Empirical Analysis of Software Usage to Drive Policy Recommendations

May 19, 2015
USCD
Jared W. Ragland
BSA | The Software Alliance
Outline

• Introduction to BSA
• Global Studies and their Methodology
  • 2014 BSA Global Software Survey
  • 2015 IDC Malware Study
• China Specific Study
  • Recent survey regarding software asset management (SAM)
• Conclusions
BSA | The Software Alliance

BSA | The Software Alliance (www.bsa.org) is the leading advocate for the global software industry before governments and in the international marketplace. Its members are among the world’s most innovative companies, creating software solutions that spark the economy and improve modern life. With headquarters in Washington, DC, and operations in more than 60 countries around the world, BSA pioneers compliance programs that promote legal software use and advocates for public policies that foster technology innovation and drive growth in the digital economy.
BSA | The Software Alliance

Intellectual Property and Enforcement
• Copyright
• Patents
• Trade Secrets
• Licensed Use of Software by Enterprises
  • Enforcement → Litigation and Prosecution
  • Compliance → Software Asset Management
BSA | The Software Alliance

Market Access for Data Intensive Industries
• Cross-border Data Flows
• Data and Server Localization
• Privacy
• Security
• Standards
• Competition

Government Procurement
• Access
• Compliance
The Use of Data in Global Policy Advocacy

• Global Industry Studies
  • 2015 EU Cybersecurity Dashboard
  • 2014 Digital Trade Agenda
  • 2013 BSA Cloud Computing Score Card

• Empirical Studies on Software Use
  • 2014 Global Software Survey
  • 2015 Malware Study
  • 2015 China SAM Study
  • 2014 BSA Software Sales Survey
2014 Global Software Survey

• **Purpose**
  • Quantifies the Volume and Value of Unlicensed Software Installed on PCs in a Given Year
  • Provide a Consistent Measure of the Use and Value of Unlicensed Software in Over 100 Markets Over a Period of Years to Identify Trends
  • Better Understand the Behaviors and Attitudes of Users Towards the Use of Unlicensed Software
2014 Global Software Survey

Methodology

- IDC Conducted Survey Global Survey of Home and Enterprise PC Users and IT Managers a Globally Representative Sample of Markets

Unlicensed Rate

\[
\text{Unlicensed Rate} = \frac{\text{Unlicensed Software Units}}{\text{Total Software Units Installed}}
\]

\[
\text{# PCs Getting Software} \times \text{Software Units per PC} = \text{Total Software Units Installed}
\]
2014 Global Software Survey

Unlicensed Rate

\[
\text{Software Market Value/} \frac{\text{Average Software Unit Price}}{\text{Legitimate Software Units}} = \text{Unlicensed Software Units}
\]

\[
\text{Total Software Units Installed} - \text{Legitimate Software Units} = \text{Unlicensed Software Units}
\]
2014 Global Software Survey

Commercial Value of Unlicensed Software

\[
\text{# Unlicensed Software Units} \times \text{Average Software Unit Price} = \text{Commercial Value}
\]
2014 Global Software Survey

Definitions

• **PC** – Desktops, Laptops, and Ultra-Portables (e.g. Netbooks)
• **Software includes:**
  • Operating Systems, Systems Software (e.g. Databases and Security Packages), Business Applications, Consumer Applications (e.g. Games, Personal Finance, Reference Software)
  • Commercial Software, Open-Source, Free or Complementary Licenses
  • Cloud Computing Services that could Replace Installed Software (Saas, PaaS)
  • Software Sold as part of Legalization Programs (e.g. Bulk Sale for Government Distribution to Schools)
• **Does NOT include:**
  • Software Loaded onto Tablets or Smart Phones
  • Software that Runs on Servers or Mainframes
  • Routine Device Drivers, Free Downloadable Utilities (e.g. Screen Savers)
2014 Global Software Survey

Conclusions

• 43% of Software Installed on PCs Globally in 2013 was not Properly Licensed (Up from 42% in 2011)

• Commercial Value of Unlicensed Software Globally in 2013 was $62.7 Billion

• Only 35% of Companies have Written Policies Requiring the Use of Properly Licensed Software

• Security is the Primary Reason Cited by Computer Users for Not Using Unlicensed Software

• 64% - Unauthorized Access (Hackers)

• 59% - Loss of Data
## 2014 Global Software Survey

### Top 20 Economies in Commercial Value of Unlicensed PC Software, 2013

<table>
<thead>
<tr>
<th>Country</th>
<th>Unlicensed Value ($M)</th>
<th>Licensed Market ($M)</th>
<th>Unlicensed Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States</td>
<td>$9,737</td>
<td>$44,357</td>
<td>18%</td>
</tr>
<tr>
<td>China</td>
<td>$8,767</td>
<td>$3,080</td>
<td>74%</td>
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<tr>
<td>India</td>
<td>$2,911</td>
<td>$1,941</td>
<td>60%</td>
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<tr>
<td>Brazil</td>
<td>$2,851</td>
<td>$2,851</td>
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</tr>
<tr>
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<td>$2,685</td>
<td>$4,773</td>
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<tr>
<td>Russia</td>
<td>$2,658</td>
<td>$1,629</td>
<td>62%</td>
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<td>Germany</td>
<td>$2,158</td>
<td>$6,834</td>
<td>24%</td>
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<tr>
<td>United Kingdom</td>
<td>$2,019</td>
<td>$6,394</td>
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</tr>
<tr>
<td>Italy</td>
<td>$1,747</td>
<td>$1,970</td>
<td>47%</td>
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<td>Indonesia</td>
<td>$1,463</td>
<td>$279</td>
<td>84%</td>
</tr>
<tr>
<td>Japan</td>
<td>$1,349</td>
<td>$5,751</td>
<td>19%</td>
</tr>
<tr>
<td>Mexico</td>
<td>$1,211</td>
<td>$1,032</td>
<td>54%</td>
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<tr>
<td>Canada</td>
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<td>$3,267</td>
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<td>$1,276</td>
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<tr>
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<td>$427</td>
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</tr>
<tr>
<td>Thailand</td>
<td>$869</td>
<td>$355</td>
<td>71%</td>
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<tr>
<td>Australia</td>
<td>$743</td>
<td>$2,795</td>
<td>21%</td>
</tr>
<tr>
<td>South Korea</td>
<td>$712</td>
<td>$1,162</td>
<td>38%</td>
</tr>
<tr>
<td>Vietnam</td>
<td>$620</td>
<td>$145</td>
<td>81%</td>
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</table>
## 2014 Global Software Survey

### Unlicensed Software Installation Rates

<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>Australia</td>
<td>21%</td>
<td>23%</td>
<td>25%</td>
<td>28%</td>
<td>$743</td>
<td>$763</td>
<td>$550</td>
<td>$492</td>
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<tr>
<td>Bangladesh</td>
<td>87%</td>
<td>90%</td>
<td>91%</td>
<td>92%</td>
<td>$197</td>
<td>$147</td>
<td>$127</td>
<td>$92</td>
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<tr>
<td>Brunei</td>
<td>66%</td>
<td>67%</td>
<td>67%</td>
<td>67%</td>
<td>$13</td>
<td>$25</td>
<td>$14</td>
<td>$13</td>
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<tr>
<td>China</td>
<td>74%</td>
<td>77%</td>
<td>79%</td>
<td>82%</td>
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<td>$8,902</td>
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<td>Hong Kong</td>
<td>43%</td>
<td>43%</td>
<td>47%</td>
<td>51%</td>
<td>$316</td>
<td>$232</td>
<td>$218</td>
<td>$221</td>
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<tr>
<td>India</td>
<td>60%</td>
<td>63%</td>
<td>65%</td>
<td>69%</td>
<td>$2,911</td>
<td>$2,930</td>
<td>$2,003</td>
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<tr>
<td>Indonesia</td>
<td>84%</td>
<td>86%</td>
<td>86%</td>
<td>84%</td>
<td>$1,463</td>
<td>$1,467</td>
<td>$886</td>
<td>$411</td>
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<tr>
<td>Japan</td>
<td>19%</td>
<td>21%</td>
<td>21%</td>
<td>23%</td>
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<td>$1,875</td>
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<td>55%</td>
<td>58%</td>
<td>59%</td>
<td>$616</td>
<td>$657</td>
<td>$453</td>
<td>$311</td>
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<tr>
<td>New Zealand</td>
<td>20%</td>
<td>22%</td>
<td>22%</td>
<td>22%</td>
<td>$78</td>
<td>$99</td>
<td>$63</td>
<td>$55</td>
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<tr>
<td>Pakistan</td>
<td>85%</td>
<td>86%</td>
<td>84%</td>
<td>84%</td>
<td>$344</td>
<td>$278</td>
<td>$166</td>
<td>$125</td>
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<tr>
<td>Philippines</td>
<td>69%</td>
<td>70%</td>
<td>69%</td>
<td>69%</td>
<td>$444</td>
<td>$338</td>
<td>$217</td>
<td>$147</td>
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<tr>
<td>Singapore</td>
<td>32%</td>
<td>33%</td>
<td>35%</td>
<td>37%</td>
<td>$344</td>
<td>$255</td>
<td>$197</td>
<td>$159</td>
</tr>
<tr>
<td>South Korea</td>
<td>38%</td>
<td>40%</td>
<td>41%</td>
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<td>64%</td>
<td>69%</td>
<td>90%</td>
<td>$187</td>
<td>$86</td>
<td>$77</td>
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<td>40%</td>
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<td>$293</td>
<td>$227</td>
<td>$215</td>
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<tr>
<td>Thailand</td>
<td>71%</td>
<td>72%</td>
<td>75%</td>
<td>78%</td>
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<td>$852</td>
<td>$694</td>
<td>$463</td>
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<tr>
<td>Vietnam</td>
<td>81%</td>
<td>81%</td>
<td>85%</td>
<td>85%</td>
<td>$620</td>
<td>$395</td>
<td>$353</td>
<td>$200</td>
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<tr>
<td>Other AP</td>
<td>91%</td>
<td>91%</td>
<td>90%</td>
<td>91%</td>
<td>$763</td>
<td>$589</td>
<td>$303</td>
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<tr>
<td><strong>TOTAL AP</strong></td>
<td>62%</td>
<td>60%</td>
<td>59%</td>
<td>59%</td>
<td>$21,041</td>
<td>$20,998</td>
<td>$16,544</td>
<td>$14,090</td>
</tr>
</tbody>
</table>

**ASIA PACIFIC**
Advantages of BSA’s Global Software Survey

• Consistent Assessment Over Time to Identify Trends in Unlicensed Software Use
• Opportunity to Advocate for Policy and Enforcement Improvements to Address Empirically Observed Challenges
• Opportunity to Understand Behavioral Trends and Identify Persuasive Arguments for the Use of Licensed Software

Caveats

• Challenges Inherent to Survey Methodology (Reporting Biases – Can be Overcome to Some Extent with Independent Validation Measures)
• Evolving Business Models May Make Sample Criteria (e.g. PC-Installed Software) Less Relevant and Informative to Software Industry Concerns Over Time, but to Change Would Undermine Year-to-Year Consistency of Study and Trend Identification Efforts
2015 Malware Study

Risky Business: Malware Threats From Unlicensed Software

malicious + software = malware

Unlicensed software & malware are tightly linked

Around the world, there is a strong and consistent correlation ($r = 0.79$) between unlicensed software use and malware encounters

Malware is dangerous and costly

Organizations experience malware incidents once every 3 minutes

Malware problems associated with unlicensed software cost organizations nearly $500 billion in 2014

Reduce cyber threats with good software management. Learn more at www.bsa.org
2015 Malware Study

Purpose
Analyze the Relationship Between Unlicensed Software Use and Malware Encounters

Conclusions
• Strong Correlation Between Unlicensed Software Use and Malware Encounters
• Unlicensed Software Use is a Strong Predictor of Malware Encounters
• Empirical Evidence of Causation in this Correlation
2015 Malware Study

Methodology

• Unlicensed Software Rates from 2014 BSA Global Software Survey
• Malware Encounter Rate = Percentage of Computers Running Microsoft Real-Time Security Software that Reported Detecting Malware in a Quarter (~20% of PCs Worldwide per Quarter in 2013).
2015 Malware Study

Correlation: $r = 0.79$
2015 Malware Study

Prediction: $R^2 = 0.62$
2015 Malware Study

Evidence of Causation

• 2014 Study by IDC and National University of Singapore (NUS) Finding Frequent Malware in PCs Pre-Installed with Unlicensed Software, Unlicensed DVDs, and Unlicensed Downloaded Software and Activation Keys.

• Survey Results (Same Study):
  • 20% Stated Unlicensed Software had Infected Their PCs with Viruses
  • 40% Stated Unlicensed Software Slowed Their PCs
  • 10% State Unlicensed Software had Destroyed Files

• The Results Make Clear that Some Malware Comes from Unlicensed Software

• Most Malware Constitutes a Cybersecurity Threat (Separate Studies)
Software Asset Management (SAM) Promotes Software Legalization and Improves IT Efficiency

Purpose

• Assess the Adoption of Software Asset Management in China

Methodology

• Survey Over 120 Chinese Companies with more than 250 Employees in the Manufacturing and Financial Sectors
Software Asset Management (SAM) Promotes Software Legalization and Improves IT Efficiency

Results

- 98.3% of the companies surveyed believed that SAM can improve their enterprises' IT management and optimize their internal IT operational procedures.
- 97.5% believed that SAM helps to ensure IT compliance within an enterprise.
- 69.2% believed that SAM helps to improve operational efficiency.
- 54.2% believed that SAM can help them meet the requirements of relevant national and international SAM standards such as ISO/IEC19770.
- The majority of IT managers from the enterprises surveyed admitted that SAM was critical for their organizations: 68% of respondents rated SAM as important for their organization; 29% of responses were neutral; while 3% believed it was unimportant.
- Yet, only 3.4% of the surveyed Chinese manufacturing and financial services companies admitted to adopting a SAM policy and practice.
2014 BSA Software Sales Survey

Software Sales per PC

US Dollars


China Brazil India Russia Mexico Poland Turkey Thailand Indonesia France USA Average - All
## 2014 BSA Software Sales Survey

### TOTAL COUNTRIES

<table>
<thead>
<tr>
<th>Sales per PC (USD)</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
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<td>26</td>
<td>26</td>
<td>26</td>
<td>23</td>
<td>27</td>
<td>15</td>
<td>18</td>
<td>17</td>
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<tr>
<td>Brazil</td>
<td>69</td>
<td>66</td>
<td>73</td>
<td>70</td>
<td>76</td>
<td>80</td>
<td>100</td>
<td>61</td>
<td>80</td>
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<tr>
<td>India</td>
<td>90</td>
<td>95</td>
<td>110</td>
<td>115</td>
<td>101</td>
<td>143</td>
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<td>Russia</td>
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<td>85</td>
<td>84</td>
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<td>110</td>
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<td>79</td>
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<td>267</td>
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<td>USA</td>
<td>329</td>
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<td>349</td>
<td>293</td>
<td>368</td>
<td>288</td>
<td>312</td>
<td>266</td>
<td>313</td>
</tr>
<tr>
<td><strong>Average - All</strong></td>
<td>203</td>
<td>156</td>
<td>201</td>
<td>165</td>
<td>200</td>
<td>159</td>
<td>170</td>
<td>137</td>
<td>159</td>
</tr>
</tbody>
</table>
2014 BSA Software Sales Survey

Conclusions

• Software Sales per PC Vary Widely
• There Appears to be a Correlation Between Levels of Economic Development (e.g. Per Capita GDP) and Software Sales per PC
• However, the Correlation is Not High
• Some Countries with Relatively Low Per Capita GDP have Relatively Higher Software Sales per PC and Vice Versa
## 2014 BSA Software Sales Survey

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>India</td>
<td>$5,800</td>
<td>$137</td>
</tr>
<tr>
<td>Indonesia</td>
<td>$10,200</td>
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<td>$12,900</td>
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<tr>
<td>Thailand</td>
<td>$14,400</td>
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<tr>
<td>Brazil</td>
<td>$15,200</td>
<td>$131</td>
</tr>
<tr>
<td>Mexico</td>
<td>$17,900</td>
<td>$161</td>
</tr>
<tr>
<td>United States</td>
<td>$54,800</td>
<td>$418</td>
</tr>
</tbody>
</table>
Other Questions of Potential Interest to BSA

- What are the Factors that Facilitate Growth in the IT/Software Development Sector in a Country?
- To What Extent do IP Rights (Copyright, Patents, Trade Secrets) Contribute?
- To What Extent does Foreign Competition Help (or Hurt?) Domestic Development of this Sector?
- What is the Relationship Between the Availability of Computer-Enabled Inventions and Innovation in the IT-sector?
- To What Extent Does Freedom to Contract versus Regulatory Approaches to Employee-Inventor Reward and Remuneration Affect Investment and Outcomes in R&D (in Software, IT or Generally)?
Conclusions

• BSA Invests Significant Resources to Understand Market Trends and Behaviors to Inform our Policy Advocacy and Compliance Programs
• Quantitative, Verifiable Data Provides a Solid Foundation for Our Efforts Before the US and Foreign Governments
• We Have Found Such Efforts to Use Evidence-Based Arguments can be Persuasive
• Governments Naturally Attempt to Develop Policies that Accrue to Perceived National Interests
• We are Constantly Looking to Improve our Methodology and Address Valid Criticisms of Either the Findings or our Conclusions
Thank You!
2015 EU Cybersecurity Dashboard

http://cybersecurity.bsa.org/assets/PDFs/study_eucybersecurity_en.pdf
2014 Digital Trade Agenda

http://www.bsa.org/~/media/Files/Policy/Trade/DTA_study_en.pdf
2013 BSA Global Cloud Computing Scorecard