Quarterly Mobile Index
Q4 2015

PubMatic

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 (QMI)

By analyzing the billions of daily impressions that flow through our platform, we are able to observe real-time developments
in the mobile space that allude to broader digital industry trends. 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.

In our QMI report for calendar Q4 2015, we have updated and added several key benchmarks for mobile advertising
performance around pricing, volume and growth. Note that each report provides a quarterly snapshot, and directional data
might not be comparable with prior quarter reports.
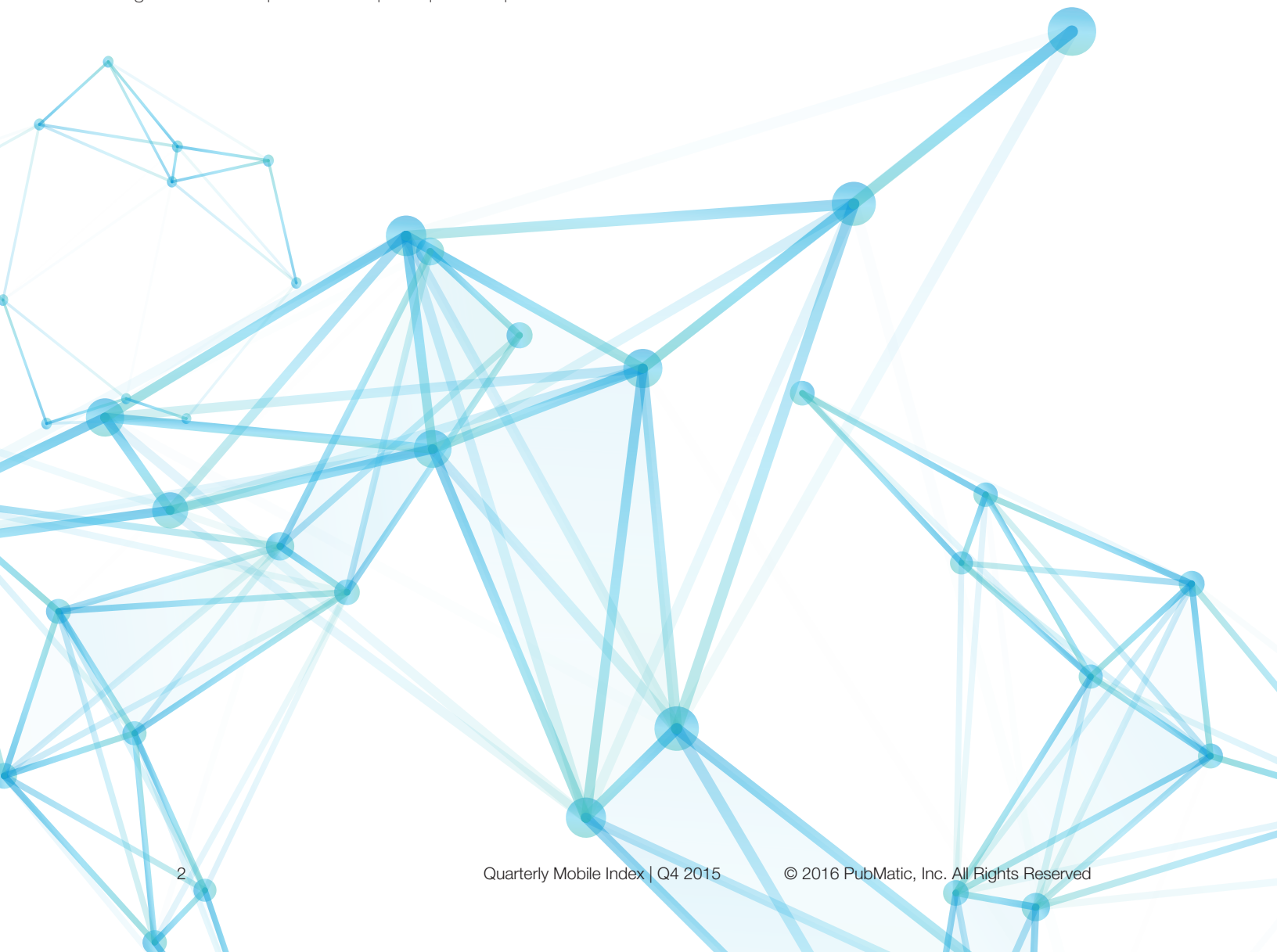
In Q4 2015, the following five key trends emerged:

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KEY TREND #1: Advertiser Demand Shifts Towards Higher-Quality Mobile PMP Inventory to Target Mobile-Obsessed Holiday Shoppers. Advertisers increasingly sought higher-quality mobile inventory to target holiday shoppers on mobile devices, as evidenced by mobile private marketplace volume spikes—up 45% from the first week of the quarter, through Black Friday (Nov. 27).

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KEY TREND #2: By Vertical, Retail and Technology Spending Drove PMP Growth in Q4. Within mobile private marketplaces, the retail and technology verticals showed major volume gains—up 106% and 285%, respectively, from week 1 to week 9—ahead of Black Friday shopping, demonstrating that e-commerce and consumer technology sales likely drove mobile ad spending in Q4 2015.

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KEY TREND #3: Significant Mobile Opportunities Exist Across All Global Regions, With the APAC Region Representing the Fastest-Growing Opportunity. The Americas and Europe, Middle East and Africa (EMEA) represented the largest opportunities in terms of volume, but the fastest-growing opportunity lies in the Asia-Pacific (APAC) region.

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KEY TREND #4: The Android App Ad Awakens. Android app ads increased the most in terms of both price and volume, while CPMs increased across all mobile platforms, including iOS app, mobile web and tablet web.

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KEY TREND #5: The Mobile Gap is Still Closed. Mobile CPMs are still higher than desktop CPMs, and both mobile and desktop CPMs grew a healthy 36% year-over-year.

What does this mean for publishers and advertisers?

1. The digital media industry is striving to produce **high-quality media experiences** that meet evolving consumer demands (especially on mobile devices and as consumers increasingly adopt ad blockers). In turn, advertisers are responding by **shifting spend towards premium ad inventory** that tend to come with higher-quality media experiences, which is **paying off for premium publishers**. As such, publishers and advertisers are increasingly **driving mobile inventory sales volume through mobile private marketplaces** (i.e. directly-sold inventory packages from publishers, or mobile PMPs), as evidenced by the major spikes in monetized impression volume throughout the holiday shopping season. Leading publishers should utilize mobile PMPs to market and monetize their high-quality mobile inventory at premium prices.

2. For advertisers and agencies, specifically, our data continues to demonstrate that there is **significant advertiser demand for mobile inventory in programmatic marketplaces**, which enable audience buying at scale. Within mobile PMPs, media buyers are also empowered with a more transparent buying experience of higher-quality inventory, which is ideal for brand advertisers and brand-focused agencies. As holiday shoppers rushed to their smartphones this season to research products and make purchases, agencies utilized mobile PMPs to execute on strategic plans for advertisers, which in turn helped guarantee inventory sales for publishers. Media buyers that are looking to pre-plan around tent-pole events, such as Black Friday, The Oscars, Super Bowl Sunday, etc., should utilize PMPs to effectively target the growing population of mobile users, at scale.

3. The "mobile gap"—i.e. the difference between mobile ad spending and time spent with mobile devices—**is still closed from our perspective**, as mobile CPMs continue to be higher than desktop CPMs in Q4 2015. This means that leading publishers should utilize programmatic marketplaces to monetize mobile inventory at higher prices, in part by leveraging first- and third-party data integration (e.g. adding location data and user IDs for persistent tracking) and by selling more higher-value rich media and video ad formats, all at scale.

KEY TREND #1:

Advertiser Demand Shifts Towards Higher-Quality Mobile PMP Inventory to Target Mobile-Obsessed Holiday Shoppers

Advertisers are shifting to higher-quality ad inventory, and our Q4 mobile private marketplace (PMP) data demonstrates an evolution towards quality. This is because, as stated previously, PMPs create transparent environments for higher-quality inventory—some of which is often otherwise direct-sold.
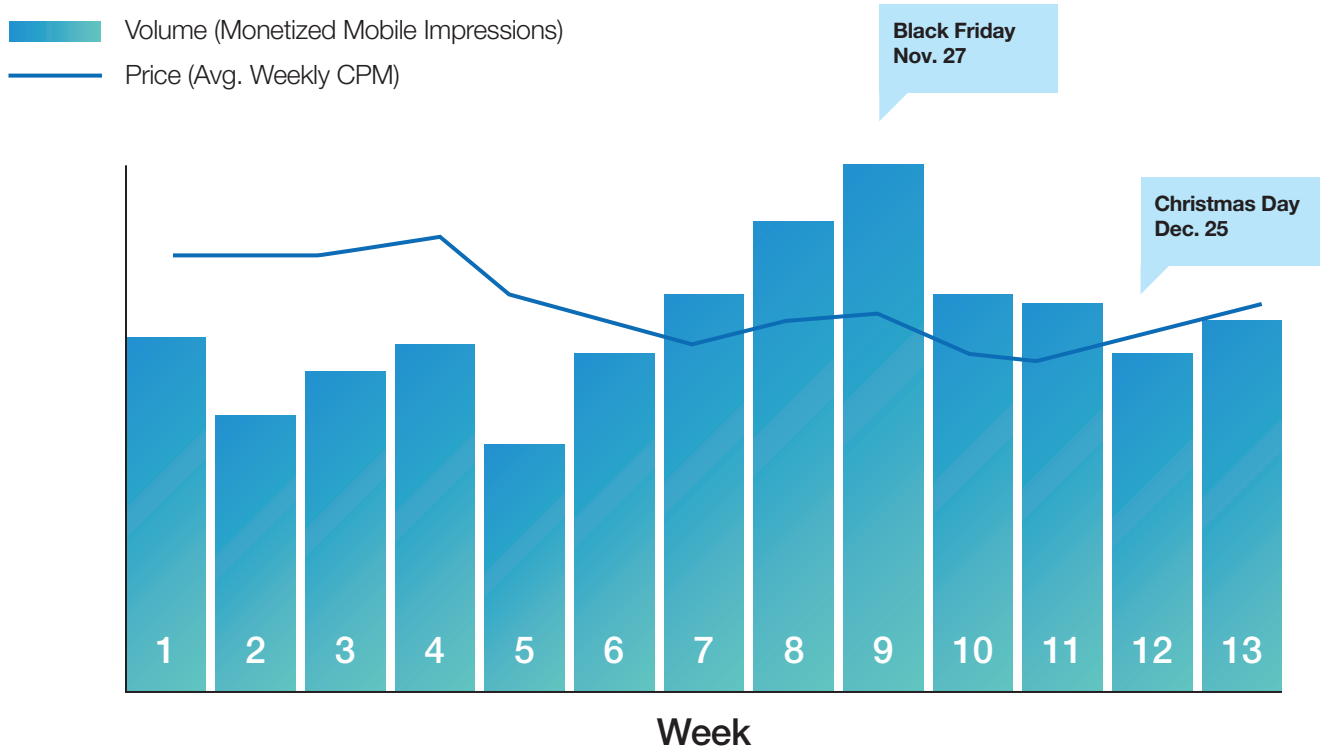
If we look at PMP price and volume, by week, we can see spikes in volume around Black Friday (Nov. 27, 2015) and Christmas Day (Dec. 25, 2015), when consumers demonstrated high levels of smartphone usage to research and shop for holiday gifts. From week 1 to

week 9, weekly monetized mobile impression volume increased 45%. According to Adobe, 34% of Black Friday shopping sales in the U.S. came from mobile devices, and based on our data, advertisers looked to target those consumers via mobile PMPs.

Looking at average weekly CPMs on a week-by-week basis, we see that CPMs remain relatively high through high-volume spikes around Black Friday. This means that overall monetization was still very high across the entire high-volume period. Typically, advertising spending rises to its highest annual levels around the holiday season, and given this strong advertiser demand in mobile PMP inventory, that might be the case again in Q4 2015.

Mobile PMP Performance, by Week (Q4 2015)

Avg. Weekly CPM vs. Monetized Mobile Impressions

Volume (Monetized Mobile Impressions)

Price (Avg. Weekly CPM)

Black Friday Nov. 27

Christmas Day Dec. 25

1 2 3 4 5 6 7 8 9 10 11 12 13

Week

KEY TREND #2:

By Vertical, Retail and Technology Spending Drove PMP Growth in Q4

By vertical, we also saw that private marketplace (PMP) growth was primarily driven by the retail and technology verticals, which typically drive consumer spending in the fourth quarter. According to Nielsen, the top destinations for holiday purchases in 2015 were department stores (57% of respondents), discount stores (49%) and electronic stores (49%)—all of which are locations that contribute to retail and technology consumer spending.

Looking more closely at the price and volume data, we see that retail monetized mobile impression volumes showed a spike during the week of Black Friday (Nov. 27), while technology monetized mobile impression volumes showed an even larger spike that week. From week 1 to week 9, weekly mobile monetized impressions increased 106% in the retail sector and 285% in the technology sector. Retail PMP CPMs showed steady levels across the entire quarter, while technology PMP CPMs spiked in week 4 prior to the rise in volume several weeks ahead of Black Friday, as advertisers targeted in-market consumers entering the consideration phase of the customer lifecycle.
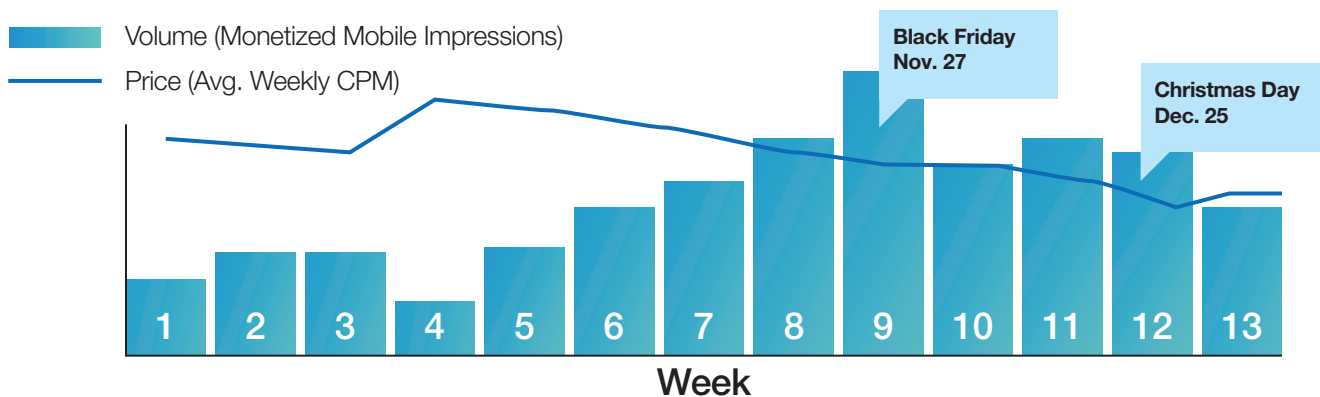
Retail Vertical Mobile PMP Performance, By Week (Q4 2015)

Avg. Weekly CPM vs. Monetized Mobile Impressions

Volume (Monetized Mobile Impressions)
Price (Avg. Weekly CPM)

Black Friday
Nov. 27

Christmas Day
Dec. 25

1 2 3 4 5 6 7 8 9 10 11 12 13
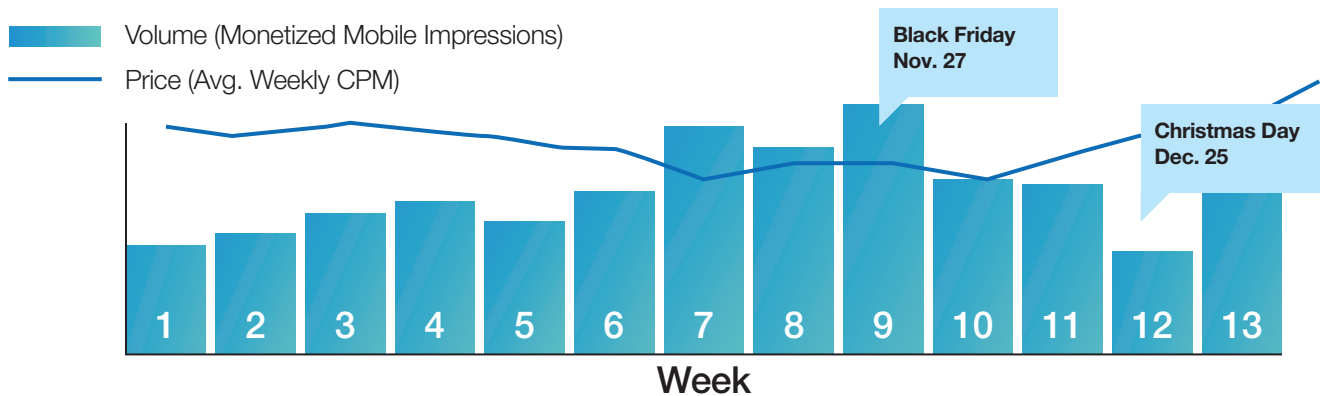
Week

Technology Vertical Mobile PMP Performance, by Week (Q4 2015)

Avg. Weekly CPM vs. Monetized Mobile Impressions

Volume (Monetized Mobile Impressions)
Price (Avg. Weekly CPM)

Black Friday
Nov. 27

Christmas Day
Dec. 25

1 2 3 4 5 6 7 8 9 10 11 12 13

Week

KEY TREND #3:

Significant Mobile Opportunities Exist Across All Global Regions, With the APAC Region Representing the Fastest-Growing Opportunity

Across global regions, we saw large year-over-year increases in monetized mobile impression volume in the Europe and Middle East (EMEA) and Asia-Pacific (APAC) regions, up year-over-year 82% and 524%, respectively. While APAC showed triple-digit growth, EMEA represented a larger opportunity. In terms of pricing, CPMs across EMEA increased 47%. While APAC CPMs declined 33%, that was offset by over 500% growth in volume.

The Americas (North and South America) remain the largest opportunity among all global regions, though monetized mobile impression volume in the Americas declined year-over-year in Q4. Despite that decline in volume, the 56% increase in CPMs offset the 25% decline in volume. This increase in price is likely due

to the advertiser shift in focus to higher-quality ad inventory, which is more targeted, relevant and typically embedded into better media experiences. With ad blocking adoption on the rise, publishers are more focused on creating an enhanced experience for consumers, which creates more value for their advertising inventory.

What this means for publishers and advertisers is that major growth opportunities in mobile still exist in the EMEA and APAC regions, as those consumers increasingly adopt mobile devices and consume more mobile content. While the Americas market has declined in volume, year-over-year, the region still represents the largest opportunity with increasing prices, due in part to increased demand for higher-quality inventory.
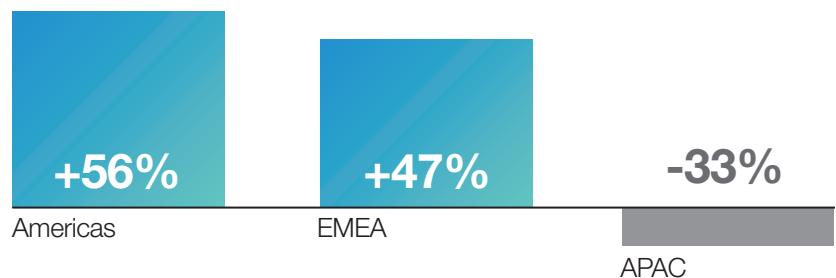
Q4 2015 Monetized Mobile Impression Volume & YOY Change
by Global Region

Legend:
- Volume (Monetized Mobile Impressions)
- YOY Change in Volume (Monetized Mobile Impressions)

Americas: -25%
EMEA: +82%
APAC: +524%
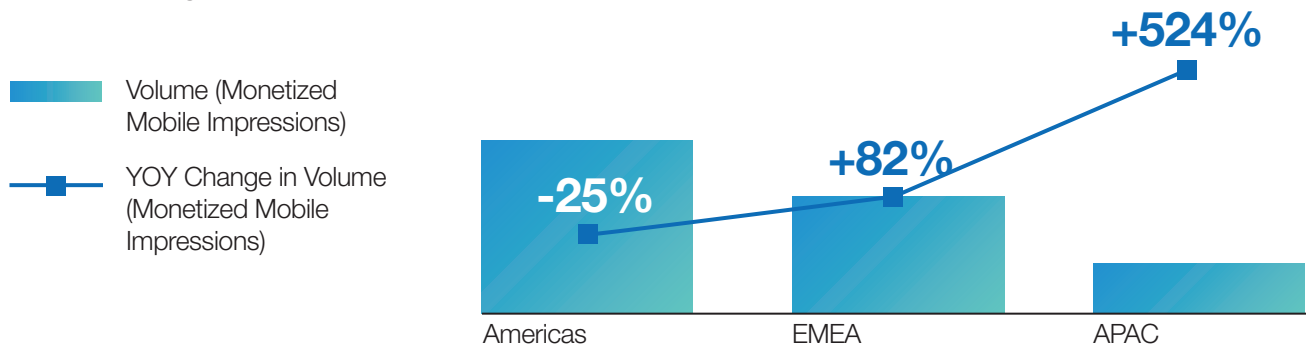
Q4 2015 YOY Change in Mobile CPMs
by Global Region

Americas: +56%
EMEA: +47%
APAC: -33%

KEY TREND #4:

The Android App Ad Awakens

While Apple app ads showed dramatic increases in price and volume in Q3, Android app ads took over as the fastest-growing platform in Q4, with a 55% year-over-year increase in price and a 76% year-over-year increase in volume. On a global basis, Android smartphone users dwarf Apple iPhone users nearly four to one (according to IDC), which might explain why advertisers were targeting Android users this holiday season. In order to reach the broadest range of smartphone users, advertisers focused on the 80% of global smartphone users, who use Android devices. Despite a new iPhone launch in September 2015, Apple was not able to make a major dent in global Android adoption in Q4.

Volume from Apple app ads increased marginally 2%, but fell for mobile web and tablet web inventory (though both volume declines were offset by larger gains in CPM). Prices were up across all platforms as advertisers continued to focus on high-quality mobile inventory. Smartphones also played a more prominent role in this year's holiday shopping process—accounting for approximately 45% of all web traffic on Black Friday, according to IBM—which might explain higher pricing for mobile inventory in Q4.
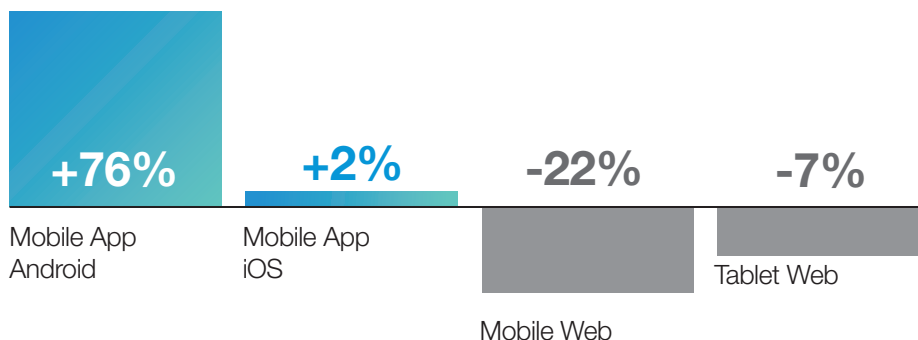
Q4 2015 YOY Change in Average Mobile CPMs
by Mobile Platform

| +55% | +40% | +51% | +20% |
| Mobile App Android | Mobile App iOS | Mobile Web | Tablet Web |
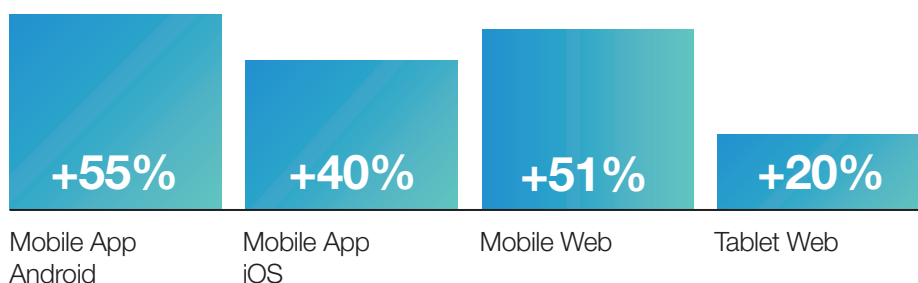
Q4 2015 YOY Change in Monetized Mobile Impression Volume
by Mobile Platform

| +76% | +2% | -22% | -7% |
| Mobile App Android | Mobile App iOS | Mobile Web | Tablet Web |

KEY TREND #5:

The Mobile Gap is Still Closed

As 2015 came to a close, the "year of mobile" many experts predicted in 2013… and then in 2014… is now a full-fledged reality. As we saw in Q3, average mobile CPMs were once again higher than average desktop CPMs—this quarter, by a margin of 20%. This reaffirms that the "mobile gap" (the deficit in mobile ad spend in relation to consumer time spent on mobile devices) within programmatic advertising is closed. Leading publishers already know that mobile is the future of their businesses, but our data indicates that programmatic needs to be a part of every publisher's strategy in order to continue to keep the mobile gap closed.

In terms of growth, both mobile CPMs and desktop CPMs increased 36%, year-over-year, demonstrating that digital ad pricing in Q4 2015 is strong and growing rapidly. These CPM increases underscore the shift to quality on the part of advertisers. With surges in online retail spending over this holiday season, advertisers were increasingly leveraging location and user ID data to better target consumers at or around the point or time of purchase, at scale. This had a positive impact on ad pricing and produced more relevant ads for consumers as a result. Advertisers are also taking advantage of the rapid increase in mobile video consumption and mobile rich media interaction, driving two formats that tend to have higher average CPMs than those of static banners.

Q4 2015 Relative CPMs & YOY Change
Desktop vs. Mobile

+20%

% Change YOY
+36%

Desktop

% Change YOY
+36%

Mobile
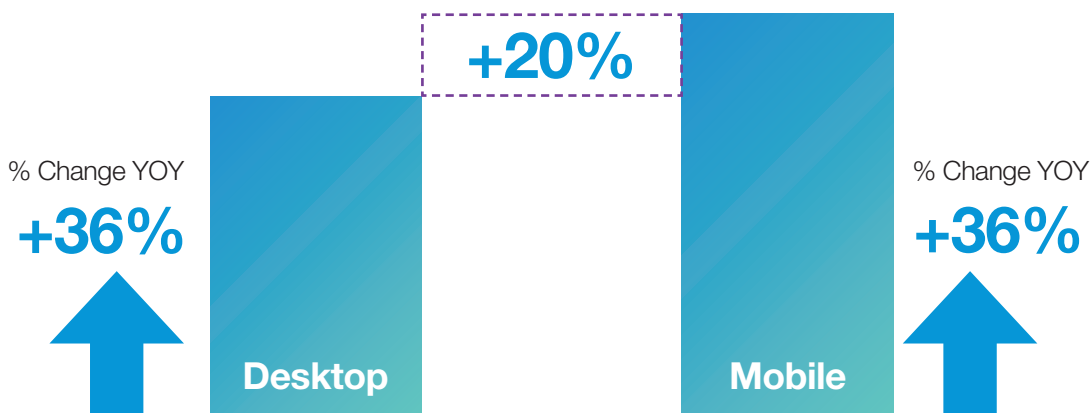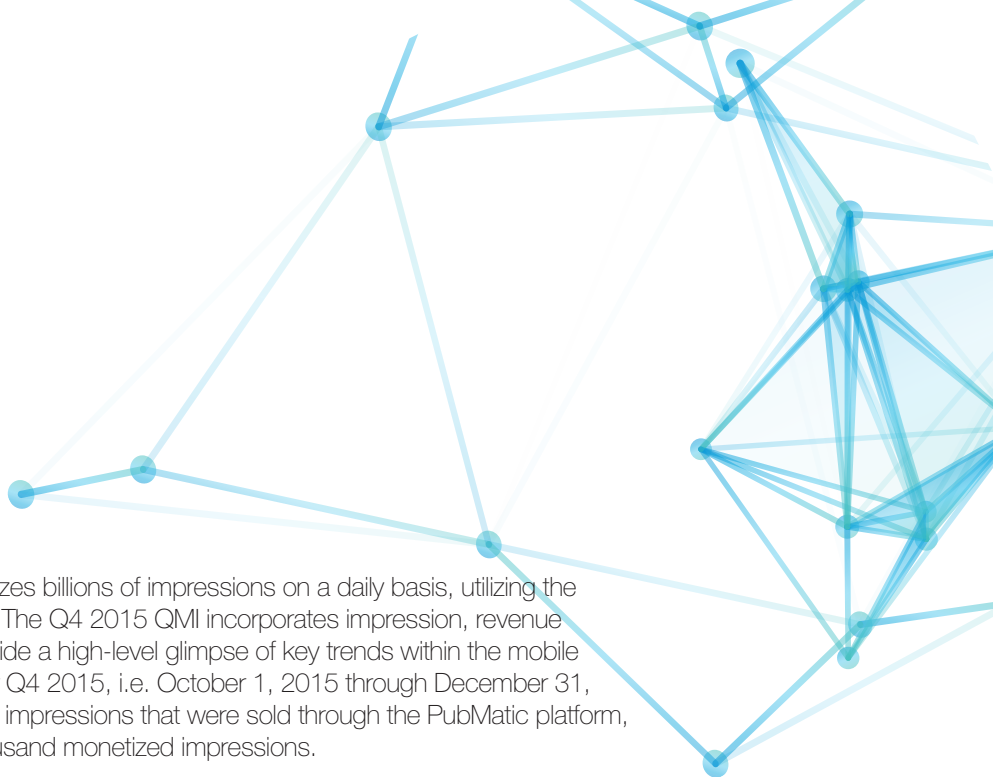
QMI Methodology

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 Q4 2015 QMI incorporates impression, revenue and CPM data from these daily reports to provide a high-level glimpse of key trends within the mobile advertising industry. Data is from calendar year Q4 2015, i.e. October 1, 2015 through December 31, 2015. "Monetized impressions" are defined as impressions that were sold through the PubMatic platform, and "CPM" is defined as the cost per one thousand monetized impressions.

About PubMatic

PubMatic is the leading marketing automation software company for publishers. Through real-time analytics, yield management, and workflow automation, PubMatic enables publishers to make smarter inventory decisions and improve revenue performance. Focused on serving the needs of premium publishers, PubMatic inspires buyer confidence by providing flexibility in audience discovery and planning media campaigns through its Media Buyer Console and APIs. The company's marketing automation software platform provides a global roster of comScore publishers with a single view into their advertiser relationships across every screen, every channel and every format. PubMatic was ranked by Deloitte as one of the fastest growing companies in the US for the fourth consecutive year in 2015. The company has offices worldwide, and is headquartered in Redwood City, California.

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