

TOURNAMENT PARTICIPANTS' GAMEPLAY AND RULES: 11 JUNE 2018

The CDDC 2018 competition is an integrated cybersecurity tournament (CST) for Institutes of Higher Learning or IHLs (i.e. Universities, Polytechnics, etc) and Junior-College/Integrated-Programme-level participants.

For the tournament (the "Event"), all participating teams will be scored based on their ability to successfully achieve both defensive-oriented objectives as well as cybersecurity-auditing, incident-response and other multi-faceted objectives.

To score big, you will be expected to think both directly and laterally. This is not built as a one-area/one-subject "hacking" or "capture-the-flag" format. This is a multi-topic, multi-challenge real-working-world-style tournament that will involve you having to (a) maintain legal compliance with the management-directed scope of work, (b) obtain clues and information from various different sources, (c) make logical and educated deductions and decisions based on the available information and environment encountered as well as cross-reference information acquired across the entire duration of the tournament, (d) prioritize objectives based on your team's strategy, (e) harden / defend your own server against attacks while ensuring that essential services needed for your server's end-users are kept operationally available at all times, (f) shift resources dynamically between goals and perform resource and time management depending on circumstances, (g) perform security-testing and audits of multiple targets across different subnets, etc. In short, you will want to complete as many mission objectives as accurately, as quickly and as to the letter as possible. Some targets are too easy, others not so much, and the big points require a lot of thinking and some effort. So some teams will have problems getting in first gear while others will be able to cruise along initially - but the further you get in, the harder it generally gets. And if you do compromise some servers, congrats but don't stop there - there is a lot more that you are have yet to encounter:)

Within the gameplay, whatever actions which are (i) not barred by the Event rules outlined in this document, (ii) not barred by any other related document issued pregameplay and/or during gameplay and/or (iii) not prohibited under any rule communication from the event organizers at any time before and/or during the gameplay, are allowed to be performed, as long as the actions themselves are not in violation of

Continuing on from the Pre-Gameday Briefing document, here's the gameplay/rules:

6. TEAM SETUP

The JC and IP teams will be in one tournament group competing against each other only, while the IHL teams (Polys and Unis) will be in a different tournament group competing against each other only.

Therefore, it is in your best interest to only target other teams belonging to your own tournament group because you gain absolutely nothing except wasting time and effort by targeting a team from the other tournament group.

The server IP assigned to your team will be made known to you via your team's G@meGe@r™ dashboard. **JC and IP teams will be in the 172.31.x.x subnet** while **IHL teams will be in the 172.30.x.x subnet**.

It is your own responsibility to check the identity of your targets before you attack them, lest you waste your time and effort:)

The G@meGe@r™ Dashboard

If you are reading this document, then congratulations - you have successfully accessed THINKSECURE® PTE LTD's G@meGe@r™ dashboard using your Gmail account. This is the central repository of information, objectives and challenges that are available to your team during this tournament. We recommend that you use your mobile devices' 3G / 4G connections to access this dashboard, though it is not mandatory to do so. However, if you get your credentials compromised for any reason (e.g. because you logged-into the dashboard through the tournament network and someone managed to sniff your credentials in transit, etc.), no one at the tournament will be able to help you recover from that.

Access and read <u>ALL</u> the files that you can see listed on the G@meGe@r™ dashboard using your Google account credentials. There is a ton of information and documentation inside these files pertaining to your assigned tasks (this workload reflects the real-world where bosses keep dumping work, rules and demands onto your desk). These files will contain all the documentation you need to progress in the tournament. Some documentation and challenges are given to you for free at the start of the game. The rest need to be earned or discovered.

In order to segment the information into smaller more-digestable chunks, the G@meGe@rTM dashboard is divided into different selections. These sections are accessible by clicking or tapping on the **little Menu icon on the top left corner** of your web browser or device screen. The respective sections on the G@meGe@rTM dashboard are as follows:

(note: if you can't see some values or the sections at the left of the screen clearly, just rotate your screen to landscape mode for a mobile device, view using a larger mobile device like a tablet or change your screen resolution if using a laptop. In fact, for mobile devices, we recommend you view the dashboard in landscape orientation by rotating your device to landscape orientation.)

(i) "Profile" section:

This is the default section that you will see after you successfully log into the dashboard. It contains important details pertaining to your team, such as your Team Name, Team Category, Team Secret value and Team Server IP address. There is also a "Total Score" field inside this page which allows you to see your team's current total score (i.e. both attack and defence scores combined) as well as the total number of submissions you have entered into the G@meGe@rTM system. Make sure you become intimately familiar with the information listed in here.

(ii) "Documentation" section:

This section contains all the documents that your team has current access to. The list of documents available to you may change depending on your actions during the tournament. Remember to check back regularly to see if there are any new files that appear.

(iii) "Time Challenges" section :

This section contains some challenges that add up towards achieving your primary objectives for the tournament. When you feel you have achieved a Time Challenge, you should either click on the relevant Time Challenge URL listed under this section to enter your information inside.

If you have successfully achieved the objective, your team's new total score will be reflected on the scoreboard as well as on the "Total Score" field inside your Profile section.

If the system deems you have not successfully achieved the objective, then it will not be reflected on the scoreboard. Don't bother asking the GameMaster about how you think you are right when you really aren't.

If the scoreboard does not update immediately, give it 5 or so minutes.

If the scoreboard and the "Total Score" field inside your Profile section never updates after your entry, then do not bug the GameMaster why you didn't score any points because you really didn't."

Note that some objectives are not listed in this section, for example any one targeting other teams' corporate server. This is because the reward for that is to see the other teams' defensive points go down. :)

(iv) "Kamikazes / Others" section :

This section contains all the secondary challenges and various other challenges that you currently have access to. The list of Kamikazes and/or Others available to you may change depending on your actions during the tournament. Apart from finding them scattered all around the Tournament infrastructure, sometimes you may also get them after successfully accomplishing a Time-Challenge or they may also be released as and when the GameMaster sees fit. Therefore, remember to check this section regularly to see if there are any new files that appear.

If you find a Kamikaze, in the infrastructure, it will be in the format "Kamikaze <name of challenge> - <secret value>". Go to the + sign at the top right of your Kamikaze section and click on it. This will bring you to a page where you can enter the discovered values into the 2 fields you see there.

For example, if you find a Kamikaze with the display "KAMIKAZE NUTS123 - PEANUTS", then you should click on the + sign and enter "KAMIKAZE NUTS123" into the "Kamikaze Name" field and "PEANUTS" into the "Kamikaze Secret" field.

If it is a legitimate Kamikaze, it will then be added to your list of available Kamikazes. If it's not legit (as in someone got into the location and put up a fake one) or you typo'ed, you won't see anything added.

When you feel you have the correct answers for a Kamikaze and/or Others, you should click on the relevant Kamikaze URL listed under this section to enter your desired answers for the Kamikaze and/or Others inside.

Once you have successfully tackled a Kamikaze and/or Others challenge, it will disappear from your listing and your score will be reflected on the scoreboard and the "Total Score" field inside your Profile section. If the system deems your answers were wrong, then the kamikaze will disappear from your listing and it will not be reflected on the scoreboard nor on the "Total Score" field inside your Profile section. Thus, all Kamikazes and/or Others will subsequently disappear from your display after your team submits a response, regardless of whether the response is correct or not.

If the scoreboard does not update immediately, give it 5 or so minutes. If it never updates after your entry, then move on and don't bother asking the GameMaster why you didn't score any points because you really didn't. :)

Also, sometimes your response might not be accepted if a Kamikaze is a "one-shot" Kamikaze which has already been successfully answered by another team who beat you to clicking the submission button. So if 10 teams are attempting such a "one-shot" Kamikaze and one team presses the submit button faster, the system

will then not allow the other 9 teams to submit their answers even though the Kamikaze may be currently displayed in their web browsers. In such a case where it happens to you, you are advised to move on and do other things as another team beat you to the submission. There is no point asking the GameMaster for help for this situation because it is intentionally designed that way. :)

(v) "Rewards" section:

This section contains any information issued to you as a result of successfully completing a Kamikaze, some other challenge or released at any time as and when the GameMaster sees fit. The list of information available to you may change depending on your actions during the tournament. Remember to check back regularly to see if there are any new entries that appear.

(vi) "Starters" section:

Only in use by the JC/IP tournament group. If you are part of the JC/IP tournament group, please refer to your "README-FIRST" document under the "Documentation" section.

7. RULES OF ENGAGEMENT

(i) Primary and Secondary Objectives

You have multiple objectives tasked to your team and these are generally spelt out in the following pages of this document, with further specific details inside the other documents displayed under your G@meGe@r™ dashboard.

• Primary Objective 1 - Offensive Objective

This primary objective is to perform an audit and assurance engagementy test against the infrastructure of the Garponesi Interior Ministry (or "GIM" for short) and the Garponesi Defense Ministry (GDM) in an attempt to get as deep as possible into their networks and systems and recover target data located deep within the target network segments. Successful actions such as proving access into the GIM or GDM infrastructure, recovering certain target information, etc, can earn **offensive points** for your team and these points are reflected on the scoreboard. The more offensive points you have that contribute to your total point score, the greater your total point score and the greater the likelihood of winning.

For this Primary Objective 1, you may **ONLY** engage the "Scope of Work" targets belonging to the GIM and GDM infrastructure that have been specified within the relevant in-game documentation URLs.

To get a complete detailed view of what targets fall under the scope of work, please view ALL the ingame documentation by clicking on the relevant links in the G@meGe@r™ dashboard's "Documentation" section (or any other section as the case may be, e.g. "Rewards" section) as they appear inside your G@meGe@r™ dashboard.

Information regarding your primary and secondary objectives will be published on your "Documentation" section when the tournament is officially started as per the GameMaster's announcement.

Make it a point to check your G@meGe@r $^{\text{TM}}$ dashboard often and read everything that appears, even if it seems to be irrelevant (because all information in life is useful - it just depends WHEN the opportunity to use the information comes along!).

Please note that the definition of "engage" is to perform any kind of testing activities against a target, regardless of whether it succeeds or not. You may also encounter unexpected situations or technologies, in which case you will have to apply "Ask The Oracle" and "Trust and Verify" approaches to addressing the problem and moving ahead.

Your team will start off from a location on the general Garponesian government public network segment which is in the **172.x.x.x** range. All Garponesian government agencies and their respective servers, including the

agency you have been assigned to and its server that you are defending, can be reached from and within this public network segment. You have CAT5 data cabling on your table which connects you to this public network segment.

Once you are connected to the public network segment, you are required to apply all your skill and knowledge to find out how to get to the relevant targets under the scope of work, including but not limited to cross-referencing and making logical deductions based on any and all available / discovered information. Apart from containing all the Garponesian government agency servers run by each respective team, the public network segment also links you to various other parts of the Garponesian government network, in particular the GIM and GDM networks..

If you want to access the general internet outside the Garponesian government public network segment to download stuff or do research, please refer to point 10 of this document.

Primary Objective 2 - Defensive Objective

Your team is responsible for the defense of agency-related services residing on a server (contained inside the laptop marked "server" or "s") that are necessary for communications the agency's users. The agency's users transact with the services and you will have to keep them operational at all times, while hardening them and constantly monitoring them for attacks. As these services are residing on a network that is connected to the public internet and other agencies as well, these services therefore represent a very tempting target for other parties as any outage would most certainly embarrass the agency your team is assigned to protect because it would be perceived to be incompetent or incapable in the public eye.

To represent the requirement imposed on you by your GIM superiors to defend your agency's services against third-party attack, your team is allotted a starting amount of **defensive** points. These defensive points generally represent how well you defend your team's services from attacks by any other parties (e.g. other teams that are tasked with auditing your agency services, etc) such that your agency's users are able to access the agency services on demand.

This primary objective is to ensure that <u>ALL</u> the following services residing on the server operated by your team are kept operational and running such that its users (represented by various resources that the GameMaster controls) can access each of the following services to perform normal request and viewing actions associated with each service residing behind the listed port:

FTP service on TCP port 21 SSH service on TCP port 22 HTTP service listening on TCP port 80 and 8081 Database service listening on TCP port 3306 RPC service listening on TCP port 111

For this defensive primary objective, you can use <u>ANY</u> manner of defensive action / approach / technique that is applicable to the services to ensure that the services (and their respective functionality and content) are all kept operationally secure, online <u>AND ACCESSIBLE</u> at all times.

After the tournament is officially started, you will be given a limited amount of time to perform the aforementioned defensive actions/approaches/techniques you deem fit and necessary before your customers start accessing your services. The duration of time depends on which participant category you are in and is as follows:

For IHL-category teams, the start of the user access period is from **1000 hours onwards** till the end of the tournament so your services had better be operational and reachable by the GameMaster from that point onwards; and

For JC/IP-category teams, the start of the user access period is from <u>either</u> 1000 hours <u>or</u> 2 hours after the completion of the <u>last</u> starter challenge by any JC/IP team, <u>whichever is later</u>, so your services need to be operational and reachable by the GameMaster from that point onwards.

Accordingly, whatever defensive actions you wish to take such as patching the service, upgrading to a new service, changing the service code, etc, it is important that you must ensure all **EXISTING user-accessible service content, banners, user information, user account names and user privileges which are accessed by your customer users** as found on the system, service and/or in the directories are kept exactly the same and unchanged in all respects, so that the users can access the services in the manner that they are accustomed to.

In the real-world of work and industry, we don't get spoon-fed by bosses, supervisors, lecturers or teachers, so to prepare you for that, it is up to you to discover which of the aforementioned service content is being accessed by users (because once you start working in the real-world, you have to find the answers yourself or suffer the wrath of the boss - sad but true fact of life). Hint: try visiting your own services:)

Therefore, during the performance of all your activities, you should always ensure that the services on the server which your team is responsible for are always available from the start of your respective user access period.

If at any time the users try to access any of the services you are responsible for and in the manner that they are accustomed to and are unable to do so, your defensive point total will suffer a deduction which is based on the extent of the failure to connect to the defined services mentioned above. Therefore, the longer the users cannot access these defined services, the more points you will lose from your defensive point total. If your defensive point total is reduced to zero on the scoreboard, your team will be considered to have been suffered total service outage, as represented by the zero defensive point score.

As you never know when another third-party or team has successfully compromised your server and/or has disabled your services, it is a good idea to keep an eye on your defensive points on the scoreboard. If you see them dropping regularly, you might want to check the connections into and out of your team server, whether the services are up, did you mess up your routing table, firewall rules, etc.

IMPORTANT REMINDER: YOU SHOULD ENSURE THAT YOUR SERVER IP ADDRESS IS CONFIGURED BEFORE THE START OF THE USER ACCESS PERIOD. YOU WILL AUTOMATICALLY START LOSING POINTS IF YOUR SERVER IS NOT REACHABLE BY THE USERS WHO ARE DETERMINING IF YOUR SERVER IS UP (AND DON'T ASSUME YOU HAVE EVERYTHING WORKING - AN ATTACKER MIGHT BE ON YOUR SERVER MESSING UP THE SERVICES, ROUTING TABLES, ETC). ALSO, IMMEDIATELY CHANGE ALL YOUR SERVER'S OS AND APPLICATION ACCOUNT LOGIN PASSWORDS TO SOMETHING ONLY YOUR TEAM WOULD KNOW.

Primary Objective 3 - Auditing Other Agency Servers

This one is a unique objective in that you don't score any points for doing it successfully. Instead, you make another tean lose its defensive points! This is the one objective where Denial-of-Service against the target is expressly allowed.

However you should ensure that it is a targeted DoS because a traffic-based DoS attack attempt may also suck up your bandwidth such that your own agency server is not reachable by your agency users and you may end up reducing your own defensive points instead!

Hint: in order to identify other servers, you should take a look at how your own server is configured.

• Primary Objective 4 - Time Challenges

There are time challenges regarding completion of certain objectives. Teams which manage to successfully complete key objectives which pertain to the listed time challenges based on scoring system determination will be awarded points based on the time they take to successfully complete said key objectives. Time challenges will disappear from your dashboard upon successful completion.

Secondary / Kamikaze Objectives

At various points in the game, there will be additional challenges presented to you in the form of secondary objectives called KAMIKAZEs. These are ad-hoc objectives which are behind your primary and secondary objectives in priority. However, they are still valuable - if they are successfully accomplished, all will yield extra points for your team. In some cases, they may also additionally provide extra clues and information to help you along and these clues and information will be displayed in the "Rewards" section where applicable.

A KAMIKAZE can be identified by the word KAMIKAZE followed by a hash value in the body of the information display of the resource you encounter. When you find a KAMIKAZE and wish to take up the challenge, simply enter the discovered hash value information inside the "Kamikaze" section of your dashboard and the URL details for that particular KAMIKAZE challenge will then appear inside "Kamikaze" section of your dashboard.

Note that other teams might try to create spoofed/fake KAMIKAZEs in the in-game infrastructure, so if you *don't* see a KAMIKAZE challenge appearing after you submit the hash value information inside the dashboard, then what you found was a fake. :)

(ii) General Rules & Information

- (a) Depending on your actions, you may encounter information at different points throughout the infrastructure. These might not be objectives in themselves but may provide valuable hints, clues and/or insight to help you along in attaining certain objectives (for example, you compromised a server but it didn't yield any points however you found some information inside one of its directories which turned out to reveal information that you would have gotten any other way, etc).
- Some of these might be particularly useful but you may need to analyze and correlate them (sometimes standalone and other times in conjunction with other information sources) in order to get maximum benefit. Note that some types of information may be more valuable than mere points, provided you know how to use the discovered information.
- (b) You are free to use any legitimate/legally-obtained equipment, software and/or tools that are relevant for engaging the scope-of-work targets to achieve the relevant primary objectives. So for example, you would use Nmap to portscan a server target that you are supposed to gain access to, but you would not use a Denial-of-Service tool against that same server target because then you wouldn't get access to it if it went down. However, regardless of what tools you choose to use, you will need to plan your engagement strategy effectively, manage your resources carefully, stay within the scope of work and prioritize your objectives in order to beat your competitors. And very importantly, you will have to perform a lot of "Trust & Verify" and "Ask The Oracle" in order to successfully complete your objectives and remain within the scope of work.
- (c) You will be competing against other teams and will need to ensure that you do not reveal or lose any information to any of the other teams. This means that you have to secure your software, hardware and information in <u>all</u> respects, including but not limited to the physical.
- (d) In the past, we have noticed that teams belonging to the same institution may attempt to help and communicate with each other regardless of whether there are any rules stating otherwise. As this may cause the perception that they have a numbers advantage, we would suggest to teams who are the only representative from their organization **AND** who feel outnumbered to reach out to other sole-representative teams of other schools to form your own coalition to counter-balance the numbers.
- Since we are on the topic, it is **NOT TRUE** that greater numbers will win this game. You could have 10000 average people versus 1 Albert Einstein, but the Albert Einstein would make a much larger impact and difference even though it is 10000 versus 1 (google $E=MC^2$ for the proof).
- (e) GIM DH takes a very serious view of any party that tries to perform any denial-of-service (DoS) attacks to be performed against the GIM and GDM routers and services so intentional DoS attacks or against or attempts to deny access to any GIM and GDM targets and services are prohibited.

Also, as the main goal is to meet all primary and secondary objectives issued by the GameMaster, so you doing any kind of DoS attempt will only slow your own team down by sucking up your own switch-port bandwidth.

As long as the GIM and GDM routers and services are live and operational, you are not allowed to bring any of them down and it is expressly considered **outside of your scope of work** if you even attempt to do so.

GIM DH will not hesitate to take all measures necessary against attackers discovered to be intentionally performing any DoS attacks against the GIM and GDH network segments and their services, including but not limited to cutting off network access of the attacker, imposing punitive point penalties, etc.

8. SCORING RULES

The objective is to get the highest total point and the highest defensive point count on the scoreboard located at the front of the venue.

Your main point total is scored on the basis of the following:

- Achieving Primary Objectives
- · Achieving Time Challenges
- · Achieving Kamikaze Objectives

Note that there is negative scoring enabled for the tournament, i.e. if you perform certain actions which result in liability and bad press accruing to your team or submit wrong answers to certain challenges, you might get points <u>deducted</u> from your score. If you do not have enough points for a relevant deduction, your score may turn negative.

Defensive points are scored on the basis of the following:

 Keeping your services accessible on-demand by customer representatives. See the earlier section in this document entitled "Primary Objective 2 - Defensive Objective" for more information regarding how defensive points are won or lost.

More details about the objectives and challenges and what you need to do to score your points will be made known to you via the respective G@meGe@r™ dashboard sections when you meet certain in-game criteria.

In the event of any dispute in the tournament, the GameMaster's decision is final and no correspondence will be entertained. You are advised to take screenshots to prove your actions (2 screenshots are recommended: the "before" and "after") in the event of any dispute to show to the GameMaster to support your case prior to the GameMaster making a decision. No screenshots will be entertained **AFTER** a decision is made..

In the event of a scoring tie even after all scores have been computed, the team which scores the **combined** fastest times across **all** Time-Challenges will be declared the winner.

For the IHL category, where no Time-Challenge has been completed by any tied team, the GameMaster will use the timestamps for the fastest successful submission of the Kamikaze-DoMeFirst as recorded in the G@meGe@rTM system as the tie-breaker, subject to the GameMaster's manual determination on the validity of the scoring.

For the JC/IP category, where no Time-Challenge has been successfully completed for the teams with the scoring tie, the fastest team to complete their Starter challenges based on the timestamps recorded by the G@meGe@rTM system shall be used as a basis for determining the tie-breaker, subject to the GameMaster's manual determination on the validity of the scoring.

In such event of manual determination being required, the Scoreboard display may be over-ridden by the GameMaster's ruling where such determination is made manually based on the evidence and supercedes the automated scoreboard sorting order.

9. LEGAL / ETHICS RULES

As you are representing your team and its values, it is very important that you understand concepts such as staying within the assigned scope of work (i.e. the targets and objectives given to you) and following instructions.

From time to time, you might encounter situations that appear to require you to do something inconsistent with the scope of work. This is where you have a decision to make regarding whether to go ahead and do it or whether to stay within the scope of work. In the real world, in order to avoid causing outage, accruing liability and/or getting fired, you must always choose to remain within the scope of work, no matter how attractive the other options may appear to be. This will be reflected in the consequences that will occur should you be discovered to have performed any actions that are not in line with the scope of work.

It may not be instantly obvious that a situation itself is asking you to do something that is not covered under your scope of work. You may have to analyze, correlate and determine if the situation involves you having to do something outside the scope of work and take the appropriate course of action to stay within the scope of work.

Where there is any inconsistency between what you are asked to do or what you think you have to do versus the scope of work targets as initially communicated to you by your organization, the scope of work targets must always take precedence.

Subject to the situation, the GameMaster may not be able or allowed to give you hints or assistance in navigating your way out of such a situation and you will have to make your own decision based on the information on hand and your interpretation of it.

However, for the purposes of this tournament, even if you do get penalized because you forgot the boundaries and went outside the scope of work, don't give up!! If you can pull yourself together and carry on in the tournament, there are many other objectives that you can meet to potentially overcome any point penalty you may incur. Obviously, in the real-world, try to avoid going outside the scope of work in the first place!

Also, apart from the above and any other prohibition in any in-game document, you may not perform any action which is against and/or contravenes any law of the Republic of Singapore as listed at the website https://sso.agc.gov.sg .

10. INTERNET ACCESS INFORMATION

When you connect to the LAN cables on your team's table, you should automatically be assigned an IP address by the Garponesi government public network DHCP server. You are able to route to the wider global internet as well at the IP layer but if you can't or your name resolution is slow, you can opt to manually perform an additional step of setting an external DNS for name resolution (only if you want to get from the government public network to the wider public internet).

Thus, if you ever need to **manually set** your computer's DNS settings to resolve fully-qualified-domain-names faster on the public internet, you should use the following values :

Internet DNS servers: 8.8.8.8 and 8.8.4.4 (if in Linux, edit /etc/resolv.conf)

Alternatively, you can use your mobile device's 3G / 4G connections to access the internet.

If you want to set your DNS settings to revert back to the Garponesian government public network DNS servers, set your primary DNS to 192.168.168.100 and your secondary DNS to 192.168.168.101.

Note also that there is no such thing as "the internet is down", unless ALL the routers in the world are destroyed or disrupted. Network connectivity is complex and you need to know how to troubleshoot your own connectivity. For example, if 2 of your computers in the same LAN have the same IP address or MAC address set, you won't be able to reach anywhere else because of the conflict at your end. Thus you have to troubleshoot from the ground up (e.g. select a different value or troubleshoot your own computer to determine if your computer is at fault)