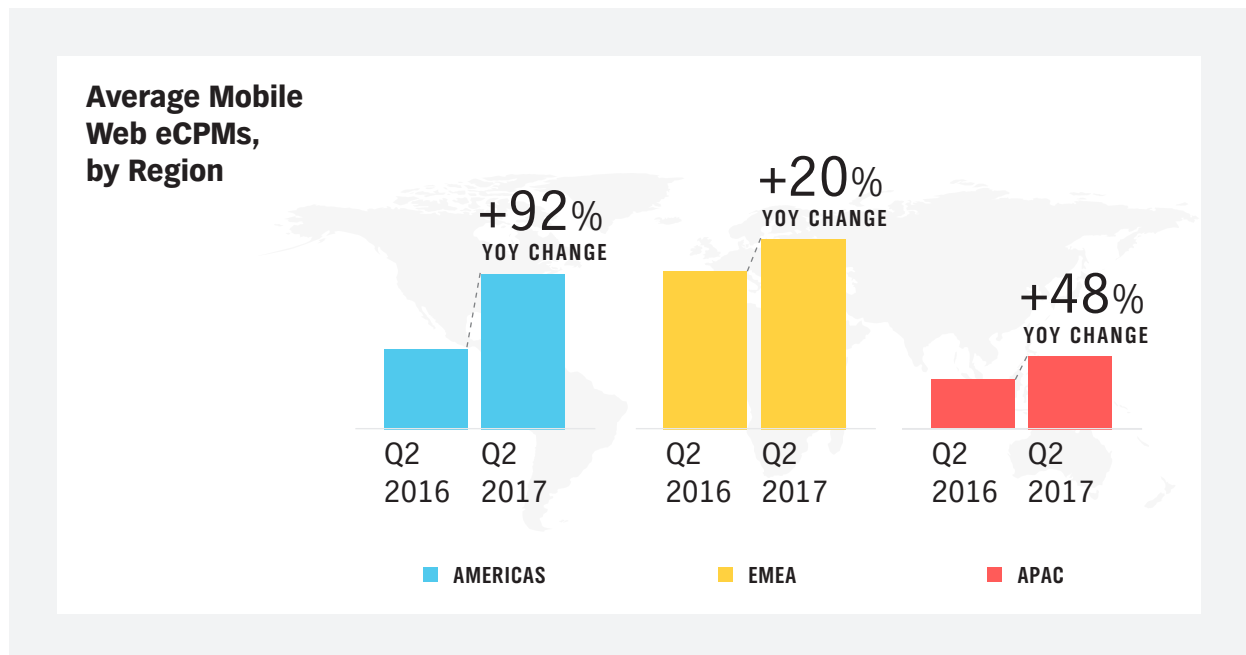
Share of Monetized Mobile Impressions, by Platform



KEY TREND #4 CONT.

Although app inventory now dominates in terms of volume, mobile web eCPMs proved resilient and still highly relevant with a 71% YOY growth. Average mobile web eCPMs rose the most in the Americas at 92% YOY in Q2 2017, followed by APAC and EMEA with respective YOY growth rates of 48% and 20%.

Despite posting the smallest mobile impression volume expansion in the quarter, EMEA continued to generate the highest mobile web eCPMs of any region.



KEY TREND

05

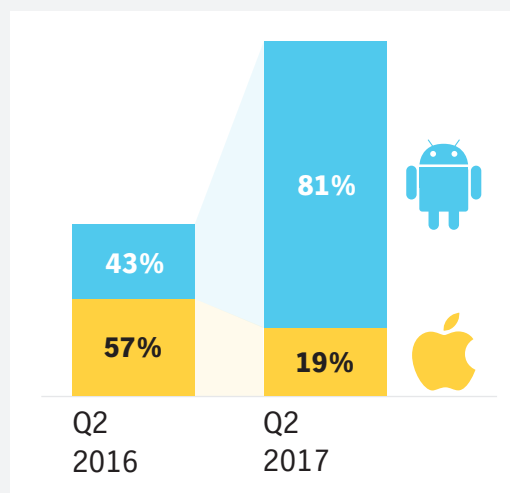
Android consolidated its position as the driver of mobile app opportunity with more than eight out of 10 monetized app impressions served to Android-powered devices in Q2, while iOS eCPMs remained higher.

Android and iOS have long been the two leading horses in the mobile operating system race. Combined, they powered all but 0.4% of smartphones sold worldwide in Q4 2016. A closer look reveals that Android-based smartphones took the lion's share with 81.7% of the global total, compared with a 17.9% slice for iOS.¹¹ Down to the country level, Android maintains the lead with 60% or greater smartphone sales shares in Australia, France, Germany, Italy, Spain, the United States and the UK in April 2017. Japan remains the most competitive major market with iOS taking a 43.5% slice compared to Android's 55.9% during that period. Among those countries, Android failed to achieve market share growth only in the United States, falling to 61.7%, compared to 67.6% in April 2016.¹²

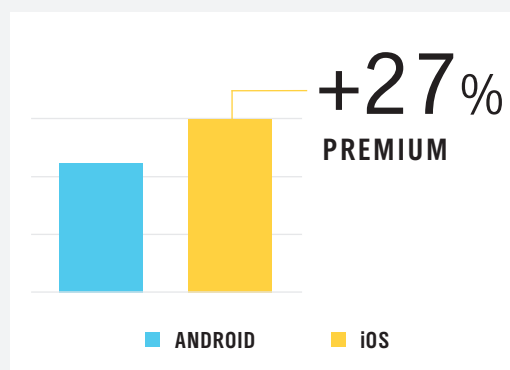
Mobile app advertising volume has inevitably followed the consumer preference for mobile operating systems, progressively shifting toward an Android-heavy mobile inventory make up. Monetized impression volume on Android devices rose 285% YOY in Q2 globally, reaching an 81% market share by OS in Q2 2017 (up from 43% in the same period the year prior).

Much of the growing Android share of mobile app impressions worldwide has been the result of a consistently surging volume in EMEA, where the number of impressions served through the

Share of Monetized Mobile App Impressions, by OS



Average Mobile App eCPMs, by OS, Q2 2017

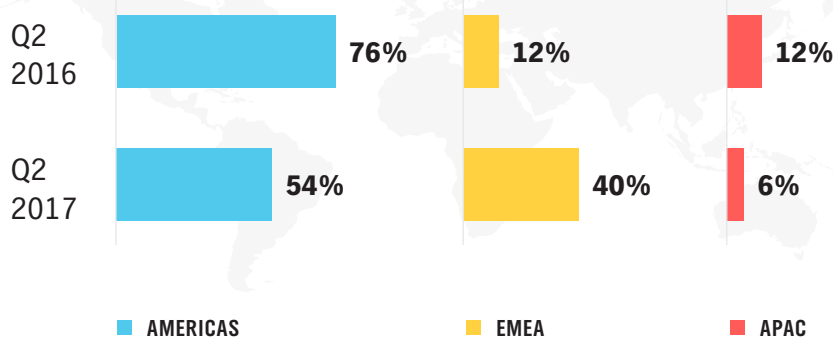


KEY TREND #5 CONT.

Android operating system increased 12X YOY. While Android impression volume also increased in the Americas and APAC (up 172% and 93% YOY in those regions, respectively), the wide growth rate gap lifted EMEA to a 40% share of all monetized Android impressions worldwide, nearly quadrupling that percentage share between Q2 2016 and Q2 2017.

Despite Android's dominant performance in terms of volume, mobile app impressions shown via iOS once again produced the highest eCPMs. While the eCPM gap favored Android in Q4 2016, premiums have since swung back to the favor of iOS inventory which garnered 27% higher eCPMs in Q2 2017, up from 23% the same period the previous year.

**Share of Monetized
Android Mobile App
Impressions,
by Region**



KEY TREND

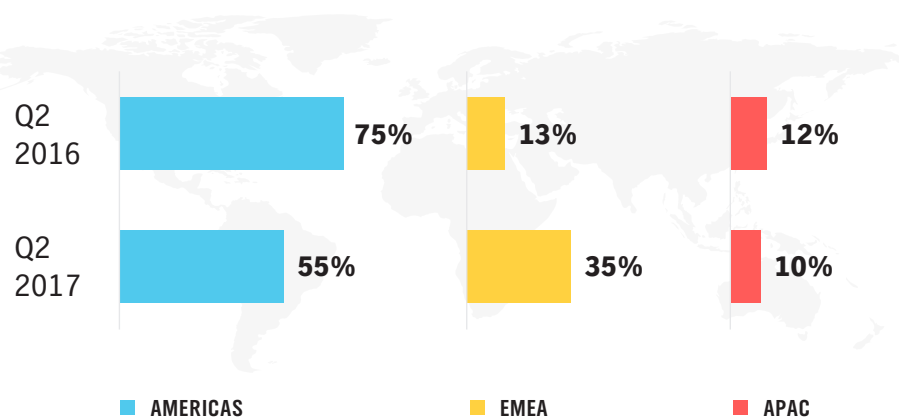
06

Mobile opportunities grew worldwide, though EMEA remains the engine powering the recent expansion as the region's share of monetized mobile impressions nearly tripled YOY in Q2.

Mobile monetization grew globally in Q2 2017, with monetized impression volume up 25% YOY worldwide, reflecting the growing opportunities for publishers and advertisers alike to adopt cross-screen digital strategies. EMEA, however, experienced the greatest growth for the second quarter in a row. Continuing an uninterrupted growth period dating back to Q1 2016, EMEA's sustained expansion nearly tripled its share of monetized mobile impressions worldwide between Q2 2016 and Q2 2017 from 13% to 35%.

The share growth for EMEA resulted in both the Americas and APAC decreasing in share. APAC represented 10% of monetized mobile impressions in Q2 2017, a portion that remained essentially flat compared with the 12% share served in that region the previous year. The growing international mobile footprint resulted in the Americas now representing just over half (55%) of monetized mobile ad impressions in Q2 2017, down from 75% in Q1 2016.

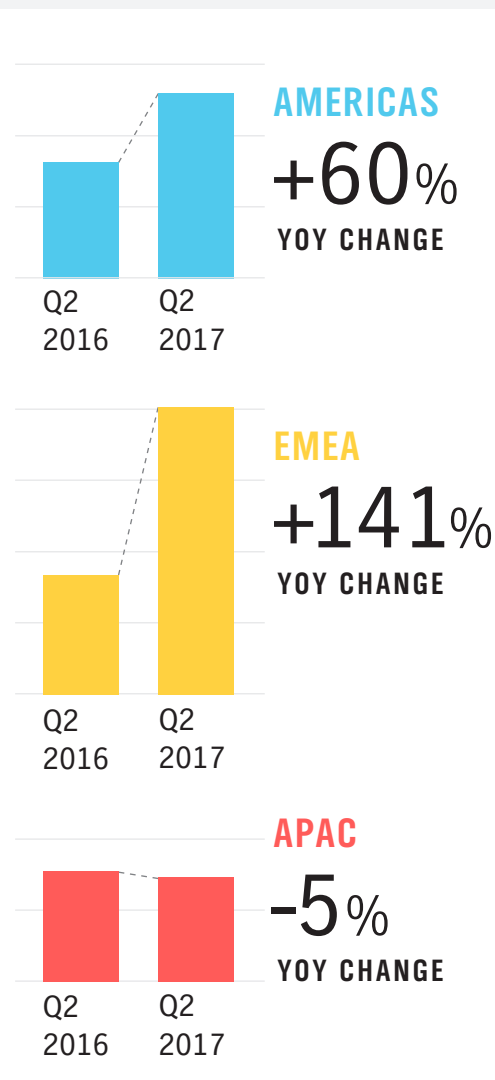
Share of Monetized Mobile Impressions, by Region




KEY TREND #6 CONT.

Average mobile eCPMs were also mixed. Globally, mobile eCPMs increased 11% YOY in Q2 2017. EMEA once again was the star of the show, posting the greatest eCPM growth rate worldwide at 141% YOY. The Americas followed, with eCPMs on our platform posting a robust 60% YOY growth rate as advertisers shifted focus from quantity to quality.¹³ APAC experienced a 5% eCPM reduction on our platform during the same period, largely due to a double digit decrease in mobile app eCPMs combined with an increase in mobile web eCPMs in the region.

Average Mobile eCPMs, by Region





Disclaimer: This QMI may include inaccuracies or typographical errors, and is based on operational data that has not been audited or reviewed by a third party. It may contain forward-looking statements about future results and other events that have not yet occurred. Actual results may differ materially from PubMatic's expressed expectations due to future risks and uncertainties, and past performance or trends are no guarantee of future results. PubMatic does not intend to update the information contained in this QMI if any information or statement contained herein later turns out to be inaccurate.

¹ "The Total Audience Report: Q1 2017," Nielsen, July 2017

^{2,9} "Media Consumption Forecasts," Zenith, May 2017

³ "IAB Deep Dive on In-Feed Ad Units – A supplement to the IAB Native Advertising Playbook," Interactive Advertising Bureau, June 2015

^{4,7} "State of the Industry: Moving Beyond Programmatic Display," Digiday and RhythmOne, December 2016

^{5,6} "US Native Digital Display Advertising Forecast: Social Dollars Drive the Market—for Now," Lauren Fisher, eMarketer, March 2017

⁸ "Advancing Programmatic Advertising: Buyers and Sellers Seek Greater Control Over Ad Campaigns and Audiences Reached," Lauren Fisher, eMarketer, April 2017

¹⁰ "US Time Spent with Media: eMarketer's Updated Estimates and Forecast for 2014-2019," Mark Dolliver, eMarketer, April 2017

¹¹ "Market Share: Final PCs, Ultramobiles and Mobile Phones, All Countries, 4Q16," Gartner, February 2017

¹² "iOS Posts Period-on-Period Growth in Urban China," Kantar Worldpanel, April 2017

¹³ "US Digital Marketing Forecast: 2016 To 2021," Shar VanBoskirk, Forrester, January 2017

About PubMatic

PubMatic is the automation solutions company for an open digital media industry. Featuring the leading omni-channel revenue automation platform for publishers and enterprise-grade programmatic tools for media buyers, PubMatic's publisher-first approach enables advertisers to access premium inventory at scale. Processing nearly one trillion ad impressions per month, PubMatic has created a global infrastructure to activate meaningful connections between consumers, content and brands. Since 2006, PubMatic's focus on data and technology innovation has fueled the growth of the programmatic industry as a whole. Headquartered in Redwood City, California, PubMatic operates 11 offices and six data centers worldwide.

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