Personal Cybersecurity

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SCHOOL OF COMPUTER AND CYBER SCIENCES
Current Problem (Some Statistics)

• Over 2 billion smartphones worldwide (large target for hackers)
• 163 million tablets sold in 2017
  • Down 6.5% from 175 million in 2016
• 2018: 3.8 million Android apps; 2 million App Store apps (unknown developers)
• Internet of Things (IoT)
  • 8.4 billion connected “things” were in use in 2017
    • Up 31% from 2016
  • Estimate by 2050, 50 billion connected devices will populate consumers homes
    • roughly five times more than the world population
Current Problem: Mobile Malware

Figure 4. Total malware samples from 2015 – 2017.

(McAfee, 2018)
Levels of Defense

• There is a tradeoff between convenience and security
  • We live in a convenient world (bad for security)

• Nobody can be 100% secure

• Do not be the easiest target

• Simple techniques to add levels of defense (not maximum security)
  • Password manager (eliminate reuse; strengthen passwords; old password reminder)
  • Multifactor authentication (something you have and something you know)
  • Encryption (scramble data to an unreadable form; phone, computer, Internet drives)
  • VPN’s (scramble data in transit)
  • Cloud Backup (restore lost, stolen, or ransomed data)
  • Security suites (advanced features, location, wipe, backup)
But First, the Easy Stuff

• Freeze credit reports and view periodically;
• Limit social media personal information (fake personal information);
• Be wary of links and attachments in emails and texts; Call sender;
• Do not trust links in emails from friends; Hackers spoof emails;
• Do not click on links in emails from your financial institutions or work;
• Turn on automatic patching for Windows computers;
• Do not trust phone numbers in emails;
• Do not trust phone numbers in caller-ID;
• Cover laptop and TV cameras with black tape when not in use;
• Consider security cameras as public.
The Best Password Managers of 2017

**By Neil J. Rubenking**  |  **January 23, 2017**  |  **9 Comments**

A password like "123456" or "monkey" is easy to remember, but it's also easy to crack. With the help of a password manager, you can have a unique and strong password for every secure website. We've evaluated two dozen to help you choose.

### Password Managers

<table>
<thead>
<tr>
<th>Name</th>
<th>Lowest Price</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dashlane 4</strong></td>
<td><strong>$39.99</strong></td>
</tr>
<tr>
<td><strong>Zoho Vault</strong></td>
<td><strong>$12.00</strong></td>
</tr>
<tr>
<td><strong>Sticky Password Premium</strong></td>
<td><strong>$14.99</strong></td>
</tr>
<tr>
<td><strong>RoboForm Everywhere 7</strong></td>
<td><strong>$19.95</strong></td>
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<tr>
<td><strong>RoboForm Desktop 7</strong></td>
<td><strong>$29.95</strong></td>
</tr>
<tr>
<td><strong>LastPass 4.0 Premium</strong></td>
<td><strong>$12.00</strong></td>
</tr>
<tr>
<td><strong>Keeper Password Manager &amp; Digital Vault 8</strong></td>
<td><strong>$29.99</strong></td>
</tr>
<tr>
<td><strong>Password Boss Premium</strong></td>
<td><strong>$29.99</strong></td>
</tr>
<tr>
<td><strong>LogMeOnce Password Management Suite Ultimate 5.2</strong></td>
<td><strong>$39.00</strong></td>
</tr>
<tr>
<td><strong>True Key by Intel Security (2017)</strong></td>
<td><strong>$19.99</strong></td>
</tr>
</tbody>
</table>

**Editor Rating**

![Password Managers Editor Rating]
Dashlane

- Password manager
- Payments
- IDs
- Receipts
- Share passwords
- Emergency
<table>
<thead>
<tr>
<th>Website</th>
<th>Login</th>
<th>Password</th>
<th>Password strength</th>
<th># of times Password Used</th>
<th>Safety Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>yahoo.com</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Not quite so safe</td>
</tr>
<tr>
<td>wcn.co.uk</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Not quite so safe</td>
</tr>
<tr>
<td>google.com</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Safe</td>
</tr>
<tr>
<td>twitter.com</td>
<td></td>
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<td></td>
<td></td>
<td>Safe</td>
</tr>
<tr>
<td>google.com</td>
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<td></td>
<td></td>
<td></td>
<td>Safe</td>
</tr>
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<td>techdrive.tk</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Safe</td>
</tr>
<tr>
<td>adrive.com</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>raptorvpn.com</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Safe</td>
</tr>
<tr>
<td>cctodo.com</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Super safe</td>
</tr>
<tr>
<td>inweb20.net</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Super safe</td>
</tr>
<tr>
<td>aitype.com</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Super safe</td>
</tr>
</tbody>
</table>
Dashlane Password Generator

Sample Password: $%^~xyFfyn8Q(PcDbtMwsm+)!x5
Multifactor Authentication

- Text a number each time you access an account
- Google Authenticator: generates a code on your phone
- Google Accounts
- Outlook.com
- Password Manager
- Financial Accounts
- Apple & Microsoft Accounts
- EBay
- Accounts that have your mailing address and credit card number (e.g. Amazon)
Control, protect, and secure your account, all in one place

My Account gives you quick access to settings and tools that let you safeguard your data, protect your privacy, and decide how your information can make Google services work better for you.

**Sign-in & security**
- Control your password and Google Account access.
  - Signing in to Google
  - Device activity & notifications
  - Connected apps & sites

**Security Checkup**
- Protect your account in just a few minutes by reviewing your security settings and activity.

**Personal info & privacy**
- Manage your visibility settings and the data we use to personalize your experience.
  - Your personal info
  - Manage your Google activity
  - Ads Settings
  - Control your content

**Account preferences**
- Set language, accessibility, and other settings that help you use Google.
  - Language & Input Tools
  - Accessibility
  - Your Google Drive storage
  - Delete your account or services

**Find your phone**
- Whether you forgot where you left it or it was stolen, a few steps may help secure your phone or tablet.

**Privacy Checkup**
- Take this quick checkup to review important privacy settings and adjust them to your preference.

**My Activity**
- Discover and control the data that's created when you use Google services.

GET STARTED
GO TO MY ACTIVITY
Signing in to Google

Control your password and account access, along with backup options if you get locked out of your account.

Make sure you choose a strong password
A strong password contains a mix of numbers, letters, and symbols. It is hard to guess, does not resemble a real word, and is only used for this account.

<table>
<thead>
<tr>
<th>Password &amp; sign-in method</th>
</tr>
</thead>
</table>
| Your password protects your account. You can also add a second layer of protection with 2-Step Verification, which sends a single-use code to your phone for you to enter when you sign in. So even if somebody manages to steal your password, it is not enough to get into your account.

<table>
<thead>
<tr>
<th>Note: To change these settings, you will need to confirm your password.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Password</td>
</tr>
<tr>
<td>2-Step Verification</td>
</tr>
<tr>
<td>App passwords</td>
</tr>
<tr>
<td>Google Account PIN</td>
</tr>
</tbody>
</table>
Encryption

• Converts information into a code based on an algorithm

• Encrypt your phone (SD card)

• Encrypt important files and folders (VeraCrypt for advanced users; free)

• Encrypt storage (USB, external hard drives)

• Encrypt whole hard drive (work computers)

• Encrypt your data when in transit (VPN)

• Encrypt your Internet drive data (Boxcryptor)
# The Best Encryption Software of 2017

*BY NEIL J. RUBENKING  DECEMBER 20, 2016  5 COMMENTS*

Just because you have antivirus software installed on your PC doesn't mean a zero-day Trojan can't steal your personal data. Encryption keeps you safe from malware (and the NSA).

## Shares:

<table>
<thead>
<tr>
<th>Name</th>
<th>Lowest Price</th>
<th>Editor Rating</th>
<th>Number of Encryption Algorithms</th>
<th>Public Key Cryptography</th>
<th>Rate Password Strength</th>
<th>Two-Factor Authentication</th>
<th>Create Encrypted Storage</th>
<th>Encrypt Files/Folders</th>
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</thead>
<tbody>
<tr>
<td>AxCrypt Premium</td>
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</tr>
</tbody>
</table>

[SEE IT] [SEE IT] [SEE IT] [SEE IT] [SEE IT] [SEE IT] [SEE IT] [SEE IT] [SEE IT]
Encrypt Internet Drives

- Encrypt Google Drive, iCloud, Dropbox, and others
Virtual Private Network (VPN)

- Encrypting data for transit
- Personal VPN’s
  - Encrypts your data from your device to a regionalized VPN server
  - Great for security over public Wi-Fi and cellular service
  - For PC, laptops, tablets, smartphones
The Best VPN Services of 2017

Whether it's for securing sensitive communications, protecting your identity, or streaming Netflix while you're abroad, a virtual private network (or VPN) is a key security tool.

### Service Comparison

<table>
<thead>
<tr>
<th>Service</th>
<th>Lowest Price</th>
<th>Editor Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>IFVanish VPN</td>
<td>SEE IT</td>
<td>★★★★★</td>
</tr>
<tr>
<td>ExpressVPN</td>
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<tr>
<td>NordVPN</td>
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<tr>
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<tr>
<td>KeepSolid VPN Unlimited</td>
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<td>★★★★★</td>
</tr>
<tr>
<td>TorGuard VPN</td>
<td>SEE IT</td>
<td>★★★★★</td>
</tr>
<tr>
<td>AnchorFree Hotspot Shield Elite</td>
<td>SEE IT</td>
<td>★★★★★</td>
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<tr>
<td>PureVPN</td>
<td>SEE IT</td>
<td>★★★★★</td>
</tr>
<tr>
<td>Hide My Ass VPN</td>
<td>SEE IT</td>
<td>★★★★★</td>
</tr>
<tr>
<td>Spotflux Premium VPN</td>
<td>SEE IT</td>
<td>★★★★★</td>
</tr>
</tbody>
</table>
Cloud Backup & Restore

• Copy files to the cloud
• Choose what files and folders to backup (e.g. My documents, desktop, pictures, videos)
• Encrypts your data in transit and in the cloud
• Continuous backups
• Multiple computer backup
• View files online and on multiple devices
• Restore from backup
• Access up to 30 previous versions of files
# The Best Online Backup Services of 2017

To protect your files you need to back them up, and keeping your backup off-site is the best way to ensure its safety. We've rounded up the best online backup services available.

<table>
<thead>
<tr>
<th>Name</th>
<th>IDrive</th>
<th>CrashPlan</th>
<th>SOS Online Backup</th>
<th>SugarSync</th>
<th>Carbonite</th>
<th>SpiderOakONE</th>
<th>Acronis True Image Cloud</th>
<th>Backblaze</th>
<th>EMC MozyHome</th>
<th>OpenDrive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lowest Price</td>
<td>SEE IT</td>
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<td>☑️</td>
<td>☑️</td>
<td>✔️</td>
</tr>
</tbody>
</table>
Unlimited Online Backup

Instantly protect all your photos, music and documents. Works on PC and Mac - free trial, start today.

Backup
- Automatic online backup for all of your computers, from just $8.00/month
- Fast, secure, easy to use & instant setup
- See your backed up files on the web, iPhone, iPad & Android

Briefcase
- Sync files online and across all your computers
- Work on the same files on your PC and Mac
- Share files easily and access everything from the web
- 2TB of cloud storage space as standard
- Faster, more secure and more feature rich than competing products

Pro Suite
- Get Backup and Briefcase in one integrated easy to use product
- Automatically backup all of your computers safely online
- Sync files between all your computers
- Includes a massive 5TB of Briefcase space and unlimited space for your computer backups
- Plus extra features only available in Pro Suite

Business
- Backup all your office PCs and Macs to the cloud
- Share files professionally
- Access your data on all your computers
- Easy to use, easy to manage and quick to setup
- Completely safe and secure
- Ideal for professionals and small business

Free Trial & More Info >
Security Suites (computer & mobile)

- Computer
  - Antivirus
  - Firewall
  - Spam control
  - Parental control
  - Identity theft protection
  - Backup
  - Tune-up

- Mobile
  - Antivirus
  - Identity theft protection
  - Find my phone (locate & scream)
  - Backup (photo, contacts, calls)
  - Theft alerts
  - Safe browsing
  - Privacy advisor
  - Lock & wipe
The Best Security Suites of 2017

Using your PC for games and social media is fun; keeping it safe isn’t. A security suite can be your one-stop solution. We’ve tested nearly four dozen of them, and these 10 get our highest recommendation.

|-------------------------------|------------------------------------------|------------------|----------------------------------------|---------------------------------|--------------------------------|----------------------------------|----------------------------------|----------------------------------------|----------------------------------------|----------------------------------------|
| Editor Rating                 | ★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★★
# Sample Annual Cost

<table>
<thead>
<tr>
<th>Security Service (per device)</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Password Manager (Dashlane synced)*</td>
<td>$40 per account</td>
</tr>
<tr>
<td>Virtual Private Network (Nord VPN)*</td>
<td>$40 per year (buy 2 years for $80)up to 6 devices</td>
</tr>
<tr>
<td>Laptop/Desktop Security Suite (Norton)*</td>
<td>$50 for 10 devices</td>
</tr>
<tr>
<td>Mobile Device Security Suite</td>
<td>Included in Norton Security Suite</td>
</tr>
<tr>
<td>Online Cloud Backup &amp; Recovery (iDrive)*</td>
<td>$52 for 2 TB</td>
</tr>
<tr>
<td>Cloud Encryption (BoxCryptor)</td>
<td>$48 for unlimited devices and clouds</td>
</tr>
<tr>
<td><strong>TOTAL ANNUAL COST</strong></td>
<td><strong>$230 or $19/month</strong></td>
</tr>
<tr>
<td>* = Editor’s choice</td>
<td></td>
</tr>
</tbody>
</table>

**Limited Budget:**

- Free Security Suite First
- Then VPN & Password Manager
Mobile Device Security
Android vs. iOS

- **iOS**
  - Safer, but limiting
  - Limited to the App Store
  - Limited equipment

- **Android**
  - Riskier, but much less limiting
  - Any app market
  - Many equipment choices and vendors

- Restriction (safer) vs. Freedom (riskier) is the fundamental difference
Most security issues are related to jail broken and rooted phones.
### 13 Most Dangerous Permissions

<table>
<thead>
<tr>
<th>No.</th>
<th>Permission</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Approximate location</td>
</tr>
<tr>
<td>2</td>
<td>Directly call phone numbers</td>
</tr>
<tr>
<td>3</td>
<td>Find accounts on the device</td>
</tr>
<tr>
<td>4</td>
<td>Modify/delete USB card data</td>
</tr>
<tr>
<td>5</td>
<td>Precise location</td>
</tr>
<tr>
<td>6</td>
<td>Read calendar events plus confidential information</td>
</tr>
<tr>
<td>7</td>
<td>Read phone status and identity</td>
</tr>
<tr>
<td>8</td>
<td>Read your contacts</td>
</tr>
<tr>
<td>9</td>
<td>Read your text messages (SMS or MMS)</td>
</tr>
<tr>
<td>10</td>
<td>Record audio</td>
</tr>
<tr>
<td>11</td>
<td>Send SMS</td>
</tr>
<tr>
<td>12</td>
<td>Take pictures and video</td>
</tr>
<tr>
<td>13</td>
<td>Use accounts on the device</td>
</tr>
</tbody>
</table>

The Yahtzee app had **14** total permission, **6** from this list.
Risky Apps

• Of the top 100 paid apps and top 100 free apps
  • iOS apps were found to be more risky than Android apps

• 95% of the top FREE Android and iOS apps had at least one risky behavior

• 80% of the top PAID Android and iOS apps had at least one risky behavior.

• 100 of the top 100 Android apps and 92 of the top 100 iOS apps have fake malware versions
  • Most fake apps are on 3rd party app sites
Risky Apps - continued

• Free apps are considered more risky and more likely to:
  • share data with ad networks,
  • access user contact lists, and
  • allow location tracking

• Game apps (free or paid) are the most risky

• Malicious software isn’t just distributed in apps, it also comes in websites, emails, and links
Want Risky Apps, but Limit Risk?

- Purchase a tablet with Wi-Fi; old smartphone too
  - Has no phone number to steal
- Create a free email account for app purchases
  - Not linked to your real accounts and email
- Turn off location services
  - Apps will not be able to locate you
  - But might affect some apps, like weather and maps
- Make app purchases with a one-time credit card number
- Secure with anti-virus
  - Still important, even on a dedicated gaming device
- Next Big Risk
- Internet of Things (iOT)
- 20 billion connected devices by 2020
- 50 billion by 2050
Convenience vs. Security

- Security is not convenient
- Security’s inconvenience is better than being a victim
Questions?