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The World Bank Crisis Simulation Exercise Handbook

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FIRST initiative 2.0

WORLD BANK GROUP

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Acknowledgments

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Introduction

For more than a decade, the World Bank's Finance, Competitiveness and Innovation Global Practice has assisted financial sector authorities in strengthening their preparedness and skills to manage crises through crisis simulation exercises (CSEs). CSEs provide authorities with the experience of dealing with crises and they allow them to practice decision-making, coordination, and communication so that they are better prepared should they ever face a crisis. The authorities' attitudes toward such exercises have evolved from keeping them a secret out of fear of sending the wrong signals to markets, to increased comfort with disclosing them and increased acceptance of them as a tool for crisis preparedness and management.

Crisis simulation exercises should be a mainstay of crisis preparedness toolboxes for all financial sector authorities. However, exploring such exercises as a fitting tool, let alone running them, can be a daunting task for authorities and can elicit countless questions. The purpose of this Crisis Simulation Exercise Handbook is to provide a comprehensive guide on CSEs, including how to conduct them, for use by financial sector authorities (and/or those assisting them). The handbook was prepared with generous financial support from the FIRST Initiative.[1]

Based on the World Bank's experiences from 39 tailored exercises to date (32 single-jurisdiction and seven regional) spanning over a decade, the authors draw upon close interactions with a large number of financial sector authorities from jurisdictions of varying development levels, capacities, and cultures. The handbook answers the following questions:

1. *What* is a CSE?
2. *Why* conduct a CSE?
3. *Who* should be involved in a CSE?
4. *When* should CSEs take place?
5. *Where* should CSEs take place?
6. *How* is a World Bank CSE run?

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1. The FIRST Initiative (https://www.firstinitiative.org/) has funded many CSEs over the years alongside the Financial Sector Advisory Center (FinSAC) (https://www.world-bank.org/en/programs/financial-sector-advisory-center).

The comprehensive answers to these questions are provided in chapters 1 through 6. Chapter 7 discusses the postexercise assessment and observations. Chapter 8 provides an exploratory discussion on how CSEs might be adapted, particularly to be conducted remotely, relevant for environments such as the COVID-19 pandemic. In addition, the handbook shares examples of CSE organizational tools that could be used as templates, includes links to open-source technology that the authorities can use to create their own CSE delivery platform, and shares time-saving computer programming codes for CSEs developed in-house.[2]

The goal of the handbook is to facilitate an understanding of the different ways CSEs can help authorities and to assist them in developing their capacity to run their own periodic exercises. Periodic CSEs will lead to better outcomes for solving problems that arise and mitigating the impact of a crisis should it ever come to pass.

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2. Python codes in this handbook are shared as references. Please note they are to be reviewed by knowledgeable local staff members and customized—and used by authorities at their discretion.

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Chapter 1: What Is a CSE (and What Is It Not)?

Defining Crisis Simulation Exercises

Because "simulation exercises" could mean different things to different people, when tasked with exploring this topic, it is important to first ensure that everyone involved understands and agrees on what is being required. Under discussion in this crisis simulation exercise (CSE) handbook, simply put, **is a tool to practice decision-making, coordination, and communication in dealing with a crisis**.

> *"The authorities can run all kinds of stress tests on the capital structures of the world's largest banks, trying to predict how well they would bear losses in a future crisis.* ***The stress test they really need to run is on themselves*** *[emphasis added]—whether they will stick to their promise to work nicely with each other or will revert to self-interest."*
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> John Gapper
> Financial Times, Nov 12, 2014

In the financial sector, the word "simulation" may be used in the context of data simulations, like stress testing analysis. However, when "simulation" is coupled with the word "exercise," it is helpful to discuss at the onset what crisis simluation exercises ***are not*** when describing what they are:

- They are not assessments or stress tests of financial institutions or systems done on spreadsheets or sophisticated simulator applications.

- They are not analyses of possible triggers and effects of various crises that could hit a country's financial sector.
- They are not diagnoses of issues in legal mandates, powers, policies, or procedures—CSEs may highlight shortcomings, but a comprehensive diagnostic cannot be the point of a CSE.
- They are not a "gap analysis" or a "test" of a country's crisis framework—CSEs may highlight shortcomings and/or aspects to be addressed but that should not be the main goal of a CSE.

For all the aforementioned important tasks, desk analyses by a few subject-matter experts, aided by interviews, would serve the purposes well. Also of note—a crisis simulation excercise cannot be a "test" or an "exam" of the authorities' abilities to deal with crisis situations—a point that is discussed further in chapter 2.

Types of Simulation Exercises

After accepting simulation exercises as a tool to practice decision-making, coordination, cooperation, and communication in dealing with crises, the authorities can consider different types of simulations.[3] In fact, by working through the answers to the six questions in this handbook (who, what, where, when, why, and how), authorities can consider which type of simulation best suits their needs and resources at a particular time, and can perhaps even arrive at a multi-year strategy for crisis preparedness using simulation exercises. Simulation exercise types include the following:

Drills: Many people are familiar with the concept of drills, wherein participants practice executing their respective administrative steps as called for in a defined setting or problem. The steps would most likely also be delineated (in some process or procedures document, related to regulations or laws) prior to the exercise, the purpose of which would be to increase participants' familiarity and efficiency in taking those steps through practice. In doing so, participants may realize issues previously missed, iron out details, and change the steps and hence the written procedures.

Case studies: Common in classroom settings, case studies allow participants to think through what to do or what issues to consider when faced with a well-defined scenario, usually based on real-life incidents that are written up as a case to study. All participants obtain the same packet of information detailing the facts of the problem and a set of questions to consider. In a group setting, a moderator may lead participants' discussions around the previously shared questions. Case studies may also be distributed to individuals and need not be a group exercise, although robust group discussion yields benefits.

Table-top exercises: Participants consider a well-defined scenario much like a case study, but discussions take place in stages as the scenario unfolds. Participants discuss their reactions from the point of view of their regular role or capacity, and through discussion become familiar with how things may unfold if faced with a similar scenario. They may discover potential issues in their respective handling of the situation at hand, and may ultimately revise anything from processes to laws.

Role-playing exercises: Similar to a drill in that the participants actually execute the steps called for (versus discussing what they would do), but very different in that in a role-playing game, the full setting or problem is not defined a priori for any participant. Similar to a table-top exercise, the facts of a problem unfold in stages, but it is different in that participants receive only pieces of information as they would in real life and have to communicate, coordinate, and often cooperate to identify and understand the problems and take actions according to their respective policies, procedures, laws, and regulations. Nearly all of the World Bank's CSEs are this type of simulation, which allows participants to practice managing a crisis under the "fog of war" that is similarly present in real situations. This current handbook focuses on this last type.

World Bank CSEs

Since the inception of the WB CSEs in 2008, the "how" of CSEs has evolved significantly, and with it our knowledge of how to best describe "what" CSEs are so participants

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3. The "types" referred to here are the different ways of conducting simulation exercises and not the types (or "scope" as discussed in chapter 3) of exercise scenarios. Scenarios come into focus during the second, or building, phase of the CSE process (see chapter 6). Sometimes, however, the discussion of the scope of the exercise scenario happens earlier when the host wants to practice a certain scenario, which will dictate who is to be invited.

reap the most benefit out of experiencing such an exercise. The World Bank's CSEs are best described as role-playing games of asymmetric information to practice decision-making, coordination, and communication. These CSEs are intended to provide a safe hypothetical environment for financial sector authorities to experiment making critical decisions given the existing or proposed legal and operational crisis management arrangements. The delivery is set up for extensive involvement of a counterpart team to help strengthen local capacity to regularly conduct similar exercises, without external help.

There are largely two groups in a CSE: the "Control Team" and the various "Player Teams." The Control Team consists of the CSE organizing members, who prepare the basic facts of the storylines that make up the basis of the eventual scenario, while the Player Teams are (or are role-playing) the decision-makers of the participating entities. During the exercise, the Control Team members role-play characters that are part of the storyline (and that are not represented by the Player Teams).

This means that they communicate prewritten messages (private emails or public news) to the relevant Player Teams of participating decision-makers. To cope with the asymmetric information resulting from the private messages, Player Teams decide what information to share with whom, how, and when. The Control Team members dynamically role-play in response to the actions/reactions that the Player Teams take. Player Teams eventually make, individually or collectively, decisions based on their understanding of the situation and following their legal and operational frameworks.

In this way, the CSE has been utilized as a tool for crisis preparedness and crisis management for financial sector authorities across the globe. As of December 2020, the World Bank's experience included 39 exercises, broken down into seven multi-jurisdiction/regional exercises and 32 single-jurisdiction exercises, in 27 countries, with some countries undergoing multiple rounds (table 1).

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Table 1: World Bank CSE Experiences

Regions	Number of single-jurisdiction exercises	Number of multi-jurisdiction exercises	Number of jurisdictions
East Asia and Pacific	3	1	2
Europe and Central Asia	13	2	10
Latin America and Caribbean	7	3	7
Middle East and North Africa	3		2
Sub-Saharan Africa	6	1	6
Total	32	7	27

Source: World Bank.
Note: Data as of December 2020.

"Realistic scenario was very interesting and it has enhanced my knowledge in dealing with real-life situations."
        – Player, Southern Africa single-jurisdiction exercise

"Above my expectations; highly recommend to be done again."
        – Player, Southern Africa single-jurisdiction exercise

"Need regular simulation exercises both per jurisdiction and cross border."
        – Control Team member, regional Southern Africa exercise

"The exercise showed shortcomings in communication and reporting lines."
        – Central bank board player, Eastern Europe single-jurisdiction exercise

"Certainly exceeded expectations. It seems that it was not fully scripted and was close to reality."
        – Commercial bank player, Eastern Europe single-jurisdiction exercise

LESSONS FROM THE GROUND

Early in our experience, we were neither adamant about defining the CSE, nor did we spend much time managing all the participants' expectations and explaining the best use of the CSE. In a particular single-jurisdiction exercise, the CSE was taken as a means to "test" the authorities' new crisis response binder. We belatedly realized the consequences of this misunderstanding when, during the exercise, the participants insisted on comparing every storyline "inject" against the crisis binder's cases and its steps on what to do with the information. Not only did this not fit into the necessary nonlinear time compression characteristic of CSEs, which created quite a confusion that we had to manage on the go, but also the CSE became a drawn out, inefficient event, parts of which could have perhaps been better served by a table-top or round table discussion. Nevertheless, the numerous usual benefits of undergoing a CSE still came through for the participants, as evidenced by their extremely concentrated engagement resulting in our longest ever exercise. Participants reported high satisfaction with their experience in which they, among other things, realized crisis binders may not dictate actions in a real crisis, nor can they possibly include all instructions to follow in a clear "if-then" format.

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Chapter 2: Why Conduct a CSE?

Motivation Matters

After understanding what simulation exercises are, authorities should ask "why" they wish to undergo a crisis simulation exercise before undertaking one. Figuring out the underlying motivation and desired purpose of the CSE is perhaps the most important step in exploring CSEs because it could mean the difference between a highly engaging, thought-provoking (and after-action inspiring) exercise and a majorly inefficient use of resources. In fact, trying to answer why a CSE is being requested/explored may lead the authorities back to question whether a CSE is indeed the best way to achieve the required goal.

There could be multiple valid motivations for wishing to undergo a CSE, but experience has shown that there are a few motivations that are not in sync with, and are even counterproductive to, the CSEs, as described in this handbook.

Again, the main motivation that makes CSEs fit for purpose is for participants to practice handling problems for better management, should problems occur in reality. Financial sector authorities mentioned more than once that the CSE provided "an excuse" to convene a large number of stakeholders who otherwise would not gather. Different derivations of this motivation include the following:

- Improving communication and crisis response among various stakeholders, including cooperation among regulators and between regulators and regulated entities;
- Propelling stakeholders into action post exercise, including making the case for introducing new regulations for certain topics such as cyber risks;
- Trying to handle a crisis within given mandates, regulations, laws, and available tools; and
- Drawing attention to any concerns in capacity in managing crises, and so on.

As with any initiative undertaken within or across institutions or jurisdictions, the support and buy-in of the top levels of the relevant entity/entities is a true asset. As an authority-driven CSE (versus one delivered by the World Bank or a similar external party), the support of the relevant senior management may be a given. Aside from this asset, regardless of who spearheads the exercise and no matter the scale (whether intra-division, intra-agency, or interagency), the key to success remains to be how the motivation of *practicing* is communicated and viewed by the participants. Setting this tone correctly falls on the organizers, as does safeguarding this purpose all the way through to the report and analysis stage.

When the purpose of "practicing" gives way to "testing," expectations of the CSE, as well as levels of participation, change.

Problematic Concept of "Testing"

A long discussion over the choice of wording, "test" versus "practice," may seem strange. After all, "testing" can merely be taken in spirit as a way to see whether something works as envisioned and to improve upon the results, which is in fact in line with the main goal of a CSE. However, "testing" can carry other meanings, which in our experience proved problematic. Whether the use of the word is with the intent to truly "test" frameworks, regulations, or abilities, or merely a slip of the tongue, the simple switch from "practice" to "test" has significant consequences that have compelled us to refrain from using the word "test" altogether. In fact, the benefits of taking more distance from the idea of "testing" have pushed us to present the CSE as a "game."

Once the CSE is viewed as a test (given by someone other than oneself), there is a change in incentives. At each social organizational level, there is a desire to be judged favorably, perhaps to outperform another person, division, or entity. There is an implicit assumption of correct/incorrect with grades or pass/fail, and a sense that the test proctors are looking for certain, maybe socially or professionally more acceptable, answers. For example, channeling textbook good practice in bank resolution, participants may insist on a private

sector solution even though it may not be feasible in the local context, instead of doing what they would actually do when faced with such a scenario.

THE PROBLEM WITH "TESTING"

- Pressure to achieve high marks (when there are no grades)
- Desire to outperform others or save face (as there are higher stakes if being tested)
- The tendency to give the "proctors" the "correct" answers (acting in ways they normally would not)
- The tendency to not disclose issues or lack of clarity/knowledge (for fear of being judged)

In many cases, these behaviors manifest into gross inaction—an unwillingness or inability of the decision-makers to make decisions within their authority and instead merely asking and waiting for more information. Some of this behavior is understandable and expected as a way of coping with stressful problems. However, when participants consider the exercise to be a very public exam of sorts, the inaction can be magnified, especially in cultures in which hierarchy reigns and one does not want to look bad in the eyes of subordinates, superiors, and other possible critics. This preoccupation takes away from the participants' ability to earnestly immerse themselves and to react realistically to the unfolding events; the biggest benefit and difference in undergoing a role-played simluation exercise rather than a case study is the acting, versus just talking.

In contrast, when participants embrace the concept of "practice," assisted by going as far as calling the CSE a "game," everyone can be comfortable to make mistakes and ask the "dumb" questions to learn the extent of the gaps in procedures or powers. In crisis mode, individuals can only make the best decisions for what they understand to be the problem, with the available, usually imperfect, set of information gathered from collaborating with the available sources. When the crisis is over, lessons can be drawn from reviewing what happened, and the participants gain experience on which to make future improvements. "Practice" also carries with it the meaning of

repeating to get better, instead of a checkmark of a "test," as no two crises nor responses to them can be the same.

The concept of practicing is the central element of World Bank CSEs, and ensuring the buy-in of this concept by all participants is a core task of the CSE delivery team. It is worth emphasizing that this rhetoric of practice and games needs to be carried throughout the exercise stages, all the way to reporting. It would be a breach of trust to call the CSE a game only to later make observations as if it were a test (more on this in the "how" and "post-exercise review" sections).

Purpose that Best Fits the Tool

Customarily, one looks for tools that fit a purpose. In the case of CSEs, the tool has been used for various purposes and agendas, including one-off "testing" as mentioned previously. The purpose that best fits the tool is to *practice* handling crises. Digging deeper into the "why" of CSEs, the value of the exercises really comes through when looking at what is being practiced—decision-making, coordination, and communication.

To become better at anything, practicing seems to be a no-brainer. But what should be practiced? Authorities can study the case of a certain past crisis, become familiar with the facts of the case, and derive lessons from how that case would be tackled next time (the case study). Authorities can even create a drill from that case, having individuals go through the motions of the required steps. Authorities can also replay the facts of the case in stages and discuss what they would do, and address any issues that come up, including gaps in policies, procedures, regulations, and/or laws. All these would be very worthwhile exercises.

However, like the Heraclitus quote, "Everything changes but change itself," it is highly unlikely that crises will stay the same. In fact, even with the exact same underlying scenario "injects" (messages) that happen in the same hypothetical financial system, when handled by two different groups of participants, the series of action-reactions by the particular individuals processing the information meant they ended up in two different sets of crises. In addition, too much reliance on past events and historical data (that is, operational losses) may lead to a biased picture of what could happen in the future. With this in mind, there is value in practicing handling any crisis, and the more surprising the crisis scenario, the better.

Managing crises requires making decisions, whether big (shutting down trading on the stock market) or small (sending a piece of information along to the next line manager), at various levels. Practicing taking decisive action in crisis settings would serve to increase the capacity and efficiency, and ultimately effectiveness, of those decisions. Participants in jurisdictions that have gone through any crisis are much more adept at processing and reacting to the unfolding situation. CSEs, rather than real crises, would be better to provide the experience and confidence needed to react to unfolding situations.

Strong communication and coordination are key to managing a crisis. The bigger the crisis, the bigger the number of stakeholders to engage, each with their own role and mandates. As a result, communication and coordination quickly become unruly and difficult. Practicing communication among stakeholders is necessary because not everybody knows all the relevant facts that define a problem, and timeliness is a crucial element in crisis management. Asymmetry of information is a fact in real life, with each stakeholder viewing the information from their own standpoint. Much time can be wasted in processing unhelpful messages and/or clarifying miscommunications when time is of the essence. Only by effectively communicating what each party knows and how they understand it, is it possible to identify the problem and actions to try and solve the problem.

Public communication can be a significant challenge in crisis management, hence the benefits in practicing the messaging, timing, and medium. Along with communication, coordination should be practiced for effective crisis management because crises may demand coordination and even collaboration by those unfamiliar with doing so in normal circumstances. Acting unilaterally in crisis situations can lead to mistakes with big consequences, some of which cannot be undone (like closing a financial entity without notifying the other regulators of the companies exposed to the closed entity).

LESSONS FROM THE GROUND

Several of our CSEs were originated by suggestions, sometimes in the context of Financial Sector Assessment Program recommendations. In one instance, such an inorganic motivation (as a requirement from an external source) proved problematic in many ways. Scheduling interviews with the relevant authorities was difficult, as was obtaining even the most basic data of the local system and market information to tailor the storylines. The input of the dedicated local staff that we usually invite to join the Control Team could not be relied upon. All this showed a lack of interest at the management level, as the exercise came to be viewed as something that was needed to be done to satisfy an external requirement. The CSE's success also likely suffered from a lack of trust that any weaknesses highlighted would not be shared outside of the delivery team. From this and other exercises, we derived a clear lesson that the best CSEs require a self-motivated counterpart entity with top-level support. In addition, everyone must view it as a practice (and sometimes it is most helpful to refer to it as a game), rather than as a test where weaknesses revealed may be (or be perceived to be) used against the participants.

On that note, a good example of an exercise providing practice is in feedback relayed from a central bank client. One of the systemically important banks that had participated in their CSE mentioned that the exercise provided insight on how to respond to real-life incidents and that in one specific case, they used the experience and actions taken during the CSE to respond to an actual system disruption.

Chapter 3: Who Should Be Involved in a CSE?

The answer to the question of "who" should take part in a CSE is "it depends." In defining the structure that works for a particular CSE, the authorities should consider factors such as who the main beneficiary of the CSE is, who wants to participate, who will be allowed to participate, and what the scope of the desired scenario is. The structure is highly flexible to accommodate the authorities' specific circumstances.

Entities in CSEs — CSE Types

The World Bank has conducted three different levels of CSEs, depending mostly on the requesting entity: intra-agency, interagency in a single jurisdiction, and multi-jurisdiction CSEs. From the point of view of the authority tasked with conducting the CSE, the type would simply be dictated by the desired scope.

When the exercise is to stay within the agency (an intra-agency CSE), the Player Teams would consist of a manageable number of teams, each representing a decision-making node. For example, for a central bank–only exercise, these could consist of an average of three Player Teams, usually a combination of the central bank board or governor, head of banking supervision, head of central bank operations, head of payments, head of information security or technology, and so on. The Player Teams do not have to mirror the real structures, and functions can be merged into a team befitting the focus areas for practicing crisis management.

An interagency single-jurisdiction CSE is created when multiple agencies wish to take part. The decision-maker for each entity would make up a Player Team, with the possibility of splitting up a Player Team such as the central bank to multiple sub entities if the sub entities will have a large role to play in the storyline. For example, a jurisdiction's central bank board or governor and the

head of supervision (usually also the registrar of banks) could make up two Player Teams, alongside the heads of the deposit insurance agency, the securities and exchange commission, the insurance and pensions regulator, and the finance minister. This wider roster of participants could also include representatives of private entities themselves (of course, explicitly invited by the host agency), instead of having them be role-played by the Control Team. In fact, the involvement of banks that were invited to a few exercises was pivotal in improving public-private communication and cooperation.

A multi-jurisdiction CSE is intended for a region or a subset that wishes to undertake an exercise together, given cross-border financial entities and issues. Depending on the number of jurisdictions and their preferences, representatives from each jurisdiction could make up a Player Team or take part in mixed groups regardless of their jurisdiction. Example Player Teams in this case could be the financial sector authorities of jurisdiction A, B, and C, or authorities split into the supervision entity and the finance ministry. The number of Player Teams does not need to reflect the number of jurisdictions involved in the exercise, as fictitious countries can be made up to fit the exercise's needs.

Individuals in CSEs

Within the broad question of "who" participates, authorities have asked "which level of representation is appropriate for CSEs?"

The participation of the strategic decision-makers (alongside the technical staff) greatly enhances the CSE for all and serves to provide these key actors with a "dry run" in handling crises. With the purpose of the exercise being to practice decision-making, coordination, and communication (and not to have an operational or technical drill), one thing is for sure—the Player Teams act as the decision-maker for the designated entity, regardless of whether that Player Team includes the real top-level decision-maker. That being said, the most successful CSEs did have the actual strategic decision-makers participating, making the interactions more realistic and thus the lessons drawn more insightful.

In many countries, this means participation of the central bank's governor, the minister or high-level advisors in the ministry of finance, the head of bank supervision and other senior financial sector regulators, and the central bank's head of banking operations. In some countries, however, some of those officials are frequently changing political appointees. In these cases, the participation of high-level career officials may have a more longlasting effect.

In more than one case, the level of participation from entities changed from the operational level to the management level once the authorities were convinced of the value of the CSEs, catching on perhaps to the practicing aspect of the CSEs. In one case, the authorities decided on a two-level approach, where the first experience would involve the working-level participants role-playing as the decision-makers, followed by the next CSE, where the management level would be invited to play themselves.

Depending on the nature of the exercise, financial sector authorities may be open to inviting market actors. This has happened, for example, in the case of simulations focusing on the response to cyber incidents. The important thing to keep in mind is making sure the market participants are aware of the nature of the exercise (that the exercise is for practicing and not meant to be an indication of real reactions of authorities), and that they would be called upon to make decisions as a fictional institution. They should be fully apprised of the exercise player details, including the level of the participating authorities.

The right combination truly depends on the jurisdiction and context. Perhaps a main guiding principle would be to have participants who want to partake of their own accord.

How Many Participants?

In considering who participates, the very practical limit of the number of participants could be one guiding factor. For the Player Teams, experience shows that groups of five to seven persons or less may be ideal for the level of intense collaboration that is required to both process the scenario

information as it arrives and discuss and decide on how to proceed as the one voice the team is intended to be. Large group dynamics may fail to deliver coherent responses to the interactions with other teams. Moreover, some participants in larger teams may not be fully engaged in the action.

One exception to this limit may be made for the teams that, by design, have a large load of information to process. This is often the case in the CSEs focused on the banking sector, where almost always the team representing the head of supervision includes a significant number of participants who need to be involved in the full lifecycle of multiple banks in a CSE. Depending on the CSE scenarios and possible merging of functions, other teams could also end up with a larger team. Careful management within the Player Team is critical. The ultimate choice of the number of participants within the teams and the management thereof is left to the participating entities.

The makeup of the Control Team can be more flexible. The Control Team is made up of the CSE leaders and the designated representatives of each of the areas the Player Teams represent, as well as others who bring in the expertise necessary to role-play a likely long list of characters in the storyline. Each area to be represented by a Player Team would be guided to designate two staff members to the Control Team for this purpose (and more if the communication load is expected to be heavy, as it would be for supervision). Any additional relevant roles without their own Player Team and any willing observers may join the Control Team. The number of observers could be limitless as long as they are given a realistic way to follow the exercise action and there is a clear understanding of expectations of their non-active participation. Cultural and professional sensitivities permitting, observers could also be "dispatched" to silently observe the Player Teams from within.

LESSONS FROM THE GROUND

In earlier exercises, we expended much energy trying to secure the participation of the high-level individuals to the Player Teams and we used to get discouraged when we were not successful. However, we had cases in which we did have the titular individual present but lacking full attention and other cases in which we realized the decision-maker in practice may in fact not be the title holder but rather their staff, who would benefit more from the CSE. In one instance, we had invited the finance minister at the behest of the host, the central bank, and were instead joined by less senior staff members of the treasury. Although they were not the top-level authority, they role-played the finance minister very well and stayed engaged enthusiastically the whole time, something that may not have happened with the sitting finance minister. In another exercise, the finance minister did join with the caveat that he could only stay an hour at most. He ended up staying the full day, including the debrief at the end of the day in what was one of our most fruitful post-exercise discussions. The conclusion was that regardless of the reasons for someone not participating, our role was to best relate the true purpose of the CSEs, their benefits, and how the exercises would be conducted so the authorities could decide for themselves.

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Chapter 4: When Should CSEs Take Place?

Sequencing of the Exercise

The question of "when" to undertake a CSE could be closely linked to "why"—for instance, the motivation to undertake a CSE can come when a jurisdiction experiences increasing vulnerabilities (often following the recommendation of a Financial Sector Assessment Program) or when there is a new crisis management framework being established or changes in a relevant regulation or law. The question could also arise from organizers or participants wondering whether they are ready to undergo such an exercise.

Put simply, there are truly no prerequisites to conducting or participating in a CSE and the utility of an exercise does not depend much on its timing, as long as motivations align with the purpose of the exercise (to practice). Thus, the answer would be the following: whenever enough motivation (whatever the sources, such as to prepare against increased vulnerabilities) is mustered and whenever resources allow.

More detailed discussion of "when" comes up most in relation to sequencing against an expected change to the way things are done, whether because of a new framework or changes in a relevant regulation or law.

If the interest in CSEs precedes the actual finalization and passage of such a milestone, it is natural to wonder whether the lessons from a CSE could inform the draft of the framework or changes in a regulation or a law. Indeed, it is possible to run a CSE as if the proposed changes are already in place, and the exercise may highlight some aspects to recommend edits for before finalization. In such a run, however, the organizers must ensure that all participants, including those in the Control Team, are aware of the "rules of the game" (that is, the details of the laws, regulations, supervisory guidance, framework, and so on) if they are different from those that the individuals are aware of from their day-to-day tasks.

If applying rules that are not yet completely familiar to everyone, the CSE would end up imposing a prerequisite that everyone study the new rule, in draft. Even if this in itself were acceptable to everyone and everyone actually did their "homework," complications may arise if there are any open or contentious issues in draft documents. These issues will need to be discussed in advance so everyone is in agreement on the details of how the new rules will play out in an applicable situation for their own mandate, role, policies, procedures, and so on. In this way, the attention could quickly be taken away from the practicing purpose of the CSE and hijacked by discussions over the rules, which may or may not be deemed applicable to the individuals who experience the scenario on the day of the exercise. It is important to remember that the main purpose of the CSE as described in this handbook is to practice decision-making, coordination, and communication, not to test the adequacy of the framework, regulation, and so on. Extra care should be taken to ensure that there is not a shift in focus, as the latter purpose may be better served with a different tool from the CSE (review chapters 1 and 2).

If participants are fully aware of proposed changes, an exercise can be an excellent tool for authorities to practice taking advantage of the proposed new tools to deal with the scenario. For this reason, it is only advisable to conduct the CSE with the new rules, if in reality the rules are in their near final stages.

Exercising Periodically

Given that the purpose of CSEs is to practice, perhaps the most important aspect of the answer to "when" is that CSEs are best conducted periodically. The experience of participating in a CSE should not be a one-off event and participants should not be expected to be experts in crisis management after one experience. Aside from the old "practice makes perfect" adage, one reason for repeating CSEs is that no two crises

are the same and variations in the scope of exercises (for example, varying participants and scenarios) are expected. Another very important reason is the inevitability of changes in personnel in any institution. Similarly, as much as exercising aims to depersonalize crisis management by emphasizing roles rather than the actual individual (through things like conducting the exercise in writing and using made-up names for financial institutions), it is difficult to separate the human, individual aspects of handling crisis situations. It is hoped that periodic CSEs following our methodologies will, over time, help participants in effective and efficient crisis management as practiced, regardless of the individuals "in office."

As CSEs move from one-off to periodic events, the value in having participants role-play other characters may be explored, as well as taking part in the Control Team instead of a Player Team and vice versa. With variations in experience, different realizations and lessons could be garnered, deepening the understanding among the participants for a more fluid and coordinated handling of real situations.

Deploying CSEs as a tool for crisis management really should mean periodic exercising, which would be served well by an in-house capacity to deliver CSEs. From the delivery angle, it would be helpful to have continuity in at least the core exercise organizers so that lessons learned from running prior CSEs can be applied to the next. Cultivating a core team of staff members in charge of delivering CSEs would be a worthwhile investment in enhancing crisis preparedness for the institution and jurisdiction.

Frequency of the practice depends on financial and human resource constraints, matched against the desired scope of the CSEs. For example, limited scope exercises may be run as often as once a quarter for select (and different) participants, but for institution-wide exercises that involve top-level decision-makers, it is generally recommended to hold them no more frequently than annually, even if resources allow, to be conscious of exercise fatigue.

LESSONS FROM THE GROUND

Understanding that the CSEs require heavy resources (albeit during a short period of time) that might be limited, it has been a common question to ask when it is best to undertake a CSE. Judging from the World Bank's body of CSE experience, the lessons from the CSE will best be gained if the existing or changed rule is able to be applied (reasonably) consistently by the players. Productive conversations on gaps in either existing or changed rules, difficulties in executing them, and so on, are more likely to happen if everyone is comfortable with their knowledge of the underlying legal and regulatory framework and able to concentrate on how to manage the crisis in front of them, not whether they understand the new rules correctly. Instead of focusing on the sequencing of the exercise vis-à-vis an expected change in rules, the best advice would be to just have a CSE whenever possible.

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Chapter 5: Where Should CSEs Take Place?

Locale Selection

In having a CSE, a host—usually the entity with more resources and high-level support—is identified early on. When the CSE involves one jurisdiction, the location is suggested by the host, who usually provides the venue. For multi-jurisdictional CSEs, the identified jurisdiction leading the effort or a secretariat for the group, whether formal or informal, may decide on the locale and venue. However, it falls on the CSE organizer to advise the selection by highlighting the requirements of the CSE to ensure the exercise can run smoothly.

Space Requirements

The question of "where" depends much on the CSE's host agency, but there are two key objectives in selecting the appropriate space:

1. Separation for visual and auditory isolation of groups—the space should be large enough to comfortably contain the Control Team and Player Teams in collaborative working table formations with enough of a visual and sound barrier among all the teams. This could be achieved by using separate rooms (within network signal strength limits—the point below); a large open space, preferably with barricade screens in between groups; or a combination.

2. Maximum network signal strength—the World Bank CSEs have been run by using a Wi-Fi router and creating a local area network that is not connected to the internet. (With collaboration from the host agency's IT specialists, there are other ways to create a network on which the CSE server may securely sit.) Assuming a similar set-up wherein the host agency uses a dedicated Wi-Fi router, the important factor in terms of CSE space is to ensure that all the hardware (usually laptops) that will be connected for the exercise can do so with a strong enough Wi-Fi signal. Weak signals can cause unintended consequences to the interaction, the crux of CSEs.

Aside from the above two non-negotiable points, one recommendation is to advocate for physical distance from normal work spaces. As much as the exercise offers a hands-on experience, it would be most beneficial to create an environment where participants have little or no other demands on their attention for the duration of the CSE. Although it may not be possible for everyone, being physically "out of the office" allows distance from the day-to-day activities.

Suggested locations have led the authors to conduct CSEs using spaces including a few participants' actual offices (least recommended) to fully offsite venues such as training centers several hours outside of the city.

(Chapter 8 deals with the options and adjustments to consider when it is not possible to have the CSE in a common physical space.)

LESSONS FROM THE GROUND

In the World Bank's experience, CSEs have been conducted in many different types of locations and spaces. Some concrete examples from previous CSEs include the following:

- One large ballroom in hotels with or without screens, depending on the size of the room
- Several smaller ballrooms and contiguous meeting rooms in hotels
- The full offsite training facility of a central bank
- One floor of unused office space in a central bank building
- An auditorium and smaller meeting rooms on two floors of a conference center
- A combination of meeting rooms and regular offices of a few central bank participants in close proximity

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Chapter 6: How Is a World Bank CSE Run?

The question of "how" merits the most space in the handbook—the World Bank's CSE methodologies are shared in detail so authorities are able to replicate them with some degree of confidence. Again, there can be many variations to how simulation exercises are run. This handbook refers specifically to how the World Bank CSEs are run.

CSE Process

Once the decision is made by an authority to have a CSE, the process of undergoing one can be broken down into four stages: planning, building, running, and reporting (see figure 1). There should be dedicated staff members to lead the efforts (or to be the lead counterpart to the external CSE specialists) to ensure the process runs smoothly.

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Figure 1: World Bank Crisis Simulation Exercise Process

CSE Process			
PLAN	**BUILD**	**RUN**	**REPORT**
• Decide CSE type • Decide agency participation • Designate dedicated local staff for "Control Team"	• Gather info • Draft & finalize scenario & background materials • Build & test CSE platform • Secure venue, IT, other logistics	• Introduce • Play • Debrief	• Review & analyze exercise record • Prepare & deliver report

REPEAT
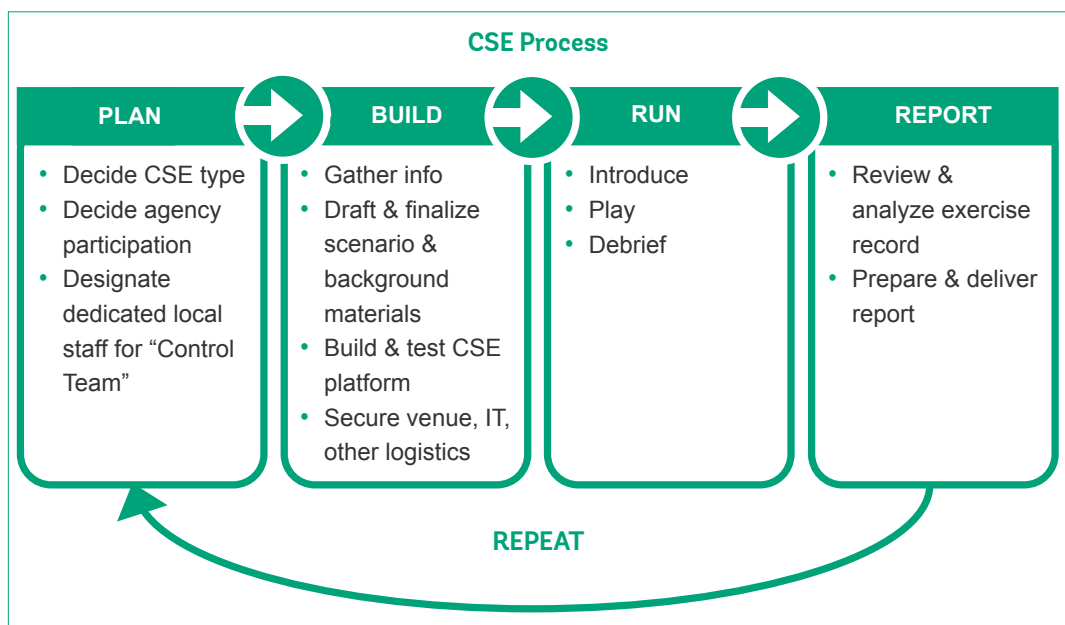
Plan—The planning stage includes deciding on the type of CSE and who will be involved (details in chapter 3). It will be important to inform the heads of the various invited institutions on what the CSE is, the organizers' objectives, and what the potential benefits are to participating to create strong top-level support. Once different agencies and their individuals sign on to take part, the CSE leaders in the Control Team should also be joined by staff members representing their various agencies or directorates, depending on the necessary level of detail envisioned. The Control Team could start with at least one experienced representative staff member from each of the invited institutions/directorates. The representative(s) should possess good working knowledge about the institution's role in the financial sector vis-à-vis the other institutions. As the types of issues to include in the scenario become clearer, the Control Team could be fortified with more representatives (or switched with others with appropriate backgrounds) from various directorates within the institutions.

Build—The building stage requires gathering various pieces of information from all the invited institutions' high-level staff members, starting from the question of what type of crisis is on their radars to concerns they have in carrying out their roles in, leading up to, and after crises. It is important during this stage to gather the laws, regulations, and policies relevant to the likely scenario incidents and to understand the flow of key information, paying attention to the information sources/recipients and the thresholds and triggers for any action. This is usually accomplished by a series of interviews conducted by the organizers after identifying which entities and levels of staff would be most appropriate to inform the scenario building and running of the exercise. (The details of scenario building and CSE interaction dynamics are covered in the following sections.) The storyline messages and related background materials are all finalized in this stage by the members of the Control Team, with strict confidentiality of the scenario details kept from the participants outside of the Control Team.

Also at this stage, the logistical details of when, where, and so on are worked out (see details in the Logistical Requirements section), as are the technological details of building the server and customizing it to fit the CSE run (see details in the Technological Details section) so all goes smoothly on the day of the exercise.

Run—The running stage usually lasts a day and a half in our experience. The CSE day starts with an introductory presentation to familiarize the participants with the exercise objectives, the platform (details in the Technological Details section and appendix B), and the rules of "play," and to set the scene, including the background on the economy, the fictitious institutions (avoid using real names), and any other relevant information to begin the exercise. After the participants settle into their designated spaces, the exercise begins (details are covered in the Managing the Exercise section). Participants can be encouraged to keep personal notes to help them remember key observations, which will be useful in the debrief and beyond.

After the exercise, a debrief session is held, usually on the next day to give exhausted participants some time to reflect. The debrief is run by the organizers and consists mainly of a moderated discussion over the participants' impressions of their experience while memories are still fresh (see figure 2 for suggestions that can serve as a guide for participants). The organizers also reveal the problems as they were intended in the scenario and may have the Control Team members include their impressions on the interactions of the previous day. This debrief is an intrinsic part of the CSE, as participants reflect on their understanding of the problems vis-à-vis those of other participants and perhaps form ideas for practical improvements to be made. Discussions may sometimes get heated, but everyone should be mindful that the intensity of the exercise makes it premature to make definitive observations or discuss any immediate actions so soon, as time is required for careful reading of the exercise records to fully understand what transpired.

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Figure 2: Suggestions for Note Taking/Questions for Debrief

Group: _____

- What did you understand as scenario problems from your group's point of view?
- Observations on interaction (communication, coordination, cooperation): What worked well? What did you find challenging?
- Observations on mandate and powers: What worked well? What did you find challenging?
- General impressions? Questions for other groups to understand their actions or inactions?
- Anything you wish was different to help manage the situations in reality? (Ideas for post-exercise discussion and/or action plans)

Report—After the exercise and debrief, the work begins on making observations by reviewing the record of the exercise. Although the report is an important part of the CSE, it is recommended to keep in mind that the main benefits of the World Bank exercises are meant to be achieved during the CSE—the experience of the participants in trying to handle escalating problems, to practice making decisions while communicating, coordinating, and cooperating with each other—and the debrief session in which participants discuss their experience and what they observed. The report can serve as an after-action report to document the process, including the intended issues put on the table for the exercise, observations thereof that may be useful for the future, and any lessons for running the CSE internally next time. The report is where the organizing experts' observations on what unfolded are recorded.

The report could point to areas that seemed to present difficulties for the participants, be it inefficient processes, misunderstanding of roles or mandates, or lack of legal powers. Discussions over these areas of improvement on the basis of a concrete experience presented by the CSE could be highly worthwhile. However, it would be counterproductive to reference the exercise in detail—for instance, to use what someone did or didn't do in the exercise as evidence for wrong-doing or indication of how they would react in real life. It is important to reiterate that the CSE is not meant to be used as a test of the participating individuals, and the report should avoid making judgments on the performance of the individuals, let alone the entities they represent (review the material in chapter 2). If well designed and managed, the exercise should have fully challenged the participants, often meaning that the measures taken would have failed to solve the problems, so as to further escalate the situation. It is a game in which the players are meant to fail, hence it would be unfair to judge them on failing to contain the problems.

As the record makes up a database, different analyses can yield interesting observations. The World Bank has used natural language processing and network analysis tools to make observations. These reporting stage tips are covered in detail in chapter 7.

Lastly, this CSE process should be repeated periodically for ongoing practice (as discussed in chapter 4).

Details of How

Dense content here is separated into the following sections: interaction dynamics, scenario building, writing the messages, managing the exercise, logistical requirements, and technological requirements. As resources allow, it may help delivery teams to organize themselves to concentrate mainly on one of these areas according to the team members' backgrounds and strengths.

CSE Interaction Dynamics

As mentioned before, there are two types of active participants in the World Bank's CSEs: players and role-players. The players are grouped into the various Player Teams, which represent the decision-maker for the team (for example, the central bank governor, the head of banking supervision, or the head of deposit insurance agency). The Player Team can be made up of however many individuals (we recommend a maximum of six persons), but they must act as THE decision-maker for that entity, speaking with one voice through one email account. The role-players all sit together in the Control Team, are all familiar with the scenario details, can see all the messages during the exercise, and all contribute to role-playing multiple identities with whom the players wish to interact.

To illustrate, an example is provided. An interagency CSE in country X may have four Player Teams (as shown in figure 3).[4]

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4. As noted in the "CSE Types" section in chapter 3, the participation of private sector counterparts is encouraged, instead of having them be role-played by the control team members. Members of the private sector know best how they may respond to the scenario crises or actions taken by authorities.

Figure 3: Interactions in a CSE

Participant Roles

"**Role-Players**", as various fictional characters, deliver the scenario facts and interact with the players.

"**Players**" react to the facts given and make decisions for entities they represent via interaction with other players and role-players.

Modes of Communication

Public info = on the news site

Private info = Emails from the CT to only one player team

Email interaction between and among players

- **Player Team 1**: the "central bank governor"—with the central bank's governor and a few members of its board.
- **Player Team 2**: the "central bank supervisory committee"—made up of the head of supervision, who in this country is part of a supervisory committee that makes the supervisory decisions, joined by a few senior staff of supervision.
- **Player Team 3**: the "the central bank market operations"—with the head of monetary operations, head of payment systems, head of RTGS, and a couple of their senior colleagues.

- **Player Team 4**: the "MoF/DIF"—with the minister of finance, the manager of the deposit insurance fund, and a few senior colleagues from each.
- **The Control Team members**: they may be role-playing the following list of characters (and more as the need arises throughout the exercise): staff of supervision, staff of central bank market operations, staff of MoF, staff of DIF, journalist, bank administrator, ambassador to country A, A bank, B bank, C bank, D finance company, opposition member of parliament, and so on. Each of these characters is represented by an email address.

Because the participants interact not only among themselves but also with their respective sources of "private" information, the improvised reactions of the role-players become part of the exercise scenario. For these improvised reactions to be constructive additions to the scripted scenario, it is essential for all role-players to be involved in the exercise's design from the very beginning. (See the Managing the Exercise section.)

The interaction happens through two modes of communication:

1. Some of these messages represent "public" information in the form of media articles and press releases, simultaneously available to all participants (and, figuratively, to the general public); and
2. Other messages are "private" information in the form of emails, in which the scenario details are communicated TO the appropriate Player Team(s) FROM diverse characters role-played by the Control Team members.

The exercise starts, usually with a news article or two, setting the scene and giving something for all the players to read and discuss and react to if they wish. Soon, an inject email arrives to a player from a role-played character—for example, a staff member of the supervision department sends an offsite report to the supervisory committee, highlighting significant deterioration in asset quality in a bank. The Player Team that receives the message will decide what to do about that message, whether to respond to the sender and/or to share the information with another player, triggering more messages. Meanwhile, another inject message arrives to another player, and so on.

Scenario Building

The World Bank's CSEs require close cooperation between World Bank experts and a small local team composed of senior officials of the participating agencies, who make up the Control Team. Regardless of whether this delivery team includes outsiders such as the World Bank, the members need to fully understand the country's legal framework, as well as the regulations and operational processes of the central bank, the financial sector's supervisory agencies, and other entities involved. The Control Team, and in particular its members who "hold the pen," work to identify the issues to build a scenario with details appropriate to the country's current circumstances.

The issues presented in the scenario should be relevant and interesting to the participating authorities, identified through interviews discussing the sources of concern for the authorities. Again, care needs to be taken to keep the knowledge of the scenario details within the Control Team only. Through desk review and discussions, it is important to understand the legal, regulatory, and operational framework, and the characteristics of key financial institutions and the system. Most commonly, scenarios for bank-centric financial sector crises include bank liquidity or insolvency problems, which escalate to necessitate interaction across agencies. Examples of other common issues (not mutually exclusive) are listed in figure 4. While these may be broadly applicable to all countries, what makes the scenarios especially applicable and real to the participants are the locally adapted details surrounding those problems. Authorities will be highly sensitive to certain triggers for trouble; examples include depreciation of the local currency, divesting foreign parent banks, sovereign default, payment system disruption, deposit protection fund illiquidity, the impact of one financial entity's problems on a bank in the group or vice versa, and so on.

With the domino effects of each trigger depending on their severity, many authorities' worries can play into the overall scenario to induce stress and panic to practice crisis management.

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Figure 4: Common Issues to include in a Bank-Centric System CSE

- Information-sharing and coordination among various financial sector regulators
- Home-host supervision issues and supervisory colleges
- Central bank liquidity facilities
- Bank runs
- Bank solvency issues
- Bank failure resolution
- Prompt corrective action; supervisory measures to take
- Licensing, fit, and proper criteria
- Public communication (press releases and interaction with journalists)
- Cybersecurity threats and incidents

It is recommended to avoid the real names of financial institutions (or any other entities whose names may create distractions for the exercise) and to avoid mimicking exactly the existing institutions and their real-life problems so as to prevent unintended signals or misinterpretations, especially in a multi-agency CSE or those involving market participants. Utmost care must be taken to not instigate any real-life stresses on the system because of fictitious problems built for a CSE, or suffer any reputational damage due to an incorrectly planned or executed exercise. The impact of leaked documentation taken out of context could be difficult to undo, and the use of real names constitutes wholly unnecessary risk-taking. However, the financial system structure, group structures, and sector exposures of simulated entities may reasonably resemble the main characteristics of real ones to provide a realistic background for the participants to take the scenario problems seriously.

Once the issues and local key details of the scenario are worked out, the next step is to determine how the story would unfold to the characters in the exercise. This means translating the information into messages or "injects" to the appropriate recipients. To do this, it would be important to understand the type of characters (the participant roles) and their interactions in a CSE in detail.

Translating the Scenario into Messages

Armed with a list of problems the pre-exercise scripted scenario should include and the details that make those problems believable (although surprising sometimes), one needs to apply some imagination and rounds of discussions with the Control Team to arrive at a set of messages that together represent how such problems would manifest in reality.

The work up to this stage may have led the Control Team leaders to decide to put forward a few different main issues to tackle in the CSE that cannot be plausibly related. For example, to present the participants with a solvency problem of a bank leading to resolution, a cyber incident, and a divestiture of a foreign parent bank, multiple financial institutions would need

to be involved. There can be many reasons for simplifying or complicating the scenario, with participants' capacity and appetite likely at the top of the list. With less experience running CSEs, it may make sense to start with simpler scenarios. The simplest would be to have one main issue or problem and to not introduce too many multiplying triggers.

Whether tackling one or three main problems, first simplify by conceptually separating them into standalone storylines, then work on how to intertwine them (or not). (See the Managing the Exercise section.) For each of the storylines:

1. Take one major issue or problem that the players will be challenged to handle (for example, a solvency problem at a medium-size bank) and ask the following questions: How would it happen? What events need to take place (or what information needs to come to light) for this problem to form?
2. Draft the sequence of events that would occur to get to the problem. These are the storyline facts to be told to the participants. Add the details that would make the problem what it needs to be for the CSE—anything from a straightforward problem that allows the authorities to work it out to some degree and move on to other problems, to a major issue that is the source of nightmares with many different complicating pieces that do (or merely threaten to) blow up at the same time with no seeming end.
3. Decide *how* to convey the facts of the storyline, through either private messages (emails) or public messages (news articles). For this, ask: how would this become known to one or more of the Player Teams? Who is/are the source(s) of information, recipient(s) of the information, and how is this shared?
4. Write and refine. See "Guidelines for Writing CSE Messages" in appendix A for detailed tips.

Throughout the process, it is important for the Control Team members to validate the details and ensure the sequencing makes sense in the local context. A major part that only the local staff members can contribute is their knowledge of how these types of information are transmitted in reality. While "public" information typically consists of news, opinion articles, and press releases, and are reasonably standard around the world (except, perhaps, in depth and style), most "private"

pieces of information need to closely resemble not just the style, but also the actual content of those communications in real life. Consequently, some emails may need to be accompanied by the typical internal reports such as inspection reports or incident reports that would normally circulate among the participants.

These materials will need to be fitted to the exercise details, and they will need to shortened to be digestable in the CSE's fast-paced, time-compressed environment (more on this in the following section) and to highlight the key points relevant to the exercise. Other materials that may be needed similarly as props include annual reports or financial statements of the fictitious financial institutions that appear in the exercise. Usually, the participants are instructed to take the economy and financial system structures as they exist in reality, unless otherwise mentioned by the scenario messages. However, in case the participants are unfamiliar with the existing environment or the CSE scene is intentionally different from it, background materials depicting the financial sector and insitutions' characteristics are required to set the scene so that participants feel at ease with the basis of the exercise. The Control Team members most familiar with the respective materials can be tasked to develop these.

An important feature to keep in mind when translating the facts to messages is the use of time compression in the CSE. The series of events that take place in such a simulation exercise cannot possibly happen in "real time," with some problems taking weeks or months to develop and escalate into crises. To assist all participants in framing the information, we mark the passage of time by denoting each message with a count of weeks, months, or even quarters, whichever fits the storylines. Following the "Guidelines for Writing CSE Messages" in appendix A will help the messages be efficient and minimize confusion.

Managing the Exercise

Once the messages are complete for each of the storylines, laying out the full scenario and managing the flow of prepared messages during the exercise can be considered an art form.

There is no right or wrong way, just learning from experience and applying that experience to the unique environment of each CSE run.

Sequencing: If a CSE is to present multiple storylines of unrelated issues for the authorities to try to handle, the decision needs to be made whether to interlace the storylines.

The simplest way would be to separate the storylines with a clear beginning and ending for each issue. Going back to an earlier example, a solvency problem of a bank leading to resolution, a cyber incident, and a divestiture of a foreign parent bank can be dealt with in turn. Benefits of this would include allowing the participants to focus on the problem and have more time to consider isolated events. It would equally make the exercise management easier in the Control Team as well given the clear separation of the problems. The case can be made to separate the issues into multiple days and to even have separate CSEs, as the authorities who wish to participate may be different for each storyline (for example, entities dealing with cyber incidents or other critical infrastructures may be invited for the cyber incident storyline). The drawbacks could include some degree of loss of realism in crisis management traded for more of a workshop feel to the exercise, and if conducted on multiple days or occasions, there is the inevitable multiplication of costs. If the team in charge of running the CSE is inexperienced, however, this would be the recommended starting point.

Interlacing the storylines makes the CSE more complicated for both those in charge of running it and the participants. However, it would be a closer representation of reality, where many things happen that may or may not be related and it is up to the authorities to manage the risks and to figure out what to focus their attention on through the "fog of war."

Continuing the interagency CSE example with the four Player Teams in the previous section CSE Interaction Dynamics, figure 5 illustrates how the messages and the structure of the exercise are intended to be rolled out to the four teams (shown for illustrative purpose, not meant to show message content).

Figure 5: CSE Timeline of Scenario Injects
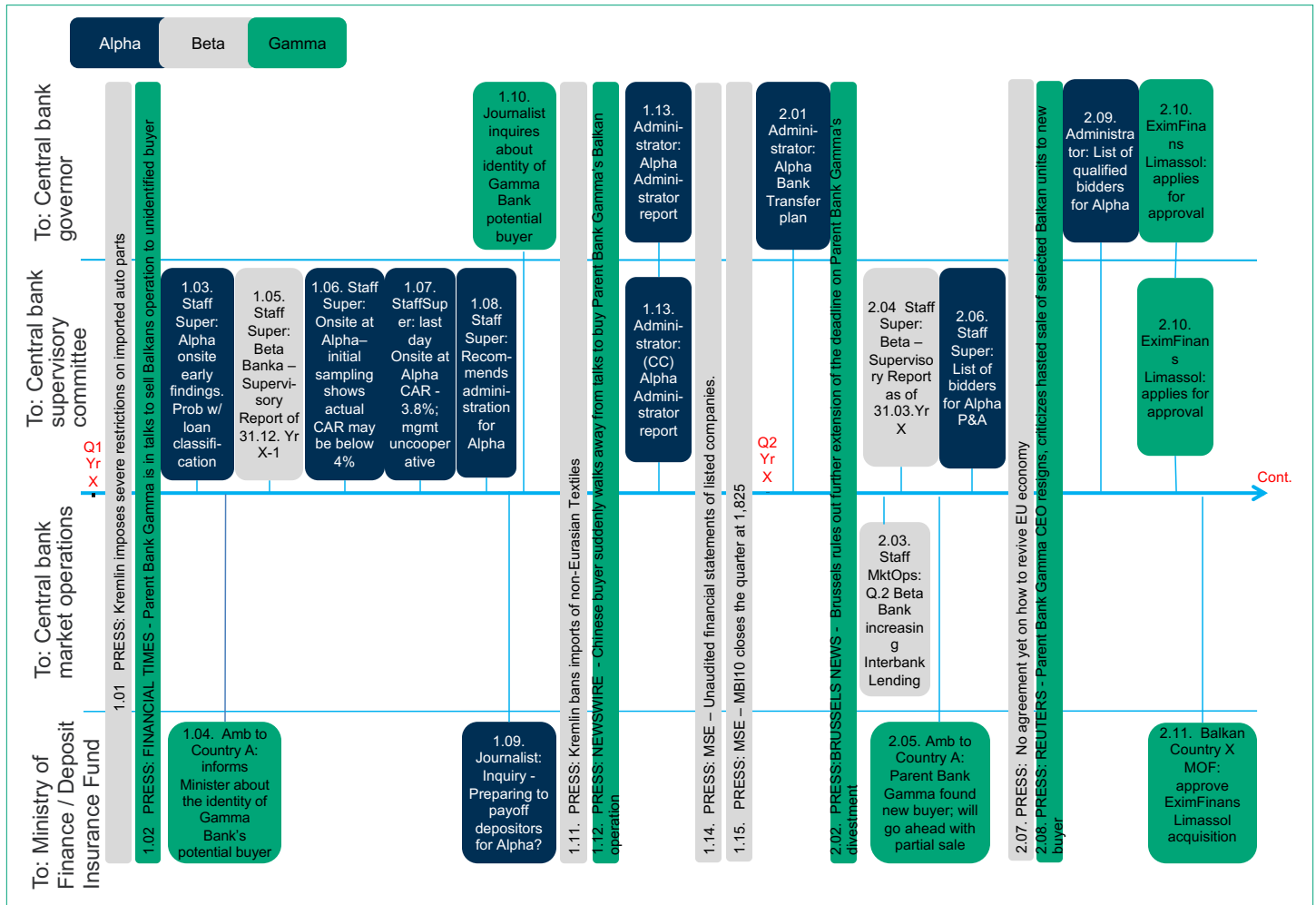
Note: Graphic shown for illustrative purposes only..

On the y-axis are the four Player Teams, and the x-axis represents time flow, with each message originating from the center blue line. In this run, the time compression is indicated in quarters along the timeline and there are three storylines to be presented, indicated by the fictitious financial institution names Alpha, Beta, and Gamma. Each of the boxes represents a message from one of the three storylines, color-coded to the storyline to which it belongs. Messages vertically spanning all four sections indicate the news articles that all the Player Teams receive, and the smaller boxes indicate the email messages that will be sent to the respective inboxes.

At a glance, this graphic shows the "Central bank supervisory committee" (which in this country denotes the decision-maker for supervisory concerns) is the recipient of the most prewritten messages, while the "Central bank market operations" team does not receive too many, at least from this page of injects. The graphic also shows the Alpha storyline problems likely erupt first and the Beta storyline problems second, while the Gamma storyline problem has a slow warm up, to erupt on the next page (not shown here).

A graphic such as the one shown in figure 5 can be used by Control Team members to visualize how the storylines will (or will not) be intertwined, view the scenario status from the point of view of each Player Team, and help keep track of the flow of the exercise.

Managing the flow during the exercise: As mentioned previously, at the beginning of the exercise the scenario is a sequence of messages prepared in advance by the Control Team, progressively revealing over several hours the problems to be addressed by the participating decision-makers in the Player Teams. Given the flexible and dynamic nature of the World Bank exercises, the true scenario is not complete until the end of the exercise. Our dynamism stretches to leaving the CSE an open-ended exercise, only to stop when those in the Control Team send a "game over" message. As a frame of reference, each storyline may have eight to 10 prewritten messages. On average, with three storylines told in about 25 prewritten messages, participants of CSEs of between four to eight hours in length have produced more than 250 to 400 messages.

It will be up to those running the CSE to monitor the flow of the communications, watch for ample communication from each of the Player Teams, keep an eye on the pace, and, as the "Big Brother" (see the explanation in the Technological Details section), decide when to send the next prewritten message. It could happen that some prewritten messages get sent out of sequence or skipped over (for example, if the message would no longer make sense given the actions of the Player Teams or if the Control Team decided to take the storyline in a different direction "on the fly"). It could even be that the CSE comes to an end before all the prewritten messages are sent (perhaps because other storylines elicited very interesting and productive discussions among the Player Teams that justified allowing more time for them). Still other times, we have had to throw out entire storylines because of a mistake made by Control Team members that gave away the storyline. Keeping flexible is highly important for this role, and our methods and tips to help keep organized are in this handbook.

Controlling the Control Team: Because the Player Teams interact not only among themselves but also with their respective sources of "private" information (the role-played characters), the role-players' improvised reactions to the Player Teams' messages become part of the exercise's scenario. Thus, the role-playing members of the Control Team need to be highly alert and careful in their messaging by being fully aware of the exercise flow.

Oftentimes, especially with larger Control Teams, there are varying degrees of dedication or capacity within the Control Team members. Those in charge of the CSE need to manage the input of the various Control Team members. Begin the CSE with instructions for Control Team members on what roles they will play during the exercise. While the technology setup allows all Control Team members to have access to all the messages being sent by everyone (see the Technological Details section), not all members should be allowed to respond to the messages. Mistakes will be made, such as responding more than once to the same email, or more serious problems such as responding with more information than is intended to be known by the recipient at the time. To ensure coverage, it would be a good idea to have a few members of relevant backgrounds dedicated to paying closer attention to certain storylines that require that background. However, drafting and sending messages to the Player Teams should be a task reserved to a few members and done in concert with other members' input, mainly checking that responses are in line with such things as local customs or regulations.

Observers on the side of the Control Team: If the number of people in the Control Team gets unruly, a separate group of observers can be set up. This group can include those who only wish to observe for one reason or another— for example, staff members from departments periphery to the main issues of the CSE run, or individuals external to the institutions participating as Player Teams who wish (and were invited/cleared) to participate. It should include those members who have been less involved with the CSE building process and the scenario. The group can be seated in the same area as the Control Team and set up with a projector and screen on which they can collectively digest the action. It would work best to have the group be guided by someone who is more familiar with CSEs and the scenario.

Keeping focus: In managing the intricate exercise to go as smoothly as possible, it is important to help the participants not get bogged down in details that do not matter. Frequently, the participants, including Control Team members, need reminders that the background materials are there to help make the problems realistic by providing the accessories that usually come with messages containing such information. It should be made clear that nothing is hidden in these materials that is not pointed out in the text of the emails themselves, and if there is any information missing, it is the point of the CSE to communicate and coordinate to obtain more and figure out a way to handle the problem as understood at the time. For

the Control Team, it is best to always keep in character when approaching the Player Teams by using emails from role-played characters to highlight the issues that need to be addressed.

Face-to-face meetings: All the World Bank CSE interaction takes place via email as a rule, and while many clients have requested face-to-face meetings, most realize that those meetings can take place by utilizing emails as chatrooms rather than as formal emails. In the CSE, all messages end up on a record of the exercise. It can be argued that the conversation in a face-to-face meeting could be recorded and transcribed, in the off chance that all participants agree to having their voice recorded. However, the advantage of using email is that it depersonalizes the interaction, highlighting the role (such as the head of market operations) rather than the individual. In a face-to-face meeting, the anonymity breaks down and in some cases the individual will have to act the part of someone else.

In addition, convening physical meetings requires that all else in the exercise stops to allow this meeting to take place in real time. Having this meeting would violate another rule of having no breaks from the action. The escalation of tensions, high focus, and hopefully intense action in crisis mode will be broken with a meeting and very difficult to build back up for the rest of the scenario to resume. A case can be made to have meetings in a single storyline exercise where the disruption to the time compression concept would be less problematic. In some instances, a few cultures have felt that certain decisions can only be made in face-to-face meetings and have insisted to include them at certain stages. In our experience, although those face-to-face meetings may have meaning in the respective culture, they did not add overwhelming value to information processing, decision-making, and coordination processes. We would argue these meetings can take place after the exercise as a follow-up roundtable session if desired.

Logistical Requirements

The CSE can be thought of as a large learning event, usually consisting of more than 60 participants who will spend nearly a day concentrating on some intense and stressful situations. As in any such big event, there are many logistical details to consider.

Much of the logistical requirements will be dictated by the host and location. Aside from the few space requirements noted in chapter 5, the guidelines below may be helpful to adapt each requirement to the individual cases:

1. Tested router: Test the CSE router in advance in all the areas where participants will work, with enough time to change the workspace configuration or venue if it is not adequate.
2. Large space: Aside from the workspaces for all the groups, a large, auditorium-like space equipped for presentations is needed to gather all participants at the beginning of the CSE and to hold the post-exercise debrief.
3. Workspaces for all participants: Set up workspaces in advance, according to requirements noted in chapter 5.
4. Placement and service access: When arranging workspaces for the groups, keep in mind the access routes to restrooms and refreshments—it is best when others' movements would least disrupt any other group.
5. Hardware requirements: Aside from the Wi-Fi router and the computer from which the CSE server will be run (see the Technological Details section), the exercise requires computers (usually laptops) with Wi-Fi connection and, if available and desirable for the physical space setup, projectors and screens for the Player Team groups. Access to printers (especially for the Control Team) may also be useful. All equipment setup requires the appropriate cables (that is, power cables, USB or pin cables to link printers and other equipment to the computers, and extension cords to the power source), paper for the printers, and other equipment such as voltage converters or adaptors, as necessary.
6. Providing for participants: Arrange to provide some laptops for those who do not or cannot bring their own. It is usually advised to have one computer screen for two participants to share, while some may prefer to bring their own devices. Less computers may be required if the group is set up with a computer connected to a projector. Sometimes a few participants may need assistance with using the email and website technology, typing, or translation—it is important to take away any possibility of disruption or distortion in interactions due to the written nature of the exercise.

7. Refreshments: As the CSEs last several hours, refreshments and meals are always provided for participants, but are arranged so participants may enjoy them in their separate spaces (so the various teams don't interact) without pausing the exercise. This helps facilitate the rule that no discussions take place outside the respective Player Team rooms/spaces and helps the exercise be more efficient and effective.

8. Backup power source: If reliable power may be a problem, a contingency plan may be necessary—the router must stay connected to power at all times for uninterrupted CSEs (laptops may run on battery for a while).

9. Time limits: As the CSEs are dynamic, where the actual full scenario is based on the actions and reactions of the players and role-players (the Control Team) during the exercise, no explicit time limit exists. The actual exercise, not counting opening presentations, has usually lasted four to six hours in a single day, although there have been outliers.

10. Physical meeting restrictions: To keep a record of all discussions, no physical meetings are allowed. All communication will happen through the platform, in written form. Meetings must take place virtually, via emails, like all other discussions. This facilitates the post-exercise reading of the conversations that is necessary for observations to be made.

Technological Details

The technology used for the CSEs is simple and purposefully open source so as to be easily obtained, allowing replication by someone with some information technology knowledge. Once the router and server are set up the first time, the subsequent CSEs will not require as much assistance from technology specialists. For smooth running of the CSE, however, it would be highly beneficial for the delivery team to include some IT staff members to manage the set up to the exercise's specifications.

Technological requirements for the CSEs are included appendix B. The main thing to note is that the CSE requires only a setup of a communication network secure from unwanted external viewers, wherein administering of emails and a "website" can take place. We have found that a Wi-Fi router and a virtual machine with a server built uniquely for each exercise serves the purpose well.

The server, complete with the pieces of software listed in appendix B, is the platform on which the scenario or scenarios come alive through bits of information (in the form of news articles or emails) from the appropriate characters (who are represented in the CSE through email addresses).

Differences between email accounts of Player Teams versus role-players: As the email client administrator, it is important to understand the mechanics behind the email accounts used in the CSE. As explained earlier, each Player Team is represented by one email address—that of the decision-maker for that function (for example, central_bank_governor@cse.net or head_of_supervision@cse.net). These accounts function like any email account, allowing people to communicate with anyone with an email address.

Then, there are the role-player accounts used by those in the Control Team. These accounts are set up to allow the user to change their identity to anyone from a long list of characters other than the Player Teams' (for example, journalist@cse.net, foreign_supervisor@cse.net, or staff_of_deposit_insurance_agency@cse.net (in reality, these would be shortened with acronyms). One of these role-player accounts is the account set up as the "Big Brother" and, technically, all the role-player accounts are mirror copies of the Big Brother account. It is set up to receive all messages in its inbox so as to be able to read all the conversations taking place in the "CSE world." This allows the Control Team members to monitor all the action taking place, provide support to the players, anticipate moves, discuss, and prepare responses before a message from a Player Team actually includes a role-played character. The Big Brother account is functionally only different in that its drafts folder is where the only copies of the prewritten messages are kept. This is to prevent any accidental sending or damaging of messages by other members of the Control Team. The technical details of how to create these accounts in the server can be found in appendix C. This also includes a shortcut to loading the email client—a huge timesaver.

LESSONS FROM THE GROUND

In one CSE, we decided to include an opportunity for the authorities to practice taking steps toward bank resolution before other more complicated systemic issues came into the picture. To try and ensure that this did not take over the focus of the exercise, the prewritten messages communicated a simple case of a small bank, where the evidence would be clear that the bank had to be closed and liquidated (among other details, the bank had had past capital adequacy issues that were continuing to deteriorate and surely would be unrecoverable, and was increasingly facing liquidity issues to add to its troubles). The local Control Team members, which included senior staff of supervision, worked on the message details, finalized the data and background story, and confirmed that with these details, the decision-makers had enough reasons to close the bank.

What happened surprised all of us in the Control Team. The decision-makers were so caught up in earlier news of a downgrade in the sovereign rating of the country's biggest partner country (on which it depends heavily for remittances, trade, and foreign exchange) that they failed to take up the small bank matter in an expeditious way. The situation required Control Team members to direct the decision-makers' attention by raising the alarm from different channels (with such tactics as having a journalist [a role-played character] write to the head of the deposit guarantee fund [a decision-maker/Player Team] requesting comments on the rumor of the bank's troubles). It did not help matters that the authorities' messages were often unclear and uncoordinated, with disparate pieces of information sent around without other important departments' knowledge in multiple rounds. The Control Team had to artificially propose a solution coming from staff of supervision (a role-played character) to try to put an end to that storyline so that the rest of the exercise storylines could fully erupt.

As much as the "simple" storyline did not go according to plan and ultimately dragged on with no clear decisions taken by the authorities, this was not a loss for the CSE. Thanks to this storyline, many observations were made (for example, a need for authorities to become more familiar with bank resolution, a protocol on sharing information in a clear and coordinated way, and so on). Best of all, the authorities felt the frustration of mixed messages and unclear direction; they experienced the havoc that confusing and uncoordinated communication can wreak, which provided motivation for them to review their internal communication practices after the exercise.

>>>
Chapter 7: Post-Exercise Review

The Exercise Output and Making It Readable

After the exercise and the debriefing (covered in the CSE Process section in chapter 6), the full record of the exercise is reviewed during the report stage of the CSE process. Found as an "mbox" file of the "Big Brother" email account in the webmail directory, this file includes all the messages' metadata. It is recommended to share this section with an IT specialist knowledgeable in computer programming lanugage (even better, a big data analyst/scientist, but not necessary) to assist. With this help, a financial sector specialist/CSE leader will be able to format the recorded messages for easier reading (and if desired, further extract information for analysis of the interactions).

In general, the mbox file requires extraction of pertinent information to a format that is readable for humans. The data we found to be essential are the usual—the date (including the message time), to, from, CC, subject, and message body—but also useful are a sequential counting number, the message IDs, and message references. A message ID is an identification number uniquely assigned to each message, and when a message is part of an email trail (that is, those emails which have used the reply button), message references list the message IDs, thereby keeping the history of the relevant messages together.

Employing network analysis and natural language processing techniques, the World Bank team extracts from the written record of the exercise the key interactions that took place. Once the meaning and practical implications of those interactions have been properly clarified, a final report is produced. The report is an after-action report summarizing the efforts of the exercise, the scenario storylines, observations of interactions, and any relevant recommendations suggested by the exercise.

A Python script called "parser0.py" that the World Bank has created and used for the purpose of analysis is shared for reference in appendix D: Reference Python Codes. (Python codes in this handbook are shared as references. Please note these are to be reviewed by knowledgeable local staff members and customized before use—use at your own discretion.)

Count of Interactions

The record's data also allows an analysis of the volume of interactions between each pair of players. It could be useful to see the count of the messages sent and received by each of the players and to and from whom the messages were sent, which would reveal which of the players were the most active and which pairs communicated the most or least. Those who communicated the most could indicate those who play key roles in the face of the crisis presented in the exercise.

Data analysis code can be written (for example in Python) to return the inputs for a table describing the volume of interactions among the players, such as in the example shown in figure 6:

>>>
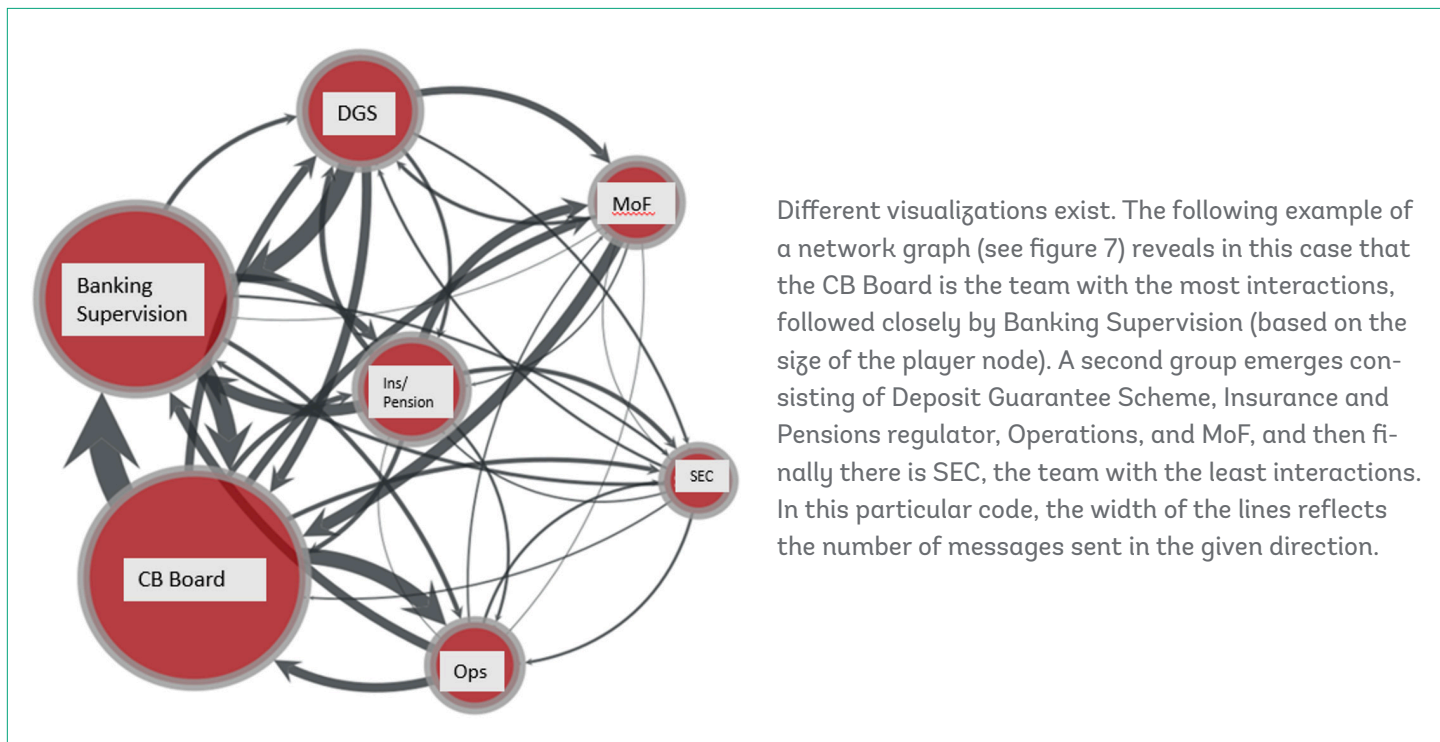**Figure 6: Example Count of Interactions Among Players**

	CB Board	CB Supervision	CB Operations	DGS	MoF	Total Sent
CB Board	0	20	15	7	11	**53**
CB Supervision	35	0	23	2	0	**60**
CB Operations	27	32	0	0	0	**59**
DGS	14	22	13	0	4	**53**
MoF	9	0	0	2	0	**11**
Total Received	**85**	**74**	**51**	**11**	**15**	**236**

Note that the total number of interactions, 236 in the example, will normally exceed the number of emails because some of them will have more than one addressee. The code written for the output of the example above counts one message that was sent/copied to multiple recipients as separate messages (for example, if one message had three recipients, the count would show three messages instead of one as it counts each pair of communications).

>>>
Figure 7: Example Network Graph of Interactions in a CSE

Different visualizations exist. The following example of a network graph (see figure 7) reveals in this case that the CB Board is the team with the most interactions, followed closely by Banking Supervision (based on the size of the player node). A second group emerges consisting of Deposit Guarantee Scheme, Insurance and Pensions regulator, Operations, and MoF, and then finally there is SEC, the team with the least interactions. In this particular code, the width of the lines reflects the number of messages sent in the given direction.

Tips for Reading the Exercise Record and Making Observations

It is often said that no one person ever knows what actually transpired in all the disparate conversations at the end of the exercise. This is why, once the "Big Brother" email accounts' messages are in a more friendly format for a human reader, it is critical to revisit the record of the exercise to try and understand what happened. Oftentimes, in the "fog of war," messages are overlooked that change the impressions and/or understandings of what happened during the exercise. However, reading the exercise record is no easy task, if not merely for the sheer volume of words.

The record of the exercise is made up of hundreds of email messages listed by message time stamp, and reading the record in sequence quickly turns difficult, much more so than trying to keep track of multiple concurrent conversations in a loud room. For example, one message written by the governor to three recipients can trigger three separate secondary conversations that can spur another layer of recipients, and so on, and all are presented in a time sequence, not neatly by conversation. Although the message references data in the email output help to piece the conversations together, it is a time- and energy-intense task to track.

Data analysis code can be written (for example in Python) to return the sequences of dialogues that took place, as described by the email number (as in the following example):

[1,3]
[2,7,9]
[3,5,17]
…
[64,72,91]
[64,72,97,105]
[64,72,97,108,115]
[64,72,97,108,117,119]
…
[202,203, …]

This information allows us to immediately see which pieces of information, such as email 64 in this example, triggered extended dialogues. Taking this list as a reference and going to the messages themselves, we can see who participated in the dialogue and where the final decisions were adopted, for example in emails 115 and/or 119.

Visualizing the long conversations may be useful, as in the following example:
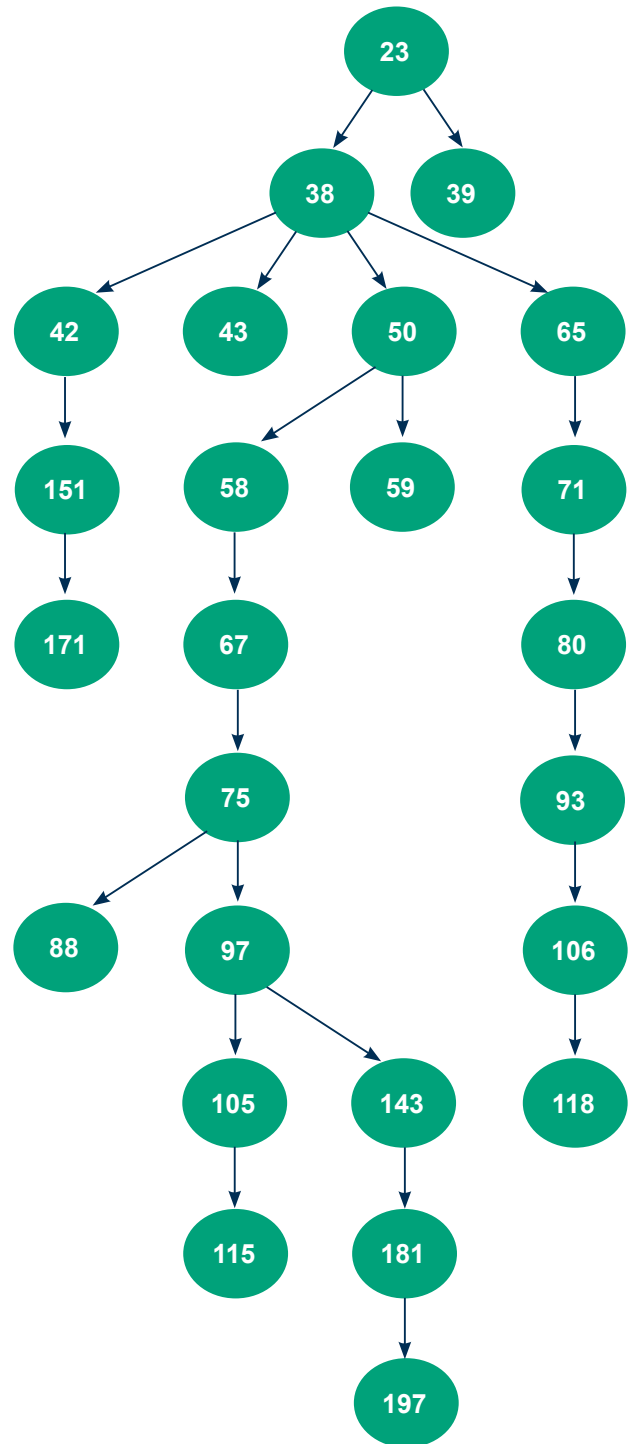
Which visualizes in bubbles the list of the following linked conversations:

23, 38, 42, 151, 171
23, 38, 43
23, 38, 50, 58, 67, 75, 88
23, 38, 50, 58, 67, 75, 97, 105, 115
23, 38, 50, 58, 67, 75, 97, 143, 181, 197
23, 38, 50, 59
23, 38, 65, 71, 80, 93, 106, 118
23, 39

However, one caveat to understanding what happened in this way is that other important things could have transpired on the side while these conversations were going on. In other words, these messages are the ones that are linked, but to truly understand the environment in which important things were said or decisions were made, there may be a need to revisit other messages around that time. For example, a final decision that was adopted in email 119 could have been because of what was going on in message 116 which, according to the email trail where 119 appears [64,72,97,108,117,119], does not show up as a list of directly linked emails in the conversation. Especially if the whole record is not being read in sequence, it is always a good idea to double check the basis on which

certain observations and any recommendations are made. Just because a piece of information is not included in one trail of email conversation does not mean that the information did not come in another unlinked message. Errors or misunderstandings can be avoided by clarifying readings with other readers and participants.

There are many other observations that can be performed on the exercise record when used as a database—for example, sentiment analysis,[5] various forms of network analysis[6] that could be interesting, and many network graphs that can visualize and aid in analysis.

Remember from the report step in the CSE process that the CSE is not meant to be used as a test and the report should not make judgments on the performance of the individuals nor the entities they represent. Reading the exercise record could provide concrete examples on which to make fact-based observations that point to areas that seemed to present difficulties for the participants, be it inefficient processes, misunderstandings of roles or mandates, or lack of legal powers. The participants could be encouraged to discuss areas of improvement by reviewing the scenario injects with more time.

5.   For more information on sentiment analysis, see the listings at https://github.com/topics/sentiment-analysis.
6.   For more information on social network analysis, see the listings at https://github.com/topics/social-network-analysis.

>>>

Chapter 8: Ideas for Alternative CSE Delivery Modes

Because the CSE's communications are done on an email platform, it has been an ongoing quest to explore a remote delivery modality of CSEs. We have been asked in the past whether it would be possible to have all or some of the players (particularly those working from different cities than the host city) in their own regular offices, participating in the CSE emails. The question is even more pertinent at the time of publication during the ongoing COVID-19 pandemic environment, where having the CSE in a common physical space may not be possible under some circumstances.

The current modality is made of a dedicated server built (with the open-source technology covered in appendix B) and hosted on a Local Area Network (LAN), through our own physical router, to which all the participants connect to be able to log in and use the CSE email client (set up as @CSE.net). Through this, participants are also able to see a news "web" page, in that it uses an internet browser but is connected to a virtual server IP address of the LAN's Wi-Fi router. The good news is that it is physically possible to host the CSE server on the Cloud. However, a remote CSE delivery mode has not taken shape for the World Bank CSEs as of yet. There are multiple reasons for this. This modality would require dedicated IT services, let alone raise some legal liability and permissions questions to be worked out. The main constraint though has had to do with information security—the reason why, on a few occasions, efforts to try to take this quest on did not garner the required approvals from the requesting authorities. Given the nature of the topics discussed in a CSE, built around real characteristics of financial institutions in one or multiple jurisdictions, a chance that these discussions could be found on a public domain of the internet was not an appealing prospect for the authorities.

However, it may still be worth looking into for future uses as the culture of remote working takes root. Setting aside the real worry of information security, which needs to be considered fully, options for those willing to try do exist.

Alternate Email Domains

To simplify and focus on the email messaging, the news articles could be delivered as emails instead of by checking a browser with a news site address. This reduces the realism slightly since select news particularly relevant to financial sector authorities usually does not come through as an email and would make the participants give it their full attention as they would to a personalized email.

For email communications, one way to set it up would be to use popular and free commercial web-based email clients such as Gmail, Hotmail, or Yahoo to set up email addresses to be used for the exercise (for example, CB_Supervisor@yahoo.com). Without administrative access to the email client however, it will require some effort to compile all the emails from all the participants into one repository in time-stamped order. There can be work-arounds perhaps, such as setting up mail-forwarding to a central account, but managing the accounts and messages for multiple Control Team players alone may get cumbersome and would definitely require rounds of "dry-run" testing. This option would be more feasible for CSEs that are not linkable or identifiable to any particular jurisdiction, for instance in cases of generic exercises such as workshops or training.

Another, more involved, way would be to utilize the email client of the host institution if possible, with the permission of the participants. This would require working closely with the IT department of the host institution. They would have to be dedicated throughout the various stages of the CSE, including to set up and test beforehand, to troubleshoot problems during the CSE, and to retrieve the records of the CSE afterwards with administrator access. A drawback could be that it may be confusing, as the host domain name (what comes after the @ symbol in an email address) would be that of an authority used in reality (for example, @worldbank.org). This would not be an issue if the temporary CSE-use only email addresses of the CSE players are all within the host organization (for example, banksupervisor@centralbank.org, payments@centralbank.org, board@centralbank.org, and so on), but an email address like the FinanceMinistry@centralbank.org or DepositInsuranceAgency@centralbank.org may take some getting used to for the participants.

The above modes are certainly possible. However, it would mean that the Control Team would have to log into multiple role-player accounts to be able to send messages from those accounts as those characters and continually monitor those accounts. This could get quite unruly quickly as our CSEs often have more than 30 role-played characters. With the current setup, the email client used for the virtual server configured in-house has the ability to switch role-player accounts without logging in, and allows as many mirrored accounts as needed to be able to read all the messages that get sent in real time. In conclusion, work-arounds exist to try out with willing partners in the future, given sufficient resources and flexibility. Regardless of the modality, the important concern of security has to be taken into account. In the in-person mode we currently deploy, it would be ensuring that only the approved participants receive access to the local area network and that the CSE record would only be shared with those who are authorized.

Different Exercise Types

The World Bank's CSEs are a particular type of simluation exercise, utilizing role-playing. As noted in the section on [Types of Simulation Exercises](#), there are other variations of tools that could be fit for purpose in varying degrees. Exploring these other types with a CSE expert could lead to an option that could be deployed remotely. For example, a guided table-top exercise can be a powerful alternative—it would have the same structure as the CSE (with decision-making players and Control Team members role-playing various other characters) but everyone would connect remotely and a Control Team leader would read out the scenario messages to the players to which they would react. It would include an element of asking "What would you do in this situation" rather than just doing it as a player would in the current mode of CSE. Clear rules will have to be set and multiple "dry-runs" recommended to avoid the pitfalls of web-hosted events.

Lastly, the option of developing a customized case study or table-top exercise should not be overlooked. Although it would not be simulating a crisis where the authorities would experience the stresses of having to make timely decisions while remembering to coordinate and communicate effectively in the face of mounting problems, collectively working through the "what-ifs" will also be a tremendous experience to advance crisis preparedness and management skills.

Appendix A: Guidelines for Writing CSE Messages

These prewritten messages are how the storylines are presented to the participants. Once the unfolding events are decided, we work out how to convey the facts of the storylines—in either private messages (emails) or public messages (news articles). We need to know who is/are the source(s) and recipients of the information, and how is this information typically shared. The end product is a series of messages in the form of emails, complete with the to/from and subject lines. Just to give an example, each storyline may require eight to 10 messages, and with three storylines, about 25 prewritten messages will produce a total of more than 250 to 400 messages by everyone in a CSE, on average.

Following a few simple protocol guidelines provided below will help gain efficiency and minimize confusion.

- Remember that the prewritten emails should always be FROM a role-played character TO one or more Player Teams.
- Keep in mind that the to/from fields of the email messages should be the email addresses to be used in the exercise and use the CC address field sparingly as this can sometimes be overlooked.
- All subject lines should mention the institution name (such as "Bank A") to which the message refers, when applicable.
- News articles should be from "From: Press," "To: Autopublish."
- The subject line of a news article should be the article title and not too long (about 10 words).
- If a Player Team includes a combination of functions in reality (for instance, an "Operations" group that includes head of payment systems, financial markets, and monetary operations), the message salutation and signature of the role-played sender can be specified if desired (for example, "Dear Head of Payments" and "Sincerely, your staff of payment systems"). However, note that the Player Team shares one email address and is instructed to act as one entity for the purpose of the exercise.
- To signal passage of time, each message will be "time-stamped." When the messages are completed, all subject lines should start with the time stamp nomenclature and message number. For example, "1.2" to note message 2 in period 1. This will ensure the proper ordered listing of the messages in the drafts folder of the Big Brother account at the start of the exercise. Before sending the messages, Big Brother should delete this marker.
- To draw attention to the time passed, add a time stamp "message" at the start of each time period, numbered 1.0, 2.0, 3.0, and so on. The period could be counted in weeks, months, quarters, chapters, acts, and so on, as fits the storyline(s)—such as Week 1.0, Week 2.0. (See the following example.)

>>>
Example messages to illustrate suggested format (and can be used as a template):

1.0 TIME STAMP
SUBJECT: 1.0 Week 1

1.1 EMAIL
FROM: Staff_Supervision
TO: Head_Supervision
SUBJECT: 1.1 Week 1: Bank A's worrisome NPL levels

Dear Head of Supervision,
We have just begun our inspection of Bank A as scheduled, and we regret to inform you that we suspect the NPLs in the latest prudential reports were under-reported. Our preliminary estimation is that their NPLs are now way beyond their reported 15% of their loans—maybe up to 40%. Worse, when we apply appropriate provisioning levels, the CAR would fall to 9.2%, against the 18% we had before. As you know, this falls dangerously close to our regulatory limit. Please advise.

Your staff.

1.2 NEWS
FROM: PRESS
TO: Autopublish
SUBJECT: 1.2 Week 1: Suspicions around health of Bank A

NATIONAL JOURNAL: According to our sources, Bank A, whose owner has been in the headlines recently, is entering into a grey area of healthy banks. Albert Green has been in the international news for his mischievous activities in the neighboring country of Maravia, where he owns the country's largest trading company, along with some small investment companies. The specifics of the problems at Bank A were not shared by the source, only that it is a problem that could bring such a bank down. Attempts to gain clarity from our country's bank supervisors were not answered before print deadline.

1.3 …(cont.) …

2.0 TIME STAMP
SUBJECT: 2.0 Week 2

2.1 EMAIL
FROM: Advisor_MOF
TO: MOF
SUBJECT: 2.1 Week 2: News of Bank B

Dear MOF,
I want to bring to your attention something I overheard about Bank B……
.....
Your advisor

2.2 EMAIL
FROM: Staff_Operations
TO: Operations
SUBJECT: 2.2 Week 2: RTGS delays

Dear boss,
We are worried about the sudden delays in the processing of RTGS….
…..
Your Payment Systems Staff

2.3 …(cont.) …

>>>
Appendix B: Technological Requirements

The technology used for the World Bank CSEs is simple and purposefully open source, which can be easily obtained, allowing replication by someone with some information technology knowledge. Once the router and server are set up the first time, the subsequent CSEs will not require as much assistance from technology specialists. For smooth running of the CSE, however, it would highly be beneficial for the delivery team to include some IT department staff members if possible, to manage the set up to the exercise's specifications.

The main aspect to note is that the CSE requires only a setup of a communication network secure from unwanted external viewers, wherein administering of emails and a "website" can take place. We have found that a Wi-Fi router and a virtual machine with a server built uniquely for each exercise serves the purpose well.

A mid-range–priced Wi-Fi router with a dual-band, multi-core processor; a good RAM (at least 256 MB); and maximum (costs permitting) connection speed should serve the purpose. All CSE communications will be done on a Wireless Local Area Network (WLAN) set up on this router. Access to the internet is neither necessary nor desirable because it allows participants to get distracted with matters unrelated to the exercise.

The server, complete with the pieces of software listed below, is the platform on which the scenario(s) come alive through bits of information (in the form of news articles or emails) from the appropriate characters (who are represented in the CSE through email addresses).

For the CSE "platform" where all the interactions take place via email and a news website, a computer equipped with an email and a webserver is required. This computer is deployed as a virtual machine (VM) in VirtualBox (https://www.virtualbox.org), QEMU (https://www.qemu.org), or VMware (https://www.vmware.com/).

The simplest setup would be on a Unix/Linux operating system, with Apache (https://httpd.apache.org) or Nginx (https://www.nginx.com) as the webserver and an email server with Postfix (http://www.postfix.org) as the message transfer agent (MTA), also known as Simple Mail Transfer Protocol (SMTP) server, responsible for transporting email messages from the mail client/mail user agents —the participants and Control Team members. To receive emails using a desktop email client, we also need an Internet Message Access Protocol (IMAP) server, such as Dovecot (https://www.dovecot.org/).

We have also found it useful to offer players access to their email accounts via an email client, such as Roundcube Webmail (https://roundcube.net) and to compose our website with content management systems (CMS) like WordPress (https://wordpress.org) or Drupal (https://www.drupal.org).

It helps to also include Webmin (https://www.webmin.com/) and phpMyAdmin (https://www.phpmyadmin.net/) for administration and to use the shortcut mentioned in appendix C.

>>>

Appendix C: Email Account Administration Tips (and Shortcut to Creating Accounts)

As with the Wi-Fi and server setup, building the email accounts would be best served with the help of an IT specialist. Still, for managing the CSE it is highly recommended for those in charge of the CSE to be aware of how things look "under the hood" for a better understanding of CSE mechanics.

There are three different types of email accounts to keep in mind, each with its own feature:

1. **Player accounts**—Central bank board, head of bank supervision, minister of finance, and so on.
   a. ACCOUNT SETTINGS:
      i.   PREFERENCES: All settings needed to send emails
      ii. FOLDERS: Need all (Inbox, Draft, Sent, Trash)
      iii. IDENTITIES: ONLY their own!
   b. Address book: should include the email addresses of all the players other than itself and the role-played characters.
      i. Manually add or delete those accounts that may not make sense for the particular player to write to (will help decrease confusion).
         1. For example, for player account named "Mgmt_Bank_A," they will need in the address book "Mgmt_Bank_B" and "Staff_Bank_A" but will not need "Staff_Bank_B" (management of Bank A will not need to ever speak to the staff of another bank).

2. **Role-played character accounts**—Staff of supervision, journalist, member of parliament, and so on.
   a. *DOESN'T EVER NEED TO BE SIGNED INTO!* since they just need to exist but will be managed from the role-player accounts.
   b. ACCOUNT SETTINGS:
      i.   PREFERENCES: None
      ii. FOLDERS: None
      iii. IDENTITIES: None
   c. Address book: NONE

3. **Big Brother and role-players** (roleplayer1; roleplayer2; and so on)
   a. ACCOUNT SETTINGS:
      i.   PREFERENCES: ALL settings needed to send info
      ii. FOLDERS: Need all (Inbox, Draft, Sent, Trash)
      iii. IDENTITIES: Need ALL ROLE-PLAYED CHARACTERS except the player accounts
   b. Address book: Need JUST THE PLAYER ACCOUNTS
      i. The other accounts exist to facilitate the interaction initiated by the Player Teams, so to write to anyone other than a player means to send and reply to oneself, which only adds meaningless bulk.

• **LOAD all the prewritten messages into the Big Brother account**
   ○ To be done once the scenario is turned into sequenced messages (emails or news articles). Load as emails saved as Draft in the Drafts folder.
   ○ Tip: To have the messages stay in order and ready to be sent during the exercise, number the messages in X.Y format, where X is the number of the measure of time used in the scenario (days, weeks, months, quarters, and so on) and Y is the message number in order. (For example, "01.01" to denote the first message of the first month.)

• *** REMEMBER TO SEND THE TEXT OF THE NEWS ARTICLES AS AN EMAIL to keep track of when the news articles were sent.**
   ○ Send email from "Press" to "administrator" (or a nondescript email address).

SETTING UP THE CSE SERVER EMAIL ACCOUNTS (Shortcut):

Python scripts have been written to more easily take care of setting up email accounts for each CSE run.

- Python scripts called "create_accounts.py" and "webmail_tables.py" have been created. *(Python codes are shared for reference in the boxes below. Please note these are to be reviewed by knowledgeable local staff and customized before use—use at your own discretion.)*
- **"create_accounts.py"** code requires three txt files (listed by their email address prefix, one per line):
  - 1) "players.txt"—the players
  - 2) "roles.txt"—the fictitious characters role-played by the Control Team
  - 3) "roleplaying_accounts.txt"—the administering accounts (Big Brother and the 10 role-player accounts)
- **"webmail_tables.py"** code takes the three txt files and creates 3 csv files:
  - 1) users.csv; 2) identities.csv; 3) contacts.csv
- To use, via WEBMIN and phpMyAdmin:
  1. Create the 3 text files required for "create_accounts.py"
  2. Run the script. (>> python create_accounts.py) — there should be a new accounts.bat file created.
  3. <After the new accounts.bat file has been created, go into the file and change the Big Brother account's password>
  4. In Webmin Users page, click on "Run batch" at top right, using the new accounts.bat file.
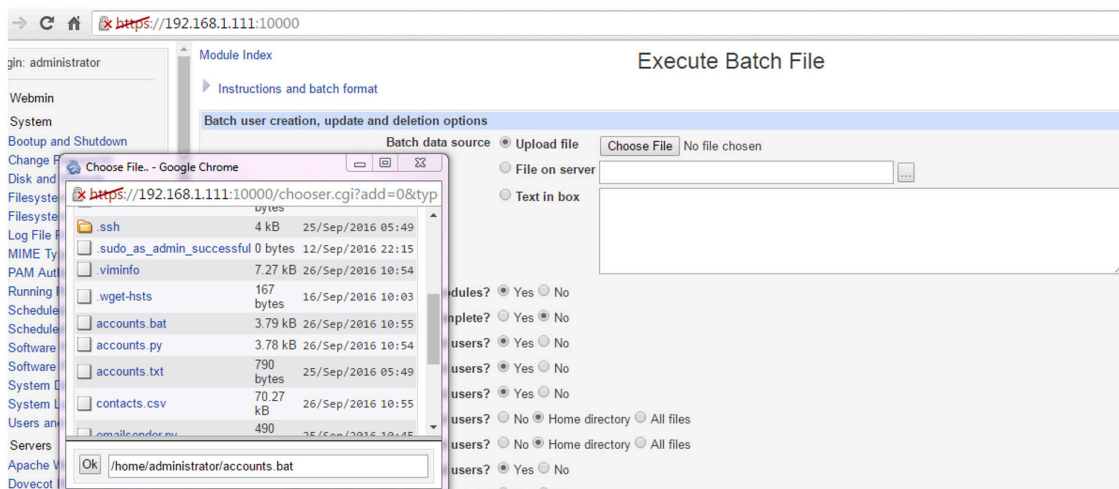
    a. Then "Execute Batch File"—this will create all the user accounts in WEBMIN.
  5. the **webmail_tables.py** code needs to be changed (In line 19—change the time zone (bolded for example) and Language as necessary)
      i. a:10:{s:9:"list_cols";a:8:{i:0;s:7:"threads";i:1;s:4:"date";i:2;s:4:"from";i:3;s:2:"to";i:4;s:7:"subject";i:5;s:6:"status"; i:6;s:4:"flag";i:7;s:10:"attachment";}s:8:"timezone";**s:13:"Europe/Vienna"**;s:11:"date_format";s:5:"d-m-Y";s:9:"date_long";s:9:"d-m-Y   H:i";s:12:"skip_deleted";b:1;s:12:"logout_purge";b:1;s:14:"compose_extwin";i:1;s:14:"draft_autosave";i:60;s:10:"reply_mode";i:1;s:15:"default_charset";s:5:"UTF-8";}
  6. Then, back in the terminal, run the other python script. (>> python webmail_tables.py) — there should be three new csv files created.
  7. Then, in phpMyAdmin, "import" each csv file (users, identities, contacts—in this order) into the respective tables.
    a. Roundcube Preferences (i.e., time zone, start msg at top, etc.) show up in the users.csv file.
    b. Choose "REPLACE table with file"
    c. *When you import users file again, you must import identities and contacts again!*

With this script, player accounts have the same passwords (1234567) as everyone else at first—needs to be changed manually.

- How the Webmail page looks for each account is set within each account—need to create various mail folders and view of columns, etc. manually in EACH account's view. Log in and change for players and role-players.

---

7. To see how to refer to the correct time in the code: log in to an existing account (like bigbrother) in Webmin, go to change preferences, and select the wanted time zone. Then in phpMyAdmin Users table, see how the time zone is referenced. Copy this to the python code.

>>>
Appendix D: Reference Python Codes

(Must be reviewed by local expert and customized before use—USE AT OWN DISCRETION):

"create_accounts.py"

```
with open('players.txt','r') as f:
   hp=f.readlines()

with open('roles.txt','r') as f:
   hr=f.readlines()

h=hp+hr

with open('accounts.bat','w') as f:
   count=1100
   for i in range(len(h)):
      h[i]=h[i].strip().split(',')
      try:
         f.write('create:'+h[i][0]+':1234567:'+str(count)+':100:'+h[i][0]+':/home/'+h[i][0]+':/bin/sh:::::\n')
         count+=1
      except:
         pass
```

"webmail_tables.py"

```
import datetime
today=datetime.date.today()
with open('roleplaying_accounts.txt','r') as f:
        roleplayers=f.readlines()
        roleplayers=[roleplayer.strip() for roleplayer in roleplayers]

with open('roles.txt','r') as f:
        roles=f.readlines()
        roles=[role.strip() for role in roles]

with open('players.txt','r') as f:
        players=f.readlines()
        players=[player.strip() for player in players]

count=1
users=roleplayers+players+roles
with open('users.csv','w') as f:
        for i in range(len(users)):
                f.write('"'+str(count)+'","'+users[i]+'",'+'"localhost","'+str(today)+'","'+str(today)+'",NULL,NULL,"pt_
PT","a:10:{s:9:""list_cols"";a:7:{i:0;s:7:""threads"";i:1;s:4:""date"";i:2;s:4:""from"";i:3;s:2:""to"";i:4;s:7:""subject"";i:5;s:4:""-
flag"";i:6;s:10:""attachment"";}s:8:""timezone"";s:13:""Europe/Vienna"";s:17:""message_threading"";a:3:{s:4:""Sent"";b
:0;s:5:""Trash"";b:0;s:6:""Drafts"";b:0;}s:17:""read_when_deleted"";b:0;s:12:""skip_deleted"";b:1;s:14:""compose_ex-
twin"";i:1;s:10:""reply_mode"";i:1;s:15:""default_charset"";s:5:""UTF-8"";s:12:""preview_pane"";b:1;s:11:""client_
hash"";s:32:""849395b87e221291c099ae6c7f6134cd"";}"\n')
                count+=1
```

```
count=1
with open('identities.csv','w') as f:
        #real identities
        for i in range(len(roleplayers)):
                f.write(str(count)+','+str(i+1)+','+str(today)+',0,1,DO-NOT-USE-THIS-IDENTITY,,do_not_use_this_
identity@xxx.xxx,,,,0\n')
                count+=1
        for i in range(len(players)):
                f.write(str(count)+','+str(i+1+len(roleplayers))+','+str(today)+',0,1,'+players[i]+',,'+players[i]+'@cse.
net,,,,0\n')
                count+=1
        #fictitious identities
        for i in range(len(roleplayers)):
                for j in range(len(roles)):
                        f.write(str(count)+','+str(i+1)+','+str(today)+',0,0,'+roles[j]+',,'+roles[j]+'@cse.net,,,,0\n')
                        count+=1

count=1
with open('contacts.csv','w') as f:
#contacts for roleplayers
        for i in range(len(roleplayers)):
                for j in range(len(players)):
                        f.write(str(count)+','+str(today)+','+'0,'+players[j]+','+players[j]+'@cse.net,'+players[j]+',,"BE-
GIN:VCARD\nVERSION:3.0\nN:'+players[j]+';;;\nFN:'+players[j]+'\nEMAIL;TYPE=INTERNET;TYPE=HOME:'+play-
ers[j]+'@cse.net\nEND:VCARD",'+ players[j]+' '+ players[j]+'@cse.net,'+str(i+1)+'\n')
                        count+=1
#contacts for players
        for i in range(len(players)):
                for k in range(len(players)):
                        if k!=i:
                                f.write(str(count)+','+str(today)+','+'0,'+players[k]+','+players[k]+'@cse.net,'+play-
ers[k]+',,"BEGIN:VCARD\nVERSION:3.0\nN:;'+players[k]+';;;\nFN:'+players[k]+'\nEMAIL;TYPE=INTERNET;-
TYPE=HOME:'+players[k]+'@cse.net\nEND:VCARD",'+ players[k]+' '+ players[k]+'@cse.net,'+str(len(roleplay-
ers)+i+1)+'\n')
                                count+=1
                for j in range(len(roles)):
                        f.write(str(count)+','+str(today)+','+'0,'+roles[j]+','+roles[j]+'@cse.net,'+roles[j]+',,"BEGIN:V-
CARD\nVERSION:3.0\nN:;'+roles[j]+';;;\nFN:'+roles[j]+'\nEMAIL;TYPE=INTERNET;TYPE=HOME:'+roles[j]+'@cse.net\
nEND:VCARD",'+ roles[j]+' '+ roles[j]+'@cse.net,'+str(len(roleplayers)+i+1)+'\n')
                        count+=1
```

"parser0.py"

```python
import mailbox
messages= mailbox.mbox('bigbrother')
players=['<cb_board@cse.net>','<cb_sup@cse.net>','<cb_ops@cse.net>', '<dgs@cse.net>']
ids={}
dialogues=[]
senders=[]
counter=1
Messages={}
for message in messages:
msgnum=counter
date = message['Date'][17:25]
fr = message['From']
to = message['To']
cc = message['CC']
subject = message['Subject']
if message.get_content_type() == 'text/plain':
body = message.get_payload(decode=True)
else:
body=''
msgid = message['Message-ID']
ids[msgid]=msgnum
msgrefs = message['References']
if msgrefs != None:
        msgrefs=msgrefs.replace('\n','')
    Messages[msgnum]=[date,fr,to,cc,subject,body,msgid,msgrefs]
counter+=1
    print('Date: ' + date)
    print('Msg: ' + str(counter))
    print('MsgID: ' + msgid)
    print('From: ' + fr)
    print('To: ' + to)
    print('CC: ' + str(cc) + '\n')
    print('Subject: ' + subject + '\n')
    print(body)
    print('Refs: ' + str(msgrefs) + '\n')
    print('----------------------------' + '\n')
```

Appendix E: Other References on Exercises

EIOPA (European Insurance and Occupational Pensions Authority). Approach and Lessons Learned from EIOPA's First Crisis Walkthrough Exercise, February 2020.

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