The Munich Internet Research Retreat (MIRR)

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ABSTRACT

This article describes the format of an outset series of research retreats and our efforts to improve the outcomes and the participation experience. We believe that our lessons learned are beneficial for organizers of similar events. The Munich Internet Research Retreat (MIRR) is a two-day gathering of Internet researchers from academia and industry locating in Munich, Germany area. The goal is to provide a forum for researchers to exchange ideas, get feedback on their current work, enlarge their professional network, and to foster collaboration between industry and academia. MIRR is organized in a highly interactive style. It consists of six short talks and most of the time is dedicated to poster sessions, group discussions, and breakout sessions. A further important element is the feedback session at the end of the retreat where we collect suggestions for improvement. After the inaugural event in November 2016, MIRR took place for the second time in May 2017. Further successors are planned every six months. Presentations delivered during the seminar are made publicly available online [11].

1. INTRODUCTION

The Munich Internet Research Retreat (MIRR) originated from informal discussions of different research groups at Technische Universität München (TUM) and a team at the Munich branch of NetApp[12] on diverse topics related to networking. In these meetings, PhD students and postdoctoral fellows (post-docs) presented their respective research, including both work in progress as well as polished results. The meetings created an informal setting for intense and rich exchange among participants. We realized that there was notable potential in reaching out further, which eventually led to the instantiation of the MIRR.

The main mission of the MIRR is to ensure mutual awareness of different teams from industry and academia working on current (complementary) topics in networking. Our scope ranges from network measurements, to systems engineering, to security and privacy problems in networks. We want to lay the foundations for establishing, broadening, and deepening cooperation among a variety of groups doing networking research. In order to foster easily sustainable relationships, our initial scope has been deliberately limited to the area around Munich (which may reach as far as 400 km in some cases). As a common denominator, we target like-minded teams within the region, where the common mindset stems from practical research in networked systems, paired with interest and efforts in the Internet Engineering Task Force (IETF), the Internet Research Task Force (IRTF) and the ACM SIGCOMM and SIGMOBILE communities.

The purpose of the MIRR is threefold: 1) We seek to provide recurring opportunities for companies to get in touch with research groups that have expertise in fields relevant to the former. 2) We aim to support researchers in understanding current and emerging research and engineering problems from the commercial development and deployment perspectives. 3) We like to offer reality feedback to academic researchers and out-of-the-box ideas to those from industry. Overall, we hope to foster future bi- or multi-lateral collaboration between academics and industry.

Towards this mission, the 1st MIRR retreat was organized on November 24–25, 2016 at the TUM Science and Study Center in Raitenhaslach, Germany[1]. A 2nd iteration of the MIRR was organized at the same location and held on May 23–24, 2017.

With this editorial we hope to provide useful insight for first-time organizers of similar research retreats, or start discussions with organizers of comparable formats. In section 2, we outline our highly tentative agenda and explain the purposes of the various action points. One quite important action point at the end of the retreat is collecting feedback from our participants. We summarize our insights from this session in section 4 and other lessons that we have learned. Besides focusing on the MIRR format itself, we also provide a rather short overview on the topics that have been discussed at both retreats in section 3.

2. RETREAT FORMAT

The main concern while organizing the retreats is to create an opportunity where researchers of academia and industry

meet each other and discuss about their work. We try to put this goal into practice with the approach described below. Some selected elements were adapted from seminars held in the renowned Leibniz Center for Informatics in Dagstuhl, Germany [9].

1) We hold the MIRR in the TUM Science and Study Center in Raitenhaslach, a former monastery, away from the daily activities of our participants to ensure focus. We also include an overnight stay and a social dinner to foster continued interaction and allow for digesting ideas. 2) The seminar is by invitation only. We put an emphasis on the industry and hand pick PhD students or post-docs with matching topics. This helps with obtaining a compatible and energetic mix of people. 3) We limit the number of participants to $\sim$40 to maintain interactivity and allow all participants to meet one another and create professional contacts. 4) MIRR is organized to provide a maximum of interactive action points on the agenda. Each participant is requested to bring two slides that include his/her photo, some keywords describing ones current research focus, and questions that he/she likes to discuss during the retreat. The slides are used at the beginning of the retreat in a self-introduction session to familiarize participants with another. In the first two iterations of MIRR, we already limited ourselves to about six 20 minutes talks which allows us to dedicate most of the time to more interactive formats like poster or breakout sessions. We furthermore ask all participants to bring a poster. Posters provide variety of topics and introduce the participant's research more profoundly than the short intro slides, and in a more personal and interactive fashion than talks. Furthermore we emphasize discussions both in the plenum as well as in small subgroups (breakout sessions). For breakouts, the plenum first agrees on most relevant topics or questions previously presented by individuals and forms groups with sizes between three to a maximum of six persons. The discussions of the various groups and their most interesting insights are later shared with the plenum in five to ten minutes, improvised talks. For our tentative agenda, see table 1. 5) Because we know that everybody's time is scarce, we organize each retreat in a way that it occupies just two days including arrival and departure. With a target of two workshops per year, presently scheduled for May and November, we shall be able to continuously engage with a growing regional community even if individuals cannot participate on every occasion. 6) As we previously mentioned, organization directions are shaped by the feedback of the participants, keeping the format constantly improving.

3. OVERVIEW ON SELECTED TOPICS

In this section we want to provide a brief overview on the topics that were covered in invited talks, poster, or breakout sessions in the first two MIRRs.

3.1 System Networking and Measurement [Vaibhav]

SDN, reproducibility etc.

Table 1: Tentative MIRR Agenda

Day 1	
10:00	Welcome and self-introduction of participants
12:00	Lunch
13:00	Poster session 1
14:00	Talk session 1
16:00	Poster session 2
17:00	Breakout sessions
18:30	Social dinner

Day 2	
09:00	Reports from breakout sessions
11:00	Talk session 2
13:00	Lunch
14:00	Closing discussion and evolving the retreat
15:00	End

Talks [ref to papers]
Group discussion
There are posters on this topic [ref to tech report and papers]

3.2 IoT, ICN and Edge Computing [Aaron]

One domain covered in MIRR is the intersection of IoT, Information-Centric Networking (ICN) and Edge Computing. There were three invited talks that triggered lively discussions. The invited talks include "Edge Computing considered harmful" by Dirk Kutscher (Huawei), "Open Platforms for Cyber-physical systems" by Christian Prehofer (fortiss), and "Opportunistic Content Dissemination in Dense Network Segments" by Teemu Kärkkäinen (TU Munich).

Inspired by those talks, discussion groups have been formed to review the existing issues, open problems, and research directions. The identified problems include: 1) Limitation of existing protocols such as Constrained Application Protocol (CoAP) that handles poorly the frequent leaving/joining events in the network. 2) The stereotype of "IoT gateway design" has hindered novel design. 3) We still have not yet come up with a suitable Internet architecture that integrates IoT coherently.

There are six open questions highlighted: 1) Where does the network end nowadays? This question couples with the ICN where nodes can contribute to the computation/content along the path. 2) What functions on gateway functions we can remove? 3) How to do naming "translation" without changing name/label? 4) Can we do packet processing while it is passing through queue? 5) How to avoid looping in the network functions? This is a key concern since we need to keep a boundary for resource usage in the network. 6) How to maintain the state on the constrained nodes?

The discussion groups also identified a set of potential research directions: 1) Design of end-to-end naming scheme, to facilitate IoT application composition and bring down the overhead of porting applications for the cloud to "gateways". 2) Semantics for individual sensor and equivalence group. 3) Trade accuracy with replication. 4) A new computation abstract suitable for IoT. 5) Abstract of distributed registry for

network function. 6) Rethink how we distribute computing and content.

Besides invited talks, MIRR also featured several posters on this topic, including “iConfig - What I See is What I Configure", “Fine-Grained Edge Offloading for IoT" [3], “Opportunistic Content Dissemination", “Data Dissemination in Vehicular Networks", “Lightweight Virtualization for Smart Cars" [10], “Car2X Lab", and “Securebox" [7].

3.3 Security and Privacy

Topics around security and privacy form the third thematic pillar of MIRR. Topics spanning the full spectrum from hardware-related, to protocol-specific, to problems of and introduced by cloud computing were covered.

In their talks “Digital Sovereignty in the Post-Snowden Era” and “IoT Security: TrustZone for v8-M” Alexander von Gernler (genua GmbH) and Hannes Tschofenig (ARM) motivated for hardware offering security features implemented in hardware resp. reported on the latest developments in the 8th version of the ARM A- and M-class processors.

Quirin Scheitle (TUM) presented his investigations on “User Tracking Based on TLS Client Certificate Authentication” [16]. He explained that currently devices often transmit their certificates in plain text and demonstrated the impact of this problem on client traceability using the Apple Push Notification service as an example.

In his talk on “Collaborative intrusion handling using the Blackboard-Pattern” [8], Holger Kinkelin (TUM) presented an approach how the individual components of intrusion handling (intrusion detection, alert processing, intrusion response) can be better intertwined using a blackboard as an information broker between components.

Inspired by Hannes Tschofenig’s talk on “IoT Security”, a breakout session was formed covering this topic. The participants collected their concerns about IoT security, in particular collateral damage caused by vulnerable IoT devices in the Internet, and listed challenges with IoT security and options for mitigation. This discussion included, for instance, mandatory firmware updates to close vulnerabilities from remote. This approach however is also problematic, as the update might introduce incompatibilities with running applications or might lead to data leaks harming user privacy.

Another group discussed Blockchains and other types of distributed ledgers as foundation for security and privacy solutions. Based upon a distributed ledger, a trustworthy logging mechanisms could for instance be created that store information from autonomous systems (cars, planes, etc.) for post-mortem analyses in a non-mutable and non-modifiable manner. Another application example includes a ledger-based configuration distribution mechanism for systems of any kind, which could bring clear benefits namely accountability and transparency of configuration.

A the third group we want to highlight discussed on cloud security. Companies own less physical hardware but lease more and more virtual machines or services in the Cloud. Besides amplifying known problems in traditional fields like security, trust, verifiability, and privacy, the cloudification also brings entirely new questions and problems. One example are services that already utilize virtualization, for example, sandboxes that analyze malware. The nesting of virtualization will decrease performance and change visibility of the malware analyzer to the inspected malware.

Besides highlighted talks and group discussions, security and privacy topics were also represented by following posters “Securebox - A Platform for Securing IoT Networks” [6, 7], posters highlighting ongoing research projects like “SafeCloud” [13], “AutoMon” [2], and “Towards an Information Model for Decentralized Anomaly Detection for DecADe” [4] and finally “Research Directions in Internet Architecture and Security” [14, 15, 5].

4. EVOLVING THE RETREAT AND LESSONS LEARNED

The last action point on the MIRR agenda is collecting feedback from our participants. In this section we want to summarize most often suggested ideas for improvement, praise, but also critics from the 2nd MIRR.

The most surprising but also most controversially discussed feedback was that some participants would have liked to have the opportunity to prepare for the retreat in advance. Others responded that they would not have time for this. The preparation supporters especially suggested to collect, publish, and refine topics of breakout sessions several days or a few weeks ahead of the actual event. For this purpose, one participant proposed to use mailing lists or more modern online discussion systems. The just described online interaction might even prove beneficial to “break the ice” between participants, who are (quoting another participant) “typically quite shy IT guys who mostly have not met before”. Furthermore, a leader of the breakout session shall be elected in advance, who quickly presents the topic to the plenum before the breakout session starts. Hence, participants who had no time to prepare for the retreat can still select the group of their choice group easily. Further ideas were to make introduction slides of participants, abstracts of talks and posters available before the event. This step might prove helpful to cherry pick partners for discussions. In our opinion, an approach that allows participants to prepare for the event but does not leave others behind is sound. Hence we will implement preparation in the upcoming 3rd MIRR.

Both, representatives of academia and industry, stated that the participation of industry was too low. This is true for the number of persons (so far the academia to industry split was about 80% to 20%) as well as for active contributions of representatives of companies, i.e. talks or topics for breakout sessions. Participants suggested that short industry talks that describe problems or open questions could be a good starting point for breakout sessions or provide interesting research ideas to the academia.

The by far most often suggested improvement was to increase the amount of interactive and individual elements in the agenda.

Participants liked both poster and breakout sessions with a slight preference towards the breakouts. Some persons even proposed to have two slots for breakout sessions. Participants mostly enjoyed the talks given in the plenum but felt that shorter talks of max. ten minutes would be enough to spark further discussions in smaller groups after the talk. Spending less time for "compulsory" talks might also mitigate a potential weakness of the MIRR format pointed out by a participant: the participant felt that the scope of topics of the retreat was too wide. While we understand the problem, we also see the advantage of getting to know work of other fields of network and Internet research as this can help to break out of ones own "mental filter bubble" and broaden ones overall knowledge. However, the amount of time one spends with (personally experienced) non-relevant content can be decreased when time is shifted from compulsory agenda points to such ones that can be picked by the participant individually. This step is, as we believe, highly important to optimize a participants personal outcomes from and perception of the retreat. Hence, shorter compulsory talks to maximize the amount of individual interaction is another important aim for the upcoming MIRR.

One participant proposed to include talks in tutorial style. While some agreed, other participants pointed out that such talks would again reduce the time available for more interactive action points. This finding led to the proposal of having two parallel tracks for talks.

Further feedback included to increase gender diversity and have changing, random seating arrangements during mealtimes. Even though we think gender diversity is desirable, we also feel that this suggestion is difficult to implement as our quite technical field seems to attract mostly men. Random seating arrangements can help to mixing people but could also backfire when participants feel patronized as the cannot talk to who they want.

5. CONCLUSIONS AND NEXT STEPS

The overall feedback of our participants has shown, that the 2nd Munich Internet Research Retreat that took place at May 23–24, 2017 was quite successful. However, the organizers of the upcoming MIRR will incorporate as much of the feedback of participants as possible to further improve the event. Talks shall be no longer than ten minutes and have the character of lightning talks, i.e. talks about work in progress and open questions instead of polished, already published results. Furthermore, we will prepare agenda and topics of the upcoming MIRR in a more interactive manner before the retreat and include our participants. This step will ensure that all participants will find a suitable breakout session and come preloaded with knowledge.

Most of the presentation material of outlined talks, summaries of breakout sessions, and contact information of presenters are available online [11].

A follow-up retreat will take place in November 2017. Interested readers are encouraged to contact the organizers to learn the exact day, about topics and about the organization. Furthermore we would like to share experiences with organizers of similar events.

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