Five Days Course on
Data protection
from principles to practice

18th to 22nd December, 2017

Discipline of Computer Science & Engineering
Indian Institute of Technology Indore
Indore, Madhya Pradesh, India
http://iiti.ac.in/GIAN/
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Course Overview

In today's knowledge driven societies, data has emerged as an important asset. Protecting this asset is thus exigent. There are a multitude of threats, and the term protection can thus be interpreted in various manner, depending on the context. Because of numerous data breach incidents that are reported in the news on an almost daily basis, data confidentiality comes foremost to one's mind when data protection is discussed. But in addition to confidentiality, it is crucial that data does not get destroyed due to corruption of the data (**integrity**), and it remains **available** at any time and manner in which the data owner may wish to access or share the data with others. The confidentiality, integrity, availability proeprties together are known as the **CIA-triad** of security objectives. There are in fact further desirable security objectives, such as authenticity, utility, and so on.

The proposed course focuses on distributed storage systems – and specifically how redundancy is managed in such systems to achieve fault tolerance and availability (and at the same time, deal with issues such as consistency). Specifically, this course delves into the technological aspects of modern distributed storage systems of varied granularity, from single appliance RAID systems, to data centers that form the back-end of cloud computing, to multi-cloud and edge computing environments – encompassing varied degrees of logical, administrative and geographic distribution of data, and looks at techniques that help achieve data availability and integrity.

Specifically, this course will (i) introduce the mathematical foudnations for coding theory, (ii) provide concrete example instances of algorithms, maximum distance separable erasure codes, network codes, local reconstruction codes, proof of data possession/retrievability, and (iii) showcase usage of these primitives in example systems – some proposed as part of academic research, others proposed and deployed by industry players such as Linux RAID, Microsoft, Facebook, etc.

Course Content

♦ Introduction & mathematical foundations
♦ Introduction to basic concepts and an overview of the course
♦ Introductory number theory
♦ Coding theory
♦ Traditional erasure /error correcting codes
♦ Codes tailor made for distributed storage systems
♦ Codes for storage systems
♦ Cloud scale storage systems
♦ Real world distributed storage systems (including those based on replication)

Who can attend?

♦ The course will be self-contained, starting from very basics, leading to advanced topics. Nevertheless, anyone comfortable with mathematical concepts, and algorithmic abstractions will best benefit from the course.

♦ Executives, engineers and researchers from service and government organizations including R&D laboratories.

♦ Student at all levels (BTech/MSc/MTech/PhD) or Faculty from reputed academic institutions and technical institutions.

Examination and Certificate

An examination will be conducted at the end of the course and grade sheets as well as participation certificate will be give to all the participants.

Teaching Faculty

Prof. Anwitaman Datta obtained his PhD from EPFL, Lausanne (Switzerland) and he is currently a tenured Associate Professor in the School of Computer Engineering at Nanyang Technological University (NTU) Singapore where he leads the Self-* Aspects of Networked & Distributed Systems (SANDS) research group. He is also a co-founder of Qiv Storage Pte Ltd (Singapore), a start-up developing resilient software defined storage appliances based on novel patented erasure codes.

Anwitaman's research interests span the topics of large-scale resilient distributed systems, information security and applications of data analytics. Some of his distinctive and pioneering research contributions in recent years include (i) the application of machine learning and stereotyping to computational trust, (ii) decentralized online social networks for privacy and censorship resistance, (iii) self-repairing (locally repairable) erasure codes for distributed storage systems. He has also made significant contributions to several other well established research topics, including cloud security, data center and NoSQL data stores, collaborative systems, social network analysis and decision support applications such as team recommendation, word sense disambiguation, entity and event identification. His research (130+ publications, 4000+ cites as per Google scholar) has been recognised internationally - both at academic platforms (best paper awards at ICDCS 2007, ICDCN 2011/2014) and by the industry (HP Labs Innovation Research Program (IRP) Award 2008). He has secured multiple competitive research grants and led several Singaporean as well as international collaborative (with Eurecom, TU Darmstadt, PJIIT Warsaw) research projects. He has also been regularly invited to deliver graduate level mini-courses and seminars at different universities, for example, at Tokyo Denki University, KTH Stockholm, Technion Israel, University of Warsaw, Poland, and conducted several tutorials on special topics at conferences such as SASO, ICDCN, etc.

Course Coordinator

Dr. Somnath Dey received his B.Tech. degree in information technology from the University of Kalyani, in 2004, and the M.S. (by research) degree in information technology from the School of Information Technology, Indian Institute of Technology, Kharagpur, in 2008. He has completed his Ph.D degree from Indian Institute of Technology Kharagpur in 2013. Presently, he is currently an Assistant Professor in the Discipline of Computer Science & engineering, Indian Institute of Technology, Indore. His research interest includes Computer Security, Biometric Security, Image processing and Pattern recognition. He has published more than 25 articles in refereed journals and conferences. He has received best paper award for his research work in different reputed international conferences. He has also received Young IT Professional Award from CSI India.

Registration Fee

Students (UG & PG)	: Rs. 2,500
Research Scholars	: Rs. 3,500
Faculty members	: Rs. 5,000
Industry and others	: Rs. 10,000
Foreigners (any positions)	: USD 250

Important Dates

Last date for Registration : December 5, 2017
Course schedule : December 18 - 22, 2017

Travel Information

Indore located in Central part of India in Madhya Pradesh State. It will well-connected by rail, road and air. The nearest railway station is Indore Junction and the nearest Airport is Devi Ahilyabai Holkar Airport. For queries regarding travel information, please contact the course coordinator.

Accommodation

Paid accommodation will be provided to participants on first -come-first-serve basis. Course fee includes course material, tutorial sheets, lecture handouts, lunch and tea during course days

Contact Details

For any information regarding eligibility, fee payment, travel information, accommodation, etc., please contact the course coordinator via email or phone.

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