



# **2019 MACCDC Qualification Round Team Packet**

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## CCDC Mission

"The goal of a Cyber Defense Competition is to provide hands-on application of information assurance skills; as such, they enhance students' understanding of both theory and practice. They provide students a laboratory in which to experiment, just as in other fields of science. They fulfill the same role as capstone projects in a traditional engineering program (i.e., projects that allow students to synthesize and integrate knowledge acquired through course work and other learning experiences into a project usually conducted in a workplace). The competition combines legal, ethical, forensics, and technical components while emphasizing a team approach. Such experiential education increases the knowledge and expertise of future professionals who may be in a position to contribute to the secure design and operation of critical information and its supporting infrastructure" (from Exploring a National Cyber Security Exercise for Colleges and Universities, Ron Dodge, Lance J. Hoffman, Daniel Ragsdale, and Tim Rosenberg, 2004).

## Competition Objectives

- Build a meaningful mechanism by which institutions of higher education may evaluate their programs
- Provide an educational venue in which students are able to apply the theory and skills they have learned in their course work
- Foster a spirit of teamwork, ethical behavior, and effective communication both within and across teams
- Open a dialog and awareness among participating institutions and students.

## Terminology

Throughout this document, the following terms are used:

- **Operations Team/Gold Team:** competition officials that organize, run, and manage the competition.
- **White Team:** competition officials that observe team performance in their competition area and evaluate team performance and rule compliance.
- **Red Team:** penetration testing professionals simulating external hackers attempting to gain unauthorized access to competition teams' systems.
- **Black Team:** competition support members that provide technical support and provide administrative support to the competition.
- **Blue Team/Competition Team:** the college and university competitive teams consisting of students competing in a CCDC event.

- **Team Captain:** a student member of the Blue Team identified as the primary liaison between the Blue Team and the White Team.
- **Team representatives:** a faculty or staff representative of the Blue Team host college or university responsible for serving as a liaison between competition officials and the Blue Team's institution.

## Competition Rules

### 1. Competitor Eligibility

- a. Competitors in CCDC events must be full-time students of the institution they are representing.
  - i. Team members must qualify as full-time students as defined by the institution they are attending.
  - ii. Individual competitors may participate in CCDC events for a maximum of five seasons. A CCDC season is defined as the period of time between the start of the first state event and the completion of the National CCDC event. Participation on a team in any CCDC event during a given season counts as participation for that entire season.
  - iii. A competitor in their final semester prior to graduation is exempt from the full-time student requirement and may compete in CCDC events as a part-time student provided the competitor has a demonstrated record of full-time attendance for the previous semester or quarter.
  - iv. If a team member competes in a qualifying, state, or regional CCDC event and graduates before the next CCDC event in the same season, that team member will be allowed to continue to compete at CCDC events during the same season should their team win and advance to the next round of competition.
- b. Competitors may only be a member of one team per CCDC season.
- c. A team member may not participate in any role at CCDC events held outside the region in which their team competes during the same CCDC season.
- d. Individuals who have participated in previous CCDC events in any role other than as a competitor must obtain eligibility approval from the director of the region in which their team competes prior to being added to the team roster. Once a candidate's eligibility has been approved they will remain eligible for all CCDC events during the same season.

### 2. Team Composition

- a. Each team must submit a roster of up to twelve (12) competitors to the competition director of the first CCDC event they participate in during a given CCDC competition season. Rosters must be submitted at least two weeks prior to the start of that event. All competitors on the roster must meet all stated eligibility requirements. No changes to the team roster will be permitted after the team competes in their first CCDC event. The competition team must be

chosen from the submitted roster. A competition team is defined as the group of individuals competing in a CCDC event.

- b. Each competition team may consist of up to eight (8) members chosen from the submitted roster.
  - c. Each competition team may have no more than two (2) graduate students as team members.
  - d. If the member of a competition team advancing to a qualifying, state, regional, or national competition is unable to attend that competition, that team may substitute another student from the roster in their place prior to the start of that competition.
  - e. Once a CCDC event has begun, a team must complete the competition with the team that started the competition. Substitutions, additions, or removals of team members are prohibited except for extreme circumstances.
    - i. Team Representatives must petition the Competition Director in writing for the right to perform a change to the competition team.
    - ii. The Competition Director must approve any substitutions or additions prior to those actions occurring.
  - f. Teams or team members arriving after an event's official start time, for reasons beyond their control, may be allowed to join the competition provided a substitution has not already been made. Event coordinators will review the reason for tardiness and make the final determination.
  - g. Each team will designate a Team Captain for the duration of the competition to act as the team liaison between the competition staff and the teams before and during the competition. In the event of the Team Captain's absence, teams must have an identified team liaison serving as the captain in the competition space at all times during competition hours.
  - h. An institution is only allowed to compete one team in any CCDC event or season.
3. Team Representatives
- a. Each team must have at least one representative present at every CCDC event. The representative must be a faculty or staff member of the institution the team is representing.
  - b. Once a CCDC event has started, representatives may not coach, assist, or advise their team until the completion of that event (including overnight hours for multi-day competitions).
  - c. Representatives may not enter their team's competition space during any CCDC event.
  - d. Representatives must not interfere with any other competing team.
  - e. The representative, or any non-team member, must not discuss any aspect of the competition event, specifically event injections, configurations, operations, team performance or red team functions, with their team during CCDC competition hours and must not attempt to influence their team's performance in any way.
4. Competition Conduct
- a. Throughout the competition, Operations and White Team members will occasionally need access to a team's system(s) for scoring, troubleshooting, etc.

Teams must immediately allow Operations and White Team members' access when requested.

- b. Teams must not connect any devices or peripherals to the competition network unless specifically authorized to do so by Operations or White Team members.
- c. Teams may not modify the hardware configurations of competition systems. Teams must not open the case of any server, printer, PC, monitor, KVM, router, switch, firewall, or any other piece of equipment used during the competition. All hardware related questions and issues should be referred to the White Team.
- d. Teams may not remove any item from the competition area unless specifically authorized to do so by Operations or White Team members including items brought into the team areas at the start of the competition.
- e. Team members are forbidden from entering or attempting to enter another team's competition workspace or room during CCDC events.
- f. Teams must compete without "outside assistance" from non-team members including team representatives from the start of the competition to the end of the competition (including overnight hours for multi-day events). All private communications (calls, emails, chat, texting, directed emails, forum postings, conversations, requests for assistance, etc.) with non-team members including team representatives that would help the team gain an unfair advantage are not allowed and are grounds for disqualification and/or a penalty assigned to the appropriate team.
- g. Printed reference materials (books, magazines, checklists) are permitted in competition areas and teams may bring printed reference materials to the competition.
- h. Team representatives, sponsors, and observers are not competitors and are prohibited from directly assisting any competitor through direct advice, "suggestions", or hands-on assistance. Any team sponsor or observers found assisting a team will be asked to leave the competition area for the duration of the competition and/or a penalty will be assigned to the appropriate team.
- i. Team members will not initiate any contact with members of the Red Team during the hours of live competition. Team members are free to talk to Red Team members during official competition events such as breakfasts, dinners, mixers, and receptions that occur outside of live competition hours.
- j. Teams are free to examine their own systems but no offensive activity against any system outside the team's assigned network(s), including those of other CCDC teams, will be tolerated. Any team performing offensive activity against any system outside the team's assigned network(s) will be immediately disqualified from the competition. If there are any questions or concerns during the competition about whether or not specific actions can be considered offensive in nature contact the Operations Team before performing those actions.
- k. Teams are allowed to use active response mechanisms such as TCP resets when responding to suspicious/malicious activity. Any active mechanisms that interfere with the functionality of the scoring engine or manual scoring checks are exclusively the responsibility of the teams. Any firewall rule, IDS, IPS, or



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- l. All team members will wear badges identifying team affiliation at all times during competition hours.
  - m. Only Operations Team/White Team members will be allowed in competition areas outside of competition hours.
- 5. Internet Usage
  - a. Internet resources such as FAQs, how-to's, existing forums and responses, and company websites, are completely valid for competition use provided there is no fee required to access those resources and access to those resources has not been granted based on a previous membership, purchase, or fee. Only resources that could reasonably be available to all teams are permitted. For example, accessing Cisco resources through a CCO account would not be permitted but searching a public Cisco support forum would be permitted. Public sites such as Security Focus or Packetstorm are acceptable. Only public resources that every team could access if they chose to are permitted.
  - b. Teams may not use any external, private electronic staging area or FTP site for patches, software, etc. during the competition. Teams are not allowed to access private Internet-accessible libraries, FTP sites, web sites, network storage, email accounts, or shared drives during the competition. All Internet resources used during the competition must be freely available to all other teams. The use of external collaboration and storage environments such as Google Docs/Drive is prohibited unless the environment was provided by and is administered by competition officials. Accessing private staging areas or email accounts is grounds for disqualification and/or a penalty assigned to the appropriate team.
  - c. No peer to peer or distributed file sharing clients or servers are permitted on competition networks unless specifically authorized by the competition officials.
  - d. Internet activity, where allowed, will be monitored and any team member caught viewing inappropriate or unauthorized content will be subject to disqualification and/or a penalty assigned to the appropriate team. This includes direct contact with outside sources through AIM/chat/email or any other public or non-public services including sites such as Facebook. For the purposes of this competition inappropriate content includes pornography or explicit materials, pirated media files, sites containing key generators and pirated software, etc. If there are any questions or concerns during the competition about whether or not specific materials are unauthorized contact the White Team immediately.
  - e. All network activity that takes place on the competition network may be logged and subject to release. Competition officials are not responsible for the security of any information, including login credentials, which competitors place on the competition network.
- 6. Permitted Materials
  - a. No memory sticks, flash drives, removable drives, CDRoms, electronic media, or other similar electronic devices are allowed in the room during the competition unless specifically authorized by the Operations or White Team in advance. Any

violation of these rules will result in disqualification of the team member and/or a penalty assigned to the appropriate team.

- b. Teams may not bring any type of computer, laptop, tablet, PDA, cell phone, smart phone, or wireless device into the competition area unless specifically authorized by the Operations or White Team in advance. Any violation of these rules will result in disqualification of the team member and/or a penalty assigned to the appropriate team.
- c. Printed reference materials (books, magazines, checklists) are permitted in competition areas and teams may bring printed reference materials to the competition as specified by the competition officials.

7. Professional Conduct

- a. All participants, including competitors, coaches, White Team, Red Team, Ops Team, and Gold Team members, are expected to behave professionally at all times during all CCDC events including preparation meetings, receptions, mixers, banquets, competitions and so on.
- b. In addition to published CCDC rules, Host Site policies and rules apply throughout the competition and must be respected by all CCDC participants.
- c. All CCDC events are alcohol free events. No drinking is permitted at any time during competition hours.
- d. Activities such as swearing, consumption of alcohol or illegal drugs, disrespectful or unruly behavior, sexual harassment, improper physical contact, becoming argumentative, willful violence, or willful physical damage have no place at the competition and will not be tolerated.
- e. Violations of the rules can be deemed unprofessional conduct if determined to be intentional or malicious by competition officials.
- f. Competitors behaving in an unprofessional manner may receive a warning from the White Team, Gold Team, or Operations Team for their first offense. For egregious actions or for subsequent violations following a warning, competitors may have a penalty assessed against their team, be disqualified, and/or expelled from the competition site. Competitors expelled for unprofessional conduct will be banned from future CCDC competitions for a period of no less than 12 months from the date of their expulsion.
- g. Individual(s), other than competitors, behaving in an unprofessional manner may be warned against such behavior by the White Team or asked to leave the competition entirely by the Competition Director, the Operations Team, or Gold Team.

8. Questions, Disputes, and Disclosures

- a. **PRIOR TO THE COMPETITION:** Team captains are encouraged to work with the Competition Director and their staff to resolve any questions regarding the rules of the competition or scoring methods before the competition begins.
- b. **DURING THE COMPETITION:** Protests by any team must be presented in writing by the Team Captain to the White Team as soon as possible. The competition officials will be the final arbitrators for any protests or questions arising before, during, or after the competition. Rulings by the competition officials are final. All competition results are official and final as of the Closing Ceremony.



- c. In the event of an individual disqualification, that team member must leave the competition area immediately upon notification of disqualification and must not re-enter the competition area at any time. Disqualified individuals are also ineligible for individual or team awards.
  - d. In the event of a team disqualification, the entire team must leave the competition area immediately upon notice of disqualification and is ineligible for any individual or team award.
  - e. All competition materials including Injects, scoring sheets, and team-generated reports and documents must remain in the competition area. Only materials brought into the competition area by the student teams may be removed after the competition concludes.
9. Scoring
- a. Scoring will be based on keeping required services up, controlling/preventing unauthorized access, and completing business tasks that will be provided throughout the competition. Teams accumulate points by successfully completing Injects and maintaining services. Teams lose points by violating service level agreements, usage of recovery services, and successful penetrations by the Red Team.
  - b. Scores will be maintained by the competition officials and may be shared at the end of the competition. There will be no running totals provided during the competition. Team rankings may be provided at the beginning of each competition day.
  - c. Any team action that interrupts the scoring system is exclusively the responsibility of that team and will result in a lower score. Should any question arise about scoring, the scoring engine, or how they function, the Team Captain should immediately contact the competition officials to address the issue.
  - d. Teams are strongly encouraged to provide incident reports for each Red Team incident they detect. Incident reports can be completed as needed throughout the competition and presented to the White Team for collection. Incident reports must contain a description of what occurred (including source and destination IP addresses, timelines of activity, passwords cracked, access obtained, damage done, etc.), a discussion of what was affected, and a remediation plan. A thorough incident report that correctly identifies and addresses a successful Red Team attack may reduce the Red Team penalty for that event – no partial points will be given for incomplete or vague incident reports.
10. Remote Team Site Judging and Compliance
- a. With the advent of viable remote access technologies and virtualization, teams will have the ability to participate in CCDC events from their respective institutions. This section addresses policy for proper engagement in CCDC events for remote teams.
  - b. Remote teams are required to compete from a location with controlled access, i.e., a separate room or a portion of a room that is dedicated for use during the CCDC event. Workstations and internet access must comply with published requirements.

- c. One or more Remote Site Judge(s) must be assigned to the team site. At least one Remote Site Judge must be present at the remote site for the duration of the event in order to facilitate the execution of the CCDC. The qualifications of Remote Site Judge are the same as Event Judge. Subject to the specifications of the remote competition, the responsibilities of the Remote Site Judge may include the following:
  - i. Be present with the participating team to assure compliance with all event rules
  - ii. Provide direction and clarification to the team as to rules and requirements
  - iii. Establish communication with all Event Judges and provide status when requested
  - iv. Provide technical assistance to remote teams regarding use of the remote system
  - v. Review all equipment to be used during the remote competition for compliance with all event rules
  - vi. Assure that the Team Captain has communicated to the Event Judges approval of initial system integrity and remote system functionality
  - vii. Assist Event Judges in the resolution of grievances and disciplinary action, including possible disqualification, where needed
  - viii. Report excessive misconduct to local security or police
  - ix. Assess completion of various Injects based on timeliness and quality when requested by Event Judges
  - x. Act as a liaison to site personnel responsible for core networking and internet connectivity
  - xi. Provide direct technical assistance to teams when requested by Event Judges
  - xii. Provide feedback to students subsequent to the completion of the CCDC event
- d. A recommendation for Remote Site Judge(s) is expected to be given from a Team representative of the participating institution to the CCDC Event Manager. Remote Site Judge(s) must not be currently employed, a student of, or otherwise affiliated with the participating institution, other than membership on an advisory board. CCDC Event Managers should also be apprised of a contact from the participating institution responsible for core networking and internet connectivity that will be available during the CCDC event.

#### 11. Local Competition Rules

- a. Unless otherwise stated below the rules of the National Collegiate Cyber Defense Competition will serve as the rules of the official rules of the Mid-Atlantic Collegiate Cyber Defense Competition all-inclusive and unaltered.

#### 12. Red Team Attack Rules

- a. Confine attack activity to the official target list located on the ScoreBot player page.
- b. No physical attacks without prior approval.
- c. No physical contact with any blue team player during the competition.

- d. If contact is necessary with a white team, black team, or a competition staff member, red team members must identify themselves as a member of the red team.
- e. No Distributed Denial of Service (DDoS) attacks.
- f. No attacks that are not recoverable by blue team action or recoverable only through a virtual machine revert to snapshot or rebuild performed by the operations team.

## General Information

### Red Team

The Red Team will be attempting to find and exploit weaknesses in each Blue Team's environment. All systems reachable by the Red Team within the Blue Team's internal and external IP address space are valid targets. This includes systems that are not being scored. The goals of the Red Team are to:

- Obtain execute privilege on the defenders' systems
- Acquire flags
- Steal Data
- Corrupt data
- Prevent Data Transmission
- Disable services

### Scoring

All Blue Teams start with 0 points. Blue Teams are ranked against each other in order of highest (best) to lowest score.

Blue Teams will be scored across the following domains:

1. **Services:** All scored services must remain up, available, and with a high degree of integrity. All services are given a predefined point value and will be checked periodically in service rounds. There will be approximately 30 service rounds at random intervals during the competition. For each service that passes the necessary check the team will receive the appropriate number of points for that service. Partial points may be awarded if services are online, but not fully functionally or with a compromise to integrity. Red Team activity can adversely affect service scores. The more service points a team receives, the better.
2. **Injects:** Throughout the competition, the Blue Team will be presented with Injects. An Inject is any assigned task to be completed in the appropriate amount of time. The type



of Injects will vary in nature and be weighted based upon the difficulty and time sensitivity of the tasking. Tasks may contain multiple parts. Sample Injects include creating policy documents, making technical changes and attending meetings. If the Inject is completed on time and to the standard required, the team will receive the appropriate number of points. Unless indicated otherwise, the Team Captains may assign Injects to specific team members for completion. Partial points may be awarded for Injects that are not fully completed but have some completed elements. Red Team activity can adversely affect Inject scores. The more Inject points a team receives, the better. Injects can be delivered through any number of methods and will include the point values and time restrictions associated with the task. Upon completion of the Injects, the performance of the Blue Team will be noted and scores adjusted.

3. Malware Reports: All Blue Teams will search for and report malware discovered on their systems using the form similar to the one provided later in the team packet.

Raw scores are used for these scoring metrics. Blue Teams are ranked using an ordinal scale, which is a measurement scale that assigns values to objects based on their ranking with respect to one another. For example, a first-place finish in the Service Functionality scoring metric warrants an ordinal score of 1; a second-place finish warrants an ordinal score of 2; up to an eighth-place finish warranting an ordinal score of 8. This process is repeated for the Inject scoring metrics.

The ordinal scores from the three (3) scoring metrics are then totaled for each Blue Team, yielding a combined ordinal score, which is used to rank the Blue Teams from first through eighth-place. The winning Blue Team will be based on the lowest combined ordinal score obtained during the competition time.

### **Tie Breakers**

In the event of a tie for first place, the team with the highest raw combined Inject and service score will win.

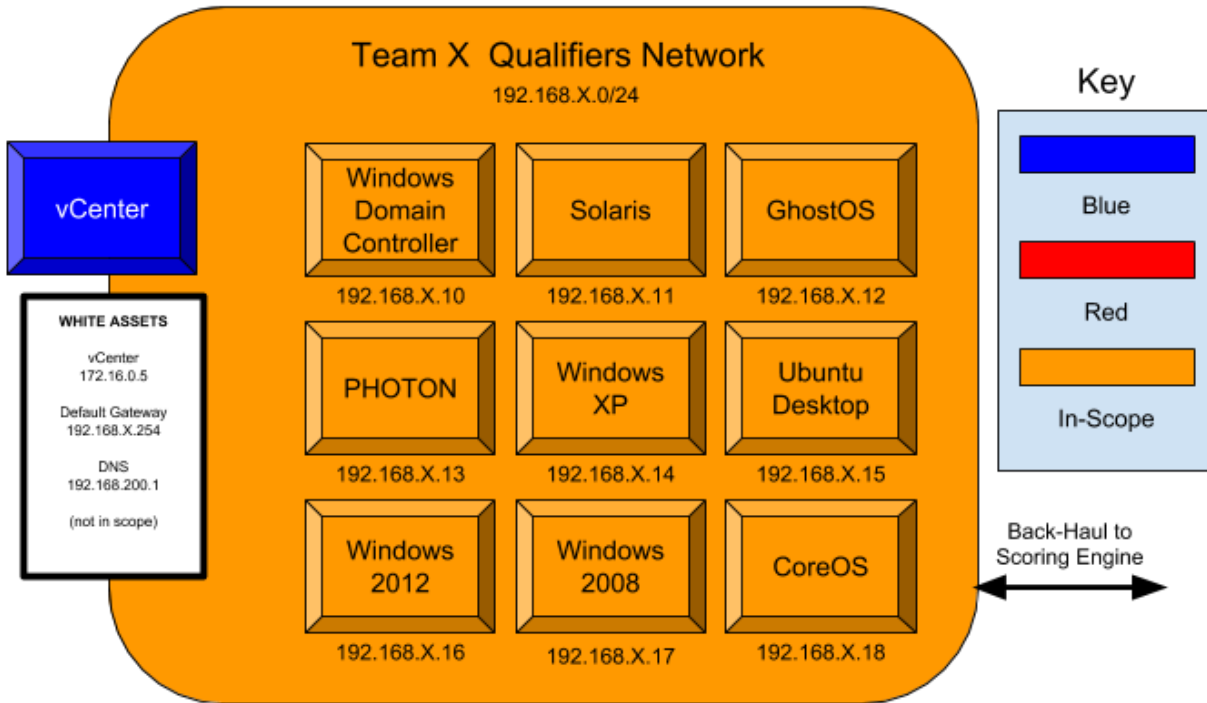
# Competition Range Information

## Blue Team Network and Assets

### IP Address Listings

Qual Round	Team #	Company	Subnet
1	1	George Mason University	192.168.1.0/24
1	2	Catawba Valley Community College	192.168.2.0/24
1	3	Marshall University	192.168.3.0/24
1	4	Millersville University	192.168.4.0/24
1	5	Drexel University	192.168.5.0/24
1	6	ECPI University	192.168.6.0/24
1	7	West Virginia University	192.168.7.0/24
1	8	The University of Virginia's College at Wise	192.168.8.0/24
1	9	Delaware Technical Community College	192.168.9.0/24
1	10	St. Vincent College	192.168.10.0/24
1	11	County College of Morris	192.168.11.0/24
2	1	Capitol Technology University	192.168.1.0/24
2	2	Virginia Polytechnic Institute and State University	192.168.2.0/24
2	3	Blue Ridge Community and Technical College	192.168.3.0/24
2	4	University of Virginia Team 1	192.168.4.0/24
2	5	University of Virginia Team 2	192.168.5.0/24
2	6	Virginia Commonwealth University	192.168.6.0/24
2	7	East Carolina University	192.168.7.0/24
2	8	UMBC Team 1	192.168.8.0/24
2	9	UMBC Team 2	192.168.9.0/24
2	10	Community College of Baltimore County	192.168.10.0/24
2	11	Liberty University	192.168.11.0/24
3	1	Bloomsburg University	192.168.1.0/24
3	2	University of Maryland	192.168.2.0/24
3	3	Penn State University	192.168.3.0/24
3	4	Wilmington University	192.168.4.0/24
3	5	Towson University	192.168.5.0/24
3	6	Northern Virginia Community College Team 1	192.168.6.0/24
3	7	Northern Virginia Community College Team 2	192.168.7.0/24
3	8	Lehigh University	192.168.8.0/24
3	9	Frederick Community College	192.168.9.0/24
3	10	James Madison University	192.168.10.0/24
3	11	University of Maryland University College	192.168.11.0/24
3	12	Christopher Newport University	192.168.12.0/24

## Network Diagram



FQDN: **SPACEFORCEX.NET**

## Mission Critical Services

The term Mission Critical is an activity, device, service or system whose failure or disruption will cause a failure in business operations. All devices are considered mission critical. The following services are considered mission critical and will be scored based on the metrics found in the Scoring section above:

Server Name / Type	Internal IP	Ports
WINAD01 / Active Directory	192.168.X.10	LDAP - 445
SOLARIS01 / Blog	192.168.X.11	SSH - 22 HTTP-Wordpress - 80
GHOSTBSD01 / Monitoring	192.168.X.12	SSH - 22 HTTP-Nagios - 80
PHOTON / File and Chat	192.168.X.13	SSH - 22 HTTP NextCloud - 80 HTTP RocketChat - 8080
WINXP01 / Blog MYSQL	192.168.X.14	SMB - 445 MYSQL - 3306
UBUNTU01 / NFS	192.168.X.15	SSH - 22 NFS - 2249
WIN2K12IIS / IIS	192.168.X.16	SMB - 445 RDP - 3389 HTTP- 80
WIN2K8SQL / MSSQL	192.168.X.17	SMB - 445 RDP - 3389 MSSQL - 1433
COREOS01 / Developer	192.168.X.18	SSH - 22 HTTP-Struts2 - 80

## System Information

- **Windows Domain Controller** - Windows DCs are the central control point for Windows Domains. Policies, Users, Groups, and Security settings are centrally managed from these systems. All SMB checks across all systems will use the "SCOREBOT" domain user.
- **Solaris Wordpress Blog** - This blog relies on the MySQL backend and will be used for future Space Force X announcements.
- **Photon Container Server** - Photon is a minimalist server for running Kubernetes and Docker style containers. Both the NextCloud (File Storage) and RocketChat (Internal Chat Server) are required for business operations
- **CoreOS Container Server** - CoreOS is a minimalist server for running Kubernetes and Docker style containers. The Struts server is required for business operations
- **TrueOS** - This is the security BSD workstation which also runs Nagios for monitoring uptime and services
- **MYSQL** - This legacy database server has been around since SpaceForceX started its IT systems division.
- **NFS** - Network File System (NFS) is a distributed file system protocol allowing a user on a client computer to access files over a computer network much like local storage is accessed. NFS builds on the Open Network Computing Remote Procedure Call (ONC RPC) system. SpaceForceX utilizes this share to store mainframe data.
- **IIS** - Internet Information Services (IIS, formerly Internet Information Server) is an extensible web server created by Microsoft for use with the Windows NT family. IIS supports HTTP, HTTP/2, HTTPS, FTP, FTPS, SMTP and NNTP.
- **MSSQL** - The MSSQL Server is the location all flight data for SpaceForceX is stored. Microsoft SQL Server was chosen due to the compatibility with the rover software.